Cherl-Ho Lee

Korean Food and Foodways

The Root of Health Functional Food

Springer

Korean Food and Foodways

Cherl-Ho Lee

Korean Food and Foodways

The Root of Health Functional Food

Springer

Cherl-Ho Lee
Korea University
Seoul, Korea (Republic of)

Translated by
Diana Hinds Evans

ISBN 978-981-19-0022-8 ISBN 978-981-19-0023-5 (eBook)
https://doi.org/10.1007/978-981-19-0023-5

This Springer imprint is published by the registered company Springer Nature Singapore Pte Ltd.
The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

Preface

The average life expectancy for women and men in Korea currently stands at 83 years, ranked 11th highest in the world. Each year life expectancy continues to rise, and *The Lancet* (Kontis et al. 2017) has predicted that by the year 2030 Koreans will jump to the #1 position. This may be due in large part to the traditional healthcare concept that specific physical constitutions respond positively to diets tailored to their needs.

This book represents the first attempt in English to take an in-depth look at the prehistoric roots of Korean food culture and its development within the framework of influential environmental and sociohistorical factors. While most book-length publications on Korean foodways in English are cookbooks, with the exception of Michael Pettid's brief historical survey, *Korean Cuisine*, this book analyzes in detail the origins, history, positive health effects, and macrobiotic implications of Korean food culture. Some of the main food types discussed include *jjigae* (stew), kimchi, fermented soybean products, land and sea vegetables, and alcoholic and non-alcoholic tonics. The traditional Korean diet has been promoted as medicine for healthy longevity for centuries and is experiencing a resurgence today.

Chapters 1 and 2 examine the culinary prehistory of the Han Korean peoples through an archeological lens in order to uncover the source of their staple foods and early food processing techniques. The nutritional anthropological significance of the development of Primitive Pottery culture along the banks of the Korea Strait connects the food culture of the regionally dominant Dongyi tribes to early state formation (circa 3000 BCE). The data in these chapters derive from two of my previous publications, *Foodways of Paleolithic Peoples in Northeast Asia and the Korean Peninsula* and *The Primitive Pottery Age of Northeast Asia and its Importance in Korean Food History*. This research was made possible by new archeological finds that became available after country-wide excavations began in the 1960s. In addition, research conducted by Dr. Sin Suk-Jeong of Yonsei University on ancient earthenware was particularly helpful in shedding light on the origin of Korean foodways. More recent archeological digs in Korea and China have unearthed substantive evidence of the Dongyi tribes of northern Korea and northeastern China, as well as the ensuing Gojoseon civilization. Chapters 3 and 4 of this book, "The Onset of Agriculture and Northeast Asian Neolithic Farm Culture" and "Food Culture of the Han Korean Ethnic Group During Northeast Asian State Formation," widely reference these archeological findings.

Chapters 5 through 9 present the historical background and manufacturing techniques for Korea's major traditional food types, synthesizing a 1985 Korea University film project on Korean food culture I directed. Six films were produced over the span of 15 years, each based on a year-long historical investigation and literature review for each topic, the results of which were also published in academic journals. The films comprise the following documentaries: (1) Traditional Korean sweets (*hangwa*), (2) Rice cakes (*tteok*), (3) Non-alcoholic beverages (*eumcheongnyu*), (4) Korean rice wines (*hanguk ui sul*), (5) Kimchi, and (6) Fermented soybean products (*jangnyu*). The planning committee included Yu Tae-Jong, Kim Sang-Sun, Jang Ji-Hyeon, Hong Il-Sik, Hwang Hye-Seong, Kang In-Hui, Sin Hyo-Seon, Won U-Hyeon, Jeong Jae-Ho, Kim Heung-Gyu, Lee Gwi-Ju, and Im Beon-Sam. The journal articles published as part of this project are "A literature review of traditional Korean sweets" (Lee Cherl-Ho and Maeng Young-Sun 1987); "A literature review of Korean rice cakes" (Lee Cherl-Ho and Maeng Young-Sun 1987); "A literature review of traditional Korean non-alcoholic beverages" (Lee Cherl-Ho and Kim Sun-Young 1991); "Types of Korean rice wines and their manufacture as found in classic texts" (Lee Cherl-Ho and Kim Ki-Myeong 1993); "A literature review of kimchi, Korean fermented vegetables" (Lee Cherl-Ho and An Bo-Sun 1995); and "A literature review of Korean fermented soybean products" (Lee Cherl-Ho and Kim Jun-Cheol 1998).

Chapter 10, "The Development of Eastern Medicine (Donguihak) and the Traditional Korean Diet," outlines the historical progress of traditional Korean methods of health prevention. The practice of seeking body-specific diets is largely based on the concept of *siguidongwon*, or "food is medicine." The distinctive macrobiotic characteristics of this practice are informed by the evolution and application of Eastern medicinal philosophy. From 1990 to 1991, Korea University ran a program sponsored by the United Nations Industrial Development Organization (UNIDO) called "International Course for Food Fermentation Technology," in which eight food scientists from Southeast Asia and Africa spent ten months in South Korea learning about Korean food culture and fermentation techniques. Lee Myung-Bok of Seoul National University Medical School and a number of other professors lectured on Korean dietary culture. The numerous sources gathered and researched for this event form the bulk of information provided in Chap. 10.

Chapter 11, "Changes in the Food and Nutritional Status of Koreans over the Last Century," comprises the results of research conducted with Dr. Ju Yong-Jae's team at the Korea Rural Economic Institute (KREI), as well as recent research by the Korea Food Security Research Foundation (KFSRF). Chapter 12, "Harmony of Eastern and Western Food Culture in the Twenty-First Century," is built on a lecture entitled "Harmonization of Eastern and Western Health Knowledge: Nutrigenomics and Sasang Typology," given by this author at the 2006 Annual Meeting of the Japanese Society for Food Science and Technology. Overall, *Korean Food and*

Foodways reveals how Korea's nearly 10,000 -year-old dietary history, which began in the Primitive Pottery era, developed over time and anticipates how Korean food culture will contribute to global society in the twenty-first century.

This book was made possible through the efforts and cooperation of many people. I extend my sincere gratitude to the above-mentioned researchers for their scholarly contributions. I would also like to thank my second daughter, Professor Lee Moonsil of the Rhode Island College History Department, and Professor Lee Gyeong-Ae of the University of Oregon, Department of Archeology, for contributing recent archeological research from Korea and abroad. This book is slated to be published in Korean and English, and I would like to thank Diana Evans, an alumna of the East Asian Languages and Civilizations Department of Harvard University graduate school, for her translation and the Korean Food Security Research Foundation board members for underwriting the translation project. I am grateful to Ms. Kim Mi-Gyeong at KFSRF for all her efforts organizing and editing the original manuscript. Sincere thanks as well to Ms. Shruthi Radhakrishnan, the editor, Ms. Camilya Anitta, the Project Manager, and Ms. Emmy Lee and the staff members at Korea Springer Nature for their work in publishing this book. Finally, my heartfelt gratitude goes to Professor Ro Seung-Ok, who has stood by my side as a partner, never sparing in hard work or cooperation.

Seoul, Republic of Korea Cherl-Ho Lee
August 2021

Translator's Note

Translating a book that details the health benefits of Korean foodways from the beginning of tribal life to today has presented exciting challenges for me, an erstwhile student of modern Korean literature. In the first few chapters, needing to pinpoint the terminology for specific Paleolithic and Neolithic tools, I visited several Korean and American natural history museums and archaeological digs online, where I compared images in Korean and English to discover translations for Korean choppers, points, and cores, microliths, hand axes, and grinding stones. Wild plants gathered by prehistoric peoples also required some sleuthing to match specific Korean terms with English translations, such as grains like barnyard grass, broom-corn millet, and foxtail millet. General Korean-English dictionaries are not precise enough to yield reliable translations for species names. On rare occasions no English equivalent could be found, only a Latin scientific name, in which case I either used that or offered an explanation along with the transliterated Korean word.

A number of traditional food types are detailed in Chapters 5-9 and a host of recipes from historical cookbooks are quoted verbatim, including archaic home cooking methods. Recipes for all manner of rice cakes inspired me to visit a *tteok* specialty shop near my home in Koreatown in Annandale, Virginia, to inquire about the texture and shaping of rice cakes with which I was unfamiliar. I also took time to educate my teetotaling self on how rice wine and distilled spirits are made. Descriptions of traditional beverages and tables listing drinks that appear in Joseon dynasty records had me pondering whether to translate or merely transliterate the name of each drink. For example, *baekhwacha* could be left as is (transliterated), or presented as a combination word, as in "baekhwa tea," or could be fully translated, as in "one hundred flowers tea." I opted for full translation because the names are delightfully evocative of times, seasons, or ingredients. I also retained the transliteration, particularly for the benefit of readers familiar with the Korean language.

The traditional Korean medical practice of preventing disease by eating a healthy diet and engaging in meditation and breathwork, as described in Chapter 10, resonates with me and many other health-conscious people in the world today. But the centuries-old Daoist elixirs used to achieve long life, or even supposed immortality, had me researching Daoism to understand the English words typically used in that practice. Efforts to effect alchemical changes in the body, while valiant, were often tragically toxic, as in premodern Western medicinal practices. It took further research on my part into the theories of yin-yang and the Five Phases to introduce in English the basis for Sasang Constitutional Medicine, a forward-looking, diet-based Korean practice optimized for individual health. Overall, the process of translating this book, with its broad scope of human history on the Korean Peninsula, coupled with the minutiae of localized recipes, such as 3 pig-days rice wine, has tested and strengthened my knowledge of jargon from various fields of Korean tradition.

A bit of housekeeping to explain my decisions on specific questions of translation: Since Korean names customarily begin with the surname, followed by the given name, I present Korean names in this book surname first, with no comma following. Per the author's preference, I standardized the style of given names with a hyphen between the two syllables, except in cases where a historical spelling is commonly accepted or a modern spelling is known. In inline text references Korean given names are included to avoid confusion, since more than one author typically carries the surname Lee or Kim, for example. Although scholarly works on Korean topics authored by Westerners typically employ the McCune-Reischauer (M-R) system of Romanization, this book employs the system created and advocated by the National Institute of Korean Language, which is used in Korea. Exceptions may be found in the lists of references where a previously published title uses M-R Romanization. Chinese Romanization follows the pinyin system, sans diacritical marks. Finally, English translations of classic Korean or Chinese titles follow standard scholarly usage where there is a clear standard; where several English translations of a given book title exist, I either choose one that I feel best reflects the original or draft one of my own.

I am deeply grateful to Dr. Lee Cherl-Ho for granting me the opportunity to translate this book and for his patience with me as I divided my time between translating and raising my three wonderful children. I would also like to thank my husband for his consistent encouragement and all the time he sacrificed to help facilitate my work.

Springfield, VA Diana Hinds Evans

Contents

About the Author

Cherl-Ho Lee has been teaching Food Engineering and Food Preservation at Korea University since 1979. He graduated from Korea University, Department of Agricultural Chemistry, and served for Korean Army as a ROTC artillery officer (1967–1969). He received his Ph.D. at the Royal Veterinary and Agricultural University of Denmark (1975) and was postdoctorate research associate at MIT, Cambridge, USA (1975–1979). He was project coordinator of Fish Fermentation Technology Network of United Nations University (1985–1987) and project director of Industrialization of Lactic Acid Fermentation Technology of Cereals and Its Dissemination to the Developing Countries for UNIDO (1987–1992), and conducted the International Course for Food Fermentation Technology at Korea University (1991–1992). He was the producer of Korean Dietary Culture Films (Korean sweets, Rice cake, Non-alcoholic beverages, Alcoholic drinks, Kimchi and Soybean sauce) (1985–1998). He chaired the ICGFI Workshop on Harmonization of procedures and regulations on food irradiation for Asia and Pacific held in Seoul (1998). He was the Secretary General of the 11th IUFoST World Congress of Food Science and Technology which was held in Seoul 2001. He cochaired the KCIST-2006 on Nutrigenomics held in Muju and chaired the 15th Session of FAO/WHO Codex Coordinating Committee for Asia held in Seoul in 2006. He was the President of Korean Society for Food Engineering in 2003–2004, the President of Korean Society of Microbiology and Biotechnology and the President of Korean Federation of Microbiology Societies in 2005, the President of Korean Society of Food Science and Technology and the President of Federation of Korean Food Related Societies in 2007. He was the President of ILSI Korea in 2004–2010. Professor Lee has been a member of Korean Academy of Science and Technology since 1999, and member of International Academy of Food Science and Technology since 2003. He was selected as a Fellow of the Institute of Food Technologists, USA, in 2010. He was awarded the Order of Civil Merit, Seongnyu Medal (1998) and the Order of Service Medal, Red Stripe (2009) from the Republic of Korea. After his retirement from Korea University in 2010, he established Korea Food Security Research Foundation and served as the chairman of the Foundation until 2020. He published over 250 research papers and 30 books in Food Science and Technology and Food Security.

Chapter 1
Northeast Asian Dietary Environment in the Paleolithic Era

Abstract The dietary environment of the prehistoric inhabitants of the Korean Peninsula and South Manchurian regions informed the food culture of Korea's ancestors and provides a starting point for tracing the development of Korean food culture. By comparing Korean food culture with the dietary practices of neighboring China and Japan, this study will provide data that shine a light on the distinctive characteristics of Korean foodways. The Paleolithic era chronology and climate, the topography, and environment of the region were investigated in this chapter. The studies on the archeological finding of the Paleolithic remains and the industry and diet of Northeastern Asian Paleolithic peoples were reviewed.

North and South Koreans began investigative research into Paleolithic artifacts on the Korean Peninsula in the 1960s. This was relatively late compared to European efforts, which began about 100 years previous, and neighboring Russia, China, and Japan, each of which began in the early 1900s. Thus, for a long time, the specific history of Paleolithic peoples on the Korean Peninsula was disregarded, treated only generally as part of the cultural area of Northeast Asia. With the advent of modern Korean research, distinctions began to be made between previous results of Chinese and Japanese research and more recent North and South Korean findings. The great strides made in Korean excavation and research have led to discoveries that reposition prehistoric peninsular people within the greater context of Northeast Asia. The narrative emerging from these studies indicates that the Paleolithic peoples who lived on the Korean Peninsula and in southern Manchuria, borderlands, and maritime areas are all linked to the formation of the Dongyi (Eastern Archer) tribes.

The dietary environment of the prehistoric inhabitants of these lands informed the food culture of Korea's ancestors and provides a starting point for tracing the development of Korean food preparation techniques. By comparing Korean food culture with the dietary practices of neighboring China and Japan, this study will provide data that shine a light on the distinctive characteristics of Korean foodways.

C.-H. Lee, *Korean Food and Foodways*,
https://doi.org/10.1007/978-981-19-0023-5_1

1.1 Paleolithic Era Chronology and Climate

Prehistoric human cultures are broadly divided according to the materials used for tool making: Stone Age, Bronze Age, and Iron Age. Geologically, the Stone Age is divided into the Paleolithic era, which pertains to the Pleistocene epoch, and the Neolithic era, which pertains to the Holocene epoch. During these timeframes significant differences can be found in cultures around the world: for example, while China, South Asia, and the Near East have a comparatively long cultural history of settled life, people in the Americas and Africa continued to live more nomadic lifestyles.

The first humans discovered on the earth appeared in Africa over three million years ago, and Paleolithic cultures have been found in the Near East, China and Northeast Asia, India, and Europe. The Paleolithic era is divided into the Lower Paleolithic (about 3,000,000–300,000 YBP [Years Before Present]), the Middle Paleolithic (300,000–40,000 YBP), and the Upper Paleolithic (40,000–10,000 YBP). The stages of human development during the Lower Paleolithic are thought to proceed from *Australopithecus* to *Homo erectus*. The brain volume of these early hominins is estimated to have reached about 900–1100 mL. In the Middle Paleolithic, *Homo neanderthalensis* used tools made of chipped stone, and their brain volume developed to the size of 1100–1500 mL, approaching the perceptivity level of modern humans. During the Upper Paleolithic *Homo sapiens sapiens* first appeared; they made tools using sharp chipped stone and animal bones. The first known human petroglyphs, found in caves, date from this period (Diamond 1993).

In Europe and Africa, the considerably long period of hunter-gatherer culture following the Upper Paleolithic era is called the Mesolithic period, in order to distinguish it from the Neolithic era of agriculture. This classification emphasizes the period in which nomadic hunter-gatherers continued to rely on wild game and foraged food while living a partially settled lifestyle. Littoral (coastal) foragers of the Primitive Pottery culture on the Korean Peninsula (8000–3000 BCE) belong to this period.

At the dawn of the Neolithic era (10,000–3000 BCE) people began to build and inhabit settlements, engage in farming and domestication of animals, and make polished stone tools and pottery. The Paleolithic era saw huge changes in climate. Severe cold repeatedly swept over the land during glacial periods, punctuated by interglacial warming. By analyzing the geological strata of the Alps and China, geologists have concluded that four Ice Ages occurred around the world. Glacial periods in the Alps are known as Günz, Mindel, Riss, and Würm, and corresponding glaciations in China are referred to as Poyang, Dagu, Lushan, and Dali (Han 1983a). Interglacial periods existed between each of these. We currently live in an interglacial period following the Würm glaciation, thus, historically speaking, our era is comparatively warm.

During the four glacial periods of the Pleistocene epoch, sea level fell, and a new shoreline was exposed along the west coast of the Korean Peninsula. The East Sea is thought to have been a large lake during this time (Barnes 1993).

1.2 Paleolithic Sites of the Korean Peninsula and Northeast Asia

1.2.1 Lower Paleolithic Sites

Figure 1.1 shows the Pleistocene glacial divisions and prehistoric sites in Northeast Asia (Lee 1998a, 2017). The first human remains in northern China and on the Korean Peninsula have been confirmed at Lower Paleolithic sites from the early and middle stages of the Pleistocene epoch (about two million-300,000 YBP). Remains of *Homo erectus* (1.8 million-650,000 YBP) have been discovered in northern China at the Xihoudu, Lantian, and Zhoukoudian sites; in Manchuria at the Jinniushan cave site on the Liaodong Peninsula; and on the Korean Peninsula at the Danyang Geumgul site, North Chungcheong Province (Choi 1983). In Gongju, South Chungcheong Province, the Seokjang-ri site, which formed 700,000–650,000 years ago, during the first interglacial period, about 240 flint knapped stone tools, including primitive hand axes, cleavers, and choppers, were unearthed (Sohn 1972). Characteristics of this site include a hot, dry climate and a proliferation of animals such as horse, elephant, and stegodon (Sohn 1978).

Fossils of early humans, *Homo sapiens*, were found in Zhoukoudian, a cave in the Beijing area, along with the remains of about 40 Peking men and women, thousands of animal fossils, a large amount of stone implements, and traces of fire usage from 600,000–400,000 YBP (Barnes 1993). Early human skulls and jawbones have also been discovered in the vicinity of Pyongyang on the Korean Peninsula, in Sangwon Cave (400,000 BCE) and Yeokpo Cave (500,000 BCE) (Jin et al. 1986). These sites are thought to be similar to those of the Soanian culture found on the Indian subcontinent and China's Zhoukoudian and Anhe cultures. At the Geomun Moru Cave site near Pyongyang, animal fossils from 7 orders, 16 families, and 29 species have been discovered, including those of boar, deer, cattle, horse, rhinoceros, elephant, badger, bear, tiger, rabbit, rat, and monkey. Among these, 61.1% are now extinct (Park 1983).

1.2.2 Middle Paleolithic Sites

Middle Paleolithic (300,000–40,000 YBP) sites discovered on the Korean Peninsula include the Seungrisan cave site in Deokcheon-gun, South Pyongan Province; the Jeommal cave site in Jewon-gun and the Durubong cave site in Cheongwon-gun, both North Chungcheong Province; and the Jeongok-ri site in Yeoncheon-gun, Gyeonggi Province. The stone implements and animal fossils excavated from these Middle Paleolithic sites are judged to be similar to artifacts of the same period found in North China. For example, the Jeongok-ri site in Korea is similar to the Dingcun site in Shanxi Province, and the stone tools and fauna found in the seventh and eighth stratigraphic layers at the Seokjang-ri site, as well as those found at

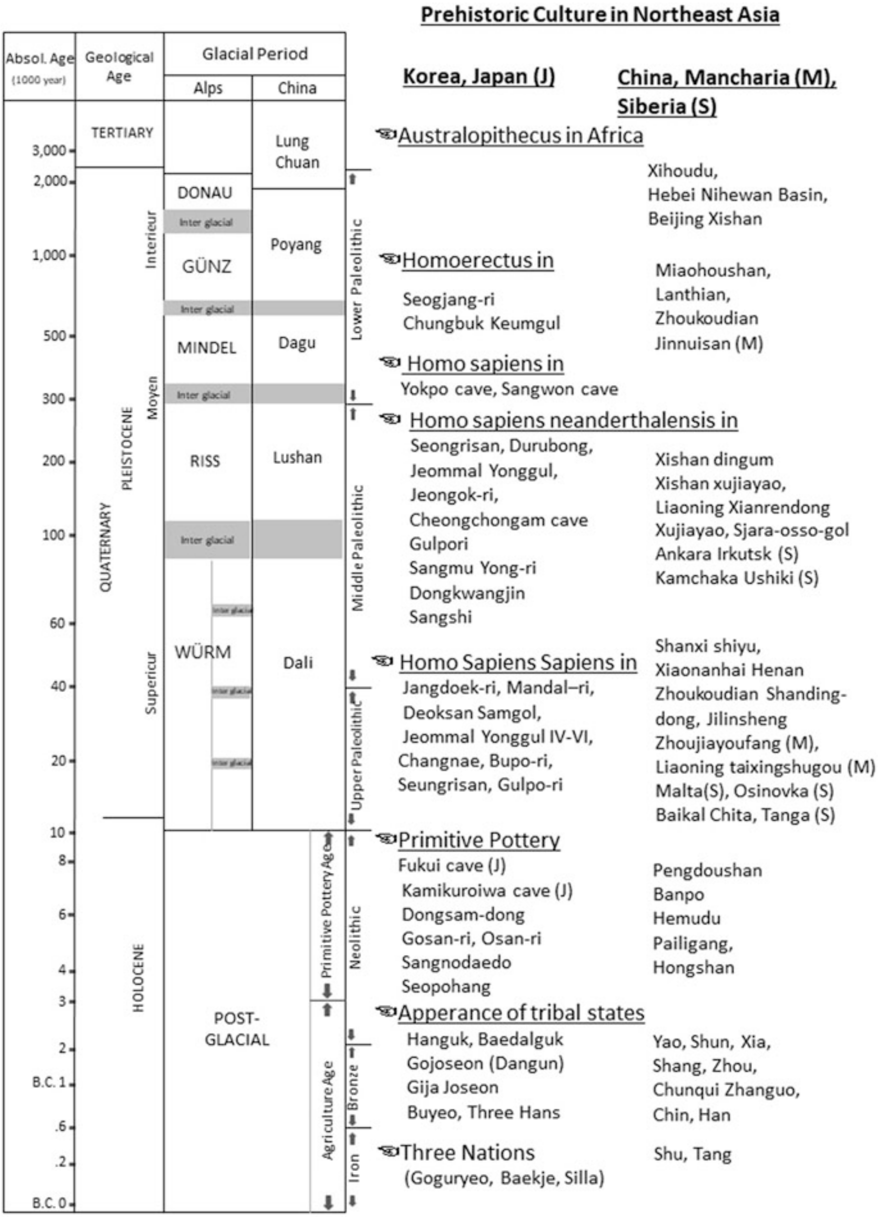


Fig. 1.1 Pleistocene Glacial Divisions, Chronology, and Prehistoric Sites in Northeast Asia

Cheongcheong-am cave, Gulpo-ri 1, and Sangmuryong-ri, are comparable to those found at the Xujiayao site in Shanxi Province (Bae 1992). At the Jeommal cave site, fossils of charcoal, tree fruits, tree leaves, and pollen were excavated, along with

7 orders, 12 families, and 20 species of fauna, including frogs, toads, deer, roe deer, horses, badgers, hyenas, leopards, and rats. The largest quantity of animal remains belongs to the deer family. Thirty-five percent of these fauna species are now extinct. Pollen and spores from hundreds of plants were also discovered at the Jeommal cave site, including those from trees such as spreading yew, needle fir, Korean red pine, sawtooth oak, and Korean chestnut. At the Durubong site, 15 orders, 28 families, and 46 species of animal remains were found, the greatest percentage of which, again, pertains to members of the deer family, including large sika deer. Also detected at this site were 343 kinds of pollen and wood charcoal remains from fir trees, Korean red pine, rice plants, lilies, sawtooth oak, maple trees, figwort, and chrysanthemums, with 10 orders and 13 families confirmed. Azalea remains were found at the mouth of the cave (Bae 1992; Lee 1998a).

The third interglacial period began about 130,000 YBP and lasted until about 70,000 YBP; this period is known to have been hot and humid, and it is surmised that sea level rose 10–20 meters higher than present levels. This period's Paleolithic sites include Seokjang-ri's seventh and eighth stratigraphic layers, the Cheongcheong-am cave site in Sangwon-gun, South Pyongan Province; the Gulpo-ri 1 site in Unggi-gun, North Hamgyong Province; and the Sangmuryong-ri site, in the upper Han River region. At the Cheongcheong-am cave site, fossils of boar, deer, roe deer, mountain goat, brown bear, and Korean hare were excavated.

Early Paleolithic sites in Siberia, such as those discovered near Irkutsk in the region of the Angara River and the Ushiki sites found on the Kamchatka Peninsula, are interglacial sites dating from 130,000–70,000 YBP that share many similarities with the Gulpo-ri site on the Korean Peninsula.

The first subcycle of the fourth glaciation, that is, the interglacial period between Würm I and II, 70,000–40,000 YBP, followed a long, cold glaciation and was comparatively short. Prehistoric sites during this period include the Donggwangjin site in Jongseong-gun, North Hamgyeong Province; Haesang cave in Pyeongsan-gun, Hwanghae Province; the Sangsi Bawi-geuneul site in Danyang-gun, North Chungcheong Province; and Billemot cave in Bukjeju-gun, Jeju Island. Neanderthal cranial bone fragments, teeth, shoulder blades, and leg bones were unearthed at Sangsi Bawi-geuneul. Fauna discovered at the Donggwanjin site comprise 6 orders and 17 species, including deer, roe deer, buffalo, wild sheep, horses, hyenas, woolly mammoths, hares, squirrels, and moles. The species extinction rate at this site stands at 33%. At Haesang cave, mostly animal bones and fossils have been recovered, and while one species from this site has become extinct, the cave bear (comprising 8.3% of the fauna found here) and the rest of the species found at this site are extant. Animal fossils confirmed at Jeju Island's Billemot cave include the bones of horses, deer, roe deer, and brown bear, the discovery of which indicates that during the glacial period, sea levels dropped, and animals were able to cross overland to Jeju Island (Lee 1998a).

1.2.3 Upper Paleolithic Sites

The end of the fourth glaciation period marks the Upper Paleolithic Era (40,000–10,000 YBP) and consists of repeated cooling and warming within relatively short periods of time, including Würm II, interglaciation between Würm II and III, and Würm III and IV. Numerous prehistoric sites from this period in Korea, southern Manchuria, China, and the Japanese Archipelago (see Fig. 1.1, above) indicate that during the Upper Paleolithic many people lived in these areas, migrating with the climate change (Lee 1996).

Upper Paleolithic sites discovered on the Korean Peninsula include layers IV-VI at the Jeommal cave site; the Jangdoek-ri site in Hwadae-gun, Hamgyeong Province; the Bupo-ri Deoksan site and Gulpo-ri sites in Unggi-gun, North Hamgyong Province; Seokjang-ri District 1, dwelling site 1 in Gongju-gun, North Chungcheong Province; the Seungrisan upper cave site in Deokcheon-gun, South Pyongan Province; the Saemgol site in Cheongwon-gun, North Chungcheong Province; the Mandalli site in Pyongyang; and the Changnae site in Jewon-gun, North Chungcheong Province. Fossils of *Homo sapiens sapiens* have been found at Jeommal cave, Seungrisan cave, and the Mandalli and Seokjang-ri dwelling sites (Sohn 1983; Lee 1998a).

Animal fossils found at the Jeommal cave site include frogs, deer, roe deer, bison, horses, bears, foxes, raccoons, leopards, tigers, lions, hares, rats, and monkeys, for a total of 9 orders and 45 species of fauna. Also, 21 species of tree pollen, 4 species of grass pollen, 10 species of charcoaled trees, and two species of seeds/fruits were collected at this site. The seed and fruit analyses revealed plant members of the rice family (*Gramineae*), pulse family (*Leguminosae*), and lily family. Many edible species of flora were discovered as well, including gingko, yew, pine, sawtooth oak, chestnut, cherry, and chrysanthemum greens. In the flat peat deposit layer at Bbeolleup cave in Jangdeok-ri, 5 classes of pollen and 17 families of rice, along with soybeans and bracken, were exhumed. At the Seokjang-ri site, the following flower pollens were excavated: clubmoss, Asian royal fern, Korean red pine, Asian flatsedge, lily, Asian white birch, pygmy water lily, Kobus magnolia, and ash tree, among others (Park 1983; Lee 1998a).

Beyond these sites, many Paleolithic remains have been found by excavating the tombs under dolmens in various places, including those at the Changnae and Suyanggae sites (Lee 1989; Park 1989); the Cheongwon Saem cave site (Lee 1983); the Jeonnam Geumpyeong site in Seungju-gun, South Jeolla Province; the Gokcheon site; and the Daejeon site in Hwasun-gun (Choi 1992).

1.3 Topography and Environment of the Korean Peninsula and Northeast Asia

1.3.1 Characteristics of Northeast Asian Topography

In the mid-twentieth century, the ancient formation of a huge area of flexure was discovered during a geological survey of Northeast Asia (Needham 1954). Flexure can occur when volcanic activity creates folds in the earth that repeatedly rise and fall, like waves. Fig. 1.2 provides a map of this area's topography and flexure formation.

The Japanese Archipelago, including the Okinawa Islands, is connected to Taiwan by an upward fold in the earth, adjacent to which a depression runs from the Taiwan Strait to the Korea Strait. The next up flexure encompasses China's eastern coast, moving north from Guangdong Province near Hong Kong to Fujian and Zhejiang Provinces, all the way to Shanghai, connecting to Korea's Jeju Island and the Jiri Mountains in Southwest Korea. It continues along the Korean Peninsula's Baekdudaegan, a mountain ridge running from the Jiri Mountains in the south

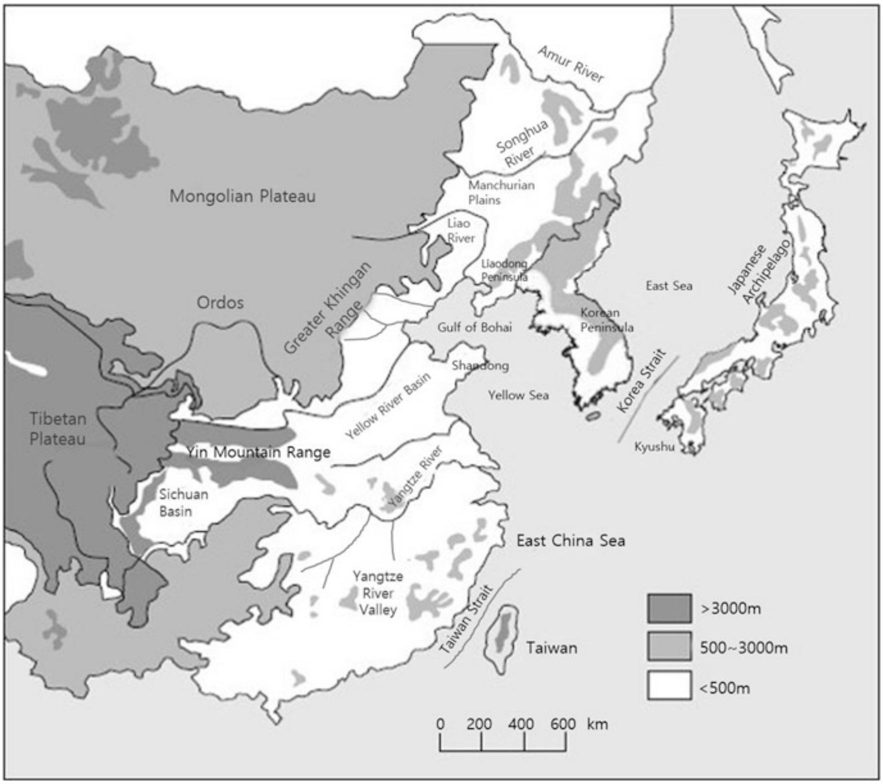


Fig. 1.2 Northeast Asian Topography and Place Names

to the Beakdu Mountains on the northern border of North Korea with China, then connects with the Sikhote-Alin Mountains in Maritime Territory (Primorsky Krai), Siberia, ending in a great basin. Meanwhile, southwest of the Baekdu Mountains, another up flexure passes through the Changbai Mountains and Liaodong Peninsula to the Gulf of Bohai and extends across the sea to Shandong Peninsula's mountain complex.

To the west of this "ㅈ"-shaped rise in the land, the vast Central China Plain unfolds, where the Yellow River and Yangtze River fan out into alluvial lowlands. This extensive plain reaches north to the Greater Khingan Range, which divides Manchuria from Mongolia, and west to the Yin Mountains, which form a border between the plain and the Gobi Dessert. These two mountain ranges separate the land in northern China, including Manchuria, from Mongolia and Siberia to the north. Accordingly, the only route to gain access to the western world through Northwest China was along the southern edge of the Yin Mountains, west toward Dunhuang, which is the corridor the silk route followed. Except for the region encompassing Anhui and Jiangsu Provinces that borders the Yellow Sea and the area of Heibei Province that borders the Gulf of Bohai, the uplifted coast in the eastern region of China blocks access from the plains to the sea (Jin 1998).

The Korean Peninsula is positioned as a land bridge connecting the two uplifted lands of Manchuria in the north and the Japanese Archipelago in the south and faces the Gulf of Bohai and the Yellow Sea to the west, Namhae ("South Sea," adjacent to the Korea Strait) to the south, and the East Sea (also known as the Sea of Japan) to the east. The Korean Peninsula's geologic features were subjected to dramatic transformations during the glacial and interglacial periods of the Pleistocene. During the fall of sea level that occurred during glaciation, a land bridge connected the Korean Peninsula to the Liaodong and Shandong Peninsulas, and a large lake formed in the Gulf of Bohai. Land also surfaced between China's Zhejiang Province and Jeju Island, Jeju Island and the southern shore of the Korean Peninsula, and the southern shore of Korea to Tsushima Island; even the rivers of Fukuoka, east of Tsushima Island, filled in and became dry land. The record shows that the Korean Peninsula provided passage for migrating animals during periods of shifting climate. It follows that Paleolithic nomads moving with prey also used this passage, thereby contributing to the spread and development of human civilization in Northeast Asia.

The geologic features of northeastern Asia, with its axis located in Manchuria and the Korean Peninsula, differ fundamentally from those found in the Yellow River Valley or Mongolia. In 1929, Pierre Teilhard de Chardin and Emile Licent published the results of their investigation into the geologic characteristics of sedimentary strata from the Middle and Upper Pleistocene periods in the area of Jilin and the Amur-Heilong River, which divides Northeast Manchuria from the Russian Far East. Their data show that while the Yellow River Valley was mainly comprised of yellow ocher and Mongolia consisted mostly of sand, Manchurian land revealed a mixture of sand and yellow or red ocher. Based on these geologic analyses, the researchers viewed Manchuria, Korea, and Japan as sharing a single culture, with Manchuria as the central location of human history in that area (Chard 1974; Choi 1983b).

1.3.2 The Natural Environment and Livelihood in Paleolithic Northeast Asia

Figure 1.3 compares the terrestrial biomes of Northeast Asia during the last glacial maximum (LGM) at the end of the Paleolithic era to the present. In the current climate, a temperate, broadleaf deciduous forest blankets the land from the South Central Korean Peninsula to just south of the Amur-Heilong River, while a subarctic, needle-leaf evergreen forest zone ranges from the alpine region at the northern border of Korea, through the Russian Maritime Territory, and up to the northeastern extent of the Amur-Heilong River (Han 1996).

The region west of the Liao River in northern China consists of warm, temperate, broadleaf deciduous forest, northwest of which the Mongolian Plateau stretches out into grassland, north of which the Siberian tundra begins. The southern part of the Korean Peninsula and the area south of Kansai in Japan, similar to the region south of the Yangtze River, are covered in warm, temperate, broadleaf evergreen forests. No doubt this distribution of flora fluctuated during the Pleistocene with the repeated climatic changes that occurred in the waxing and waning of glaciation.

During glaciation tundra spread from Siberia to the Gobi Desert, while Manchuria, the Gulf of Bohai, and the Yellow Sea became grassland. The northern regions of the Japanese Archipelago and the Korean Peninsula, Russia's Maritime Territory, and the Amur-Heilong River Basin became coniferous forests. The Shandong Peninsula and the more southerly areas of the Japanese Archipelago and the Korean Peninsula became mixed woodlands. Animals from colder regions, such as

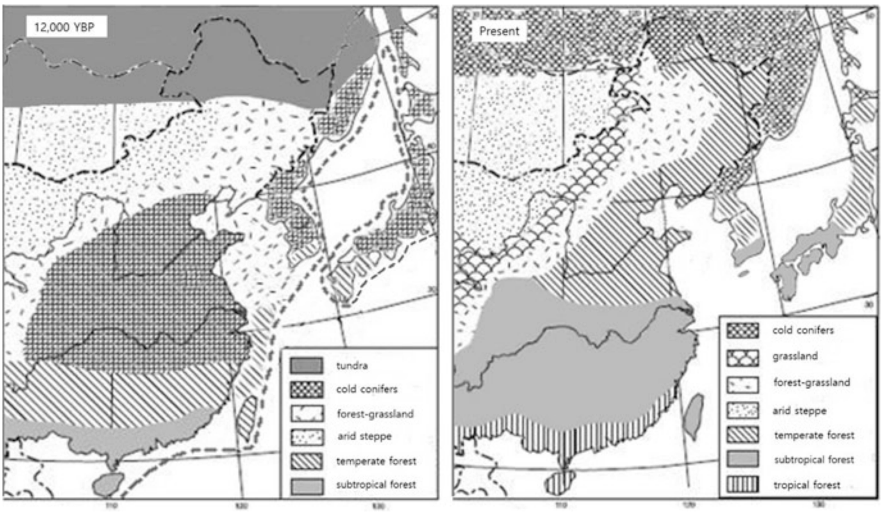


Fig. 1.3 Terrestrial Biomes in Northeast Asia, Last Ice Age (12,000 YBP) and the Present (Han 1983b, Liu and Chen 2012, modified by Lee Cherl-Ho). *Note:* The light-gray dotted line (—---) represents the new coastline after the sea level decreased

mammoths, woolly mammoths, reindeer, cave bears, wolves, and small rodents, roamed as far south as the Korean Peninsula's mountainous regions. Meanwhile, in Manchuria, the vast plains of the Yellow Sea floor became habitat for herbivores such as cattle, horses, deer, and roe deer, all of which propagated prolifically. For game, Paleolithic humans on the Korean Peninsula largely would have depended on Ice Age herbivores like cattle, horses, deer, and roe deer, and would have lived mainly in low-lying areas downstream from the rivers, near grasslands.

Contrarily, during the warmer interglacial periods, the Yellow Sea filled up with water, the grasslands receded north to Mongolia and Siberia, Manchuria, the Korean Peninsula, and the Japanese Archipelago shifted into broadleaf forest, and the Maritime Territory and Amur-Heilong River Basin became mixed forest. The fauna of Northeast Asia looked more like that which exists today: macaques, two-horned rhinoceroses, water buffalo, lions, and other hot-region animals moved up from the south as cattle, horses, deer, and other herbivores useful for human consumption moved north to Maritime Territory, the Amur-Heilong River Basin, and Siberia in order to avoid rising temperatures and humidity. It appears that Paleolithic peoples repeatedly migrated over similarly long distances, moving with the Mindel, Riss, Würm I, II, III, and IV glaciations and the intervening warmer periods to follow their prey. In addition to the long-distance, long-term migrations spurred by encroaching or receding ice, there were also shorter, annual migrations that followed fluctuations in seasonal temperatures (Sohn 1983).

The extent of long-distance human migrations in this region may have stretched from the southern tip of the Korean Peninsula northeast to the shores of the Sea of Okhotsk in Russia's Maritime Territory, and northwest across the Amur-Heilong River Basin to the north shore of Lake Baikal. This hypothesis is supported by the fact that Paleolithic relics found in these northern regions show striking similarities to those found on the Korean Peninsula. A long-distance hunter-gatherer migration pattern that spans long periods of time also accords with the kinds of remains found at these Paleolithic sites, most of which attest to a transient lifestyle. Scholars suggest that seasonal migrants moved from the south coast of the Korean Peninsula to the present-day northern border of North Korea, and also from the northern area of Korea through the Manchurian Plains and on to the Amur-Heilong River Basin, each route taking probably about 1 month to complete on foot. In the past, the phrase *samcheon-ri* (3000 ri, a traditional unit of measure) was used to depict the entirety of the Korean Peninsula; based on the premise that Paleolithic peoples could travel about 100 ri per day, 3000 ri can be calculated as the distance traveled along the length of the peninsula from north to south, even while hunting and gathering, in about 1 month's time. Indeed, archeological evidence indicates that the inhabitants of Northeast Asia during the Paleolithic era followed prey, cyclically migrating long distances due to glaciation as well as shorter distances with the seasons—a lifestyle that presents grounds for the widely-distributed cultural similarities found across this region.

1.3.3 *Migratory Route of Paleolithic Peoples on the Korean Peninsula*

Looking at a map of Paleolithic excavation sites in Northeast Asia reveals that none exist along the east or west coast of the Korean Peninsula; rather, they all follow rugged, mountainous land routes moving east along the Jiri Mountains from the southwest, then along the Taebaek Mountains up the eastern spine of the peninsula, and finally connecting to the northerly Jangbaek (Changbai) Mountains via the Baekdu Daegan mountain range (Lee 2001, 2018).

Figure 1.4 indicates the migration routes taken by Paleolithic peoples. Typically they hugged the foothills of mountain ranges, presumably to avoid running into large lakes or deep rivers. Particularly during the third Würm period, comparatively large numbers of people migrated over a long route south during glaciation and then moved north again during the interglacial period. Although this cycle of glaciation and warming took place over thousands of years, the people used their general knowledge and sense of direction in following these long, overland routes. The two main routes taken were the Northwest Manchuria-Mongol passage, which began in the southern Japanese islands and moved up through the Korean Peninsula, crossed the Liaodong Peninsula and the Gulf of Bohai or southern Manchuria, and then passed the Greater Khingan Range to Lake Baikal; and the northeastern Siberia route, which crossed the Amur-Heilong River Basin in Maritime Territory (Russia) and extended to the shore of the Okhotsk Sea. Through the latter route, the people of

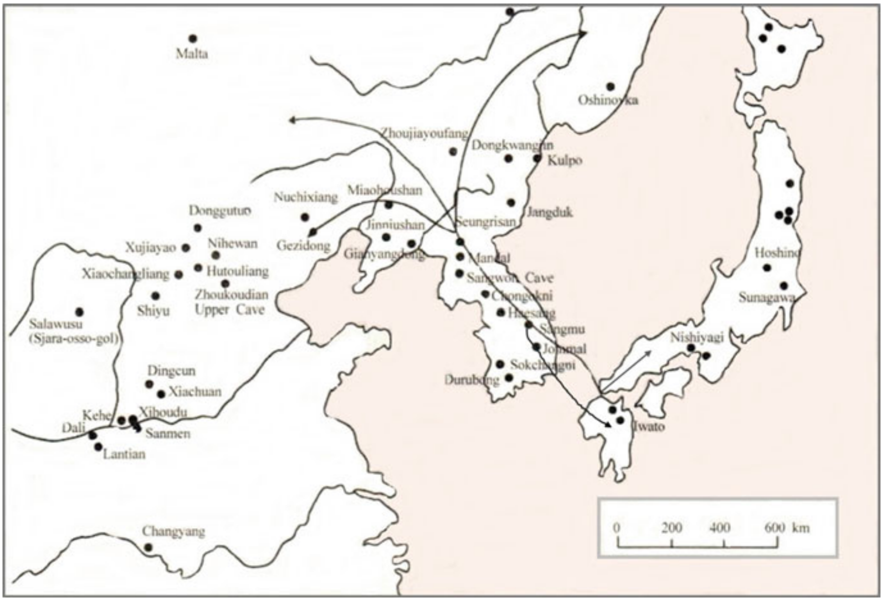


Fig. 1.4 Paleolithic Sites in Northeast Asia and Migration Routes of Paleolithic Peoples

Northeast Asia also crossed the Bering Strait and migrated to North America (Lee 1998a). The biological traces left by Paleolithic nomads at archeological sites along these migratory passages match the collective genome of the Korean people: research indicates that 60% of modern Koreans' DNA group derives from northern races, while 40% claims southern characteristics (Shim 2016).

As Paleolithic hunter-gatherers followed their prey along shorter seasonal routes, they created temporary shelters in natural caves or built pit-dwellings. On their seasonal return trip, they seemed to have a nearly bird-like instinct about where to go: after living for a period of time in one area, they soon migrated away, but they always found their dwelling places again the following year. They would have learned that if they discarded their seeds after eating, the seeds would grow and provide a comparative abundance of food and prey in the neighborhood of their dwellings upon their return. Conditions for a viable living space required a nearby source of potable water, and since containers for transporting and storing water had not yet been created, fresh streams provided an incentive for setting up temporary living space near the mountains. Paleolithic dwelling sites are often situated upstream of rivers in the foothills of long mountain ranges. Foothills near a river provided dry, high ground, away from swampy or flood-prone areas. Most of the Paleolithic sites found on the Korean Peninsula meet these requirements. During the Middle Paleolithic era, the majority of dwelling sites are found along mountain ridges in natural caves, while the Upper Paleolithic era sees increasing numbers of pit-dwellings, mostly located in gravelly areas along riverbanks or in adjacent hills. Most sites on the Korean Peninsula from the Middle Paleolithic are found in the mountains, while Upper Paleolithic sites are found closer to rivers. This trend toward larger bodies of water continued, with many dwelling sites discovered in coastal areas during the Neolithic era.

1.4 Industry and Diet of Northeast Asian Paleolithic Peoples

1.4.1 Types of Food and Methods of Acquisition

The main tasks for Paleolithic people consisted of acquiring, cooking, and storing food. Scholars suggest that the work of fashioning stone tools to help obtain food created the first divisions of labor. The examination of Paleolithic sites reveals that a differentiation of tools for the acquisition of specific types of food also began at this time.

During the Lower and Middle Paleolithic periods, human life centered on hunting in mountainous areas, for which large rocks or stone tools such as crude choppers, picks, or hand axes were used—tools geared toward hunting large animals. Accordingly, prey during this time is thought to have included the meat, organs, and blood of mammoths, woolly mammoths, boars, elk, large spotted deer, water buffalo, and horses. The organs and blood in particular provided an important source of vitamins and minerals. The existence of rock salt has not been confirmed on the Korean Peninsula or southern Manchuria, but the organs and blood would have given the people the sodium they needed. The main carbohydrate supply during this period seems to have derived from the nut family, including acorns, chestnuts, pine nuts, and hazelnuts; other frequently gathered foods consisted of fruits such as wild grapes and gooseberry; roots, like arrowroot; wild greens, as in mallow and water dropwort; mushrooms; and many other species native to the Northeast Asian region.

As the Middle Paleolithic era passed into the Upper Paleolithic, people in this region began to hunt herbivores such as deer along riverbanks in comparatively lower hill areas. As seen at Durubong caves and Seokjang-ri and Changnae dwelling sites, shelters tended to be made in natural caves along a river or in pit dwellings that were topped with wood, reeds, or animal skins. These housed family units of about 10 people each. Several stone hunting tools were produced at these sites, including double-edged and single-edged choppers, hand axes, points, and wooden spears made with stone axes. At the onset of this era, the method of capturing large animals was to chase them off a cliff or into a pit, but in time, hunting with sharp stone tools and wooden spears began to develop. Stone tool production sites from this period have been discovered apart from living sites, indicating that tool manufacture and the preparation of game had begun to fall under the rubric of specialized labor. Hunting and gathering techniques continued to develop as offspring learned the ways of their parents. Various aspects of prehistoric hunting are depicted in rock paintings on cave walls as well as in bone carvings found at archeological digs (Sohn 1983).

When migratory hunters returned to areas they had lived in previously, they found more prey than in other, similar areas because of the comparative increase in edible plants growing from the seeds the people had discarded (or eliminated in their waste) the last time they lived there. Due to this relative abundance of food sources, nomads began to extend their stay in these locales. In pollen analyses from this period, plants from the rice and bean families begin to appear, and as the Upper Paleolithic era progresses, these plants appear with more frequency. Mugwort, bracken, and other wild vegetables also begin to appear. On the Korean Peninsula, this period marks the beginning of grain consumption in the form of grass seeds that may have been gathered along with nuts. Native grains included barnyard grass, broomcorn millet, millet, rice, wild beans, and soybeans. Recent discoveries at the Soro-ri Paleolithic site in Oksan, Cheongwon-gun, support this theory: rice seeds, vegetable seeds, and 30 other kinds of seeds have been excavated from peat deposits there (Lee 1998b).

Upper Paleolithic peoples hunted deer, roe deer, aurochs, horses, boars, hares, bears, and wild animals from the dog and chicken families. They gathered acorns, chestnuts, and hazelnuts. Seasonally available foods included fruits such as wild strawberries, mulberries, grapes, and gooseberries; root vegetables like bellflower, arrowroot, and bindweed; and leafy vegetables such as mallow, water dropwort, royal fern, and mugwort. Those who settled near a river, added fare such as frogs, mollusks, and insects to their diets.

According to a study by Park (1983), 49 types of animals and 21 types of plants have been identified from the Middle Paleolithic period. Fauna of this era are all vertebrates, mostly mammals, with a high proportion of large animals. By contrast, 98 kinds of vertebrates, 4 kinds of mollusks, and 3 kinds of node-footed animals (insects) have been attributed to the Upper Paleolithic. As these numbers reveal, the passage of time resulted in an increase in the types of fauna used as food. The same holds true for flora: the number of plant types used as food during the Upper Paleolithic increased over time from 21 to 62.

The changes in tool manufacture and prey acquired by the peoples of the Paleolithic era during the Lower, Middle, and Upper periods are summarized in Table 1.1 (Lee 1998a).

Table 1.1 Tool manufacture and foods of Paleolithic peoples of northeast Asia and the Korean Peninsula

Classification	Lower Paleolithic (2,000,000–300,000 YBP)	Middle Paleolithic (300,000–40,000 YBP)	Upper Paleolithic (40,000–10,000 YBP)
Race	*Homo sapiens*	*Homo sapiens neanderthalensis*	*Homo sapiens sapiens*
Dwelling	Mountain caves	Mountain caves/hillside pit-dwellings	Hillside/riverside pit-dwellings
Tools	Large, rough stone tools, stone cores	Double-edged and single-edged choppers	Sharp stone tools, bone tools
Hunting	Chasing/pit trapping large animals	Forest and plains hunting	Forest and plains hunting
Division of labor	Insignificant	Tool-making/hunting and cooking	Division of roles within extended family groups
Cooking	Mainly raw foods, some roasting	Mainly raw foods, roasting, air-drying	Roasting, air-drying, smoking
Food resources	Mammals: Carnivores, rats, cattle, horses, mammoths, hares, monkeys Nuts: Acorns, chestnuts, pine nuts Roots: (of) wild fruits and greens	Animals: Cattle, horses, mammoths, hares, rats, frogs, insects Nuts: Acorns, chestnuts, pine nuts Roots: Arrowroot, bindweed Wild greens: Royal fern, mallow Fruit: Wild strawberries, mulberries, grapes, gooseberries, persimmons	Animals: Cattle, horses, deer, hares, rats, frogs, insects Mollusks and freshwater fish Nuts: Acorns, chestnuts, pine nuts Roots: Bellflower, arrowroot, bindweed Wild greens: Royal fern, mallow, water dropwort, mugwort Fruit: Wild strawberries, mulberries, grapes, gooseberries, persimmons Grasses: Barnyard grass, broomcorn millet, millet, rice, beans

1.4.2 Paleolithic Food Storage Techniques

Nomads capturing large prey were not able to consume the entire beast at once, so it became necessary to find a way to store the leftover meat. During the Lower Paleolithic, any uneaten meat remaining after a kill would simply be set aside. As the meat decomposed, it would begin to dry out. It appears that Paleolithic peoples ate the meat even in its partially decomposed state. The practice of eating slightly rotted raw meat would translate in the future to a dish in East Asia called *yukjang*, which entails the fermentation of raw meat. *Yukjang* is one of the earliest types of fermented foods to appear in Chinese literature. Part of the meat would be left outside in the sun in an area where the air could circulate around it; this allowed the exterior of the meat to dry quickly, thus preserving the inside from rotting and allowing for the full drying of the meat. This also seems to be the way Paleolithic peoples dried their meat. Eventually, they discovered that roasting a kill was a more effective way for any leftover hunks of meat to dry out. This is likely how they discovered the technique of smoking meat for storage. Thus, the first food preservation methods humans developed in the region were meat drying techniques, and based on remains discovered at various Northeast Asian archeological sites, it appears that these techniques developed naturally over time for Paleolithic peoples.

The Northeast Asian climate varies according to four distinct seasons, but persistent cold from November to March and monsoon rains in summer made the process of obtaining food arduous. Storing food became essential for survival during these periods. Along with drying easily spoiled animal meat and organs, fruits and nuts were also dried and stored for periods of want. This is thought to be the most significant factor differentiating culture formation between the peoples of Northeast Asia and Southeast Asia. As drying techniques for preserving food developed, Northeast Asian Paleolithic peoples were able to increase the speed of their migrations, allowing them to more quickly reach preferred destinations in which they could live for longer periods of time. Seasonal migrations slowly began to decrease as a more settled lifestyle became feasible.

Taking into consideration the seasonal characteristics of the Korean Peninsula and Northeast Asia, the people living in these regions would likely have known about preserving food in cold weather. Animal meat could be stored for relatively long periods of time in cold places. People would bury meat in the snow outside their cave or dry it in a frozen state. One group of Northeast Asian Paleolithic peoples remained in northern Siberia once they discovered the cold winter climate was advantageous for food storage; even today, in some remote areas of Siberia, the indigenous peoples maintain a unique, ancient food culture.

1.4.3 Meals in the Paleolithic Era

As mentioned above, people of the Lower and Middle Paleolithic eras lived as nomads, eating whatever large game they could acquire, which meant that they were almost fully carnivorous. Their counterparts in temperate regions, on the other hand, were largely herbivores. Although Paleolithic people used fire, they ate most of their food raw. Consumption of raw innards, such as the animal's blood, liver, lungs, omasum (stomach parts), and spleen, supplied them with a rich source of vitamins that, however, become unstable when heated. The fact that they ate the soft innards raw indicates by extension that they likely consumed most of the animal raw. They may have used stone planks to roast or fry the tough pieces that adhered to the bones. This practice of eating raw meat continued over time, and today Koreans and many other Northeast Asians enjoy eating their meat, liver, and beef tripe raw.

At the beginning of the Upper Paleolithic era, people began migrating to lower hills and plains, often near rivers, where they found a greater abundance of edible plants, thus amplifying the importance of vegetables in the Paleolithic diet. As the population of humans increased, the consistent availability of game decreased, and times of temporarily poor hunting accelerated the consumption of vegetables. Thus, Paleolithic peoples on the Korean Peninsula and across Northeast Asia who began as carnivores now relied on a combination of meat and plant foods.

Meat, nuts, and grains were likely dried in the sun or hung to dry in caves or pit-dwellings to be consumed during the winter months. In spring, plant roots and vegetables were eaten fresh. Table 1.2 presents the nutrients Northeast Asian Paleolithic peoples obtained by the seasonal foods they consumed (Lee 1998a). In summer and fall, the supply of food was comparatively abundant, but in winter and early spring, the deficit of calories and vitamins would have been severe. In seasons of cold and relative hunger, fresh animal blood supplied people with the vitamins and minerals they lacked, blood and liver being important sources of sodium, among other minerals. The physical need for sodium and protein continued to be provided by meat, which in combination with the greater consumption of plant foods resulted in a more nutritionally balanced diet.

In sum, Paleolithic humans who roamed Northeast Asia, with the Korean Peninsula at its center, mainly hunted mammals, especially herbivores like the deer family, and gathered various types of nuts, such as acorns, while seasonally supplementing their diet with fruit, roots, wild vegetables, and grains. Archeological evidence indicates that people moved with the seasons to find food in a typical nomadic, hunter-gatherer lifestyle. Migration routes in the region followed mountain ranges from the Shandong Peninsula in China up through northeastern China and Manchuria, and further north, from the Lake Baikal region to the west coast of the Okhotsk Sea, and then south through the Korean Peninsula and on to the Japanese Archipelago via Tsushima Island and Fukuoka. The migrants left traces of their culture across this vast area of land as they traveled and settled, and again traveled and settled.

Table 1.2 Nutrients from seasonal food types consumed by Paleolithic peoples of the Korean Peninsula and northeast Asia

Nutrient	Spring	Summer	Autumn	Winter
Proteins and lipids	• Animals: Deer, wild pig, bison, roe deer, goat, bear, fox, raccoon, tiger, rabbit, rat, chicken/ pheasant	• Animals: Deer, wild pig, bison, roe deer, goat, bear, fox, raccoon, tiger, rabbit, rat, chicken/ pheasant, frog, mollusk	• Animals: Deer, wild pig, bison, roe deer, goat, bear, fox, raccoon, tiger, rabbit, chicken/ pheasant, rat, frog, mollusk • Beans: Wild beans	• Animals: Deer, wild pig, bison, roe deer, goat, bear, fox, raccoon, tiger, rabbit, rat, chicken/pheasant
Carbo-hydrates	• Plants: Arrow-root, bindweed root • Tree shoots, leaves	• Fruits: Straw-berry, mulberry • Kousa dogwood, tree buds • Mushrooms	• Fruits: Wild grape, gooseberry, hazelnut • Nuts: Acorn, chestnut, pine nut • Seeds: Barnyard grass, millet, rice	• Nuts: Acorn, chestnut, pine nut • Roots: *Deodeok*, kudzu
Soluble vitamins	Bracken, mallow, parsley, mugwort, mountain vegeta-bles, field vegetables	Bracken, mallow, parsley, mugwort, mountain vegeta-bles, field vegetables	Fruits, mountain vegetables, field vegetables	Plant roots, ani-mal blood
Fat-solu-ble vita-mins & minerals	Animal blood, internal organs, innards	Animal blood, internal organs, innards	Animal blood, internal organs, innards	Animal blood, internal organs, innards

1.4.4 Paleolithic Food Tools

Due to the rapid decomposition of wood, no wooden tool remains have been found at Paleolithic sites, but food remains indicate that trees were plentiful in the environment, and thus it may be deduced that wooden tools, in addition to stone and bone tools, were also part of the culture. The main tools they used for hunting probably would have been wooden clubs and spears. Likewise, food containers may have been made of wood, whittled by a stone knife or ax. It has been suggested that this type of wooden vessel was universally used in this region, perhaps as a bowl, for example, or a trough. The Northeast Asian use of wooden bowls for food offerings in ancestor worship rituals since the dawn of history implies that in prehistoric times people used wooden bowls for food. Neolithic peoples who began making pottery continued to use wooden bowls ritualistically, just as their forebears had. This tradition continued through the eras of bronze, iron, and plastic, and remains in place to this day.

Whether or not Paleolithic people fashioned primitively-shaped spoons and chopsticks made of wood or bones is still unknown. According to legend, King Zhou of the Shang Dynasty (about 2000 BCE, during the Bronze Age) used ivory chopsticks, but the oldest spoon and chopsticks set discovered in Northeast Asia dates to the sixth or seventh century BCE, in Najin, Hamgyong Province (now part of North Korea). However, a spoon made of bone has been found at a Bronze Age site in China's Jilin Province (Gu 1994). Based on this data, it seems likely that Paleolithic people ate with their hands. This assumption is aided by a Bronze Age document from the Shang Dynasty containing a Chinese character that appears to be modeled after two people seated around a footed bowl filled with rice, partaking with their fingers. It follows that the people of Northeast Asia would have maintained a culture of eating with their fingers for a very long time (Lee 1992).

When raw animal meat was the main food source for Paleolithic people, plates or bowls were not necessary, but as cooking developed into a standard way to prepare food, and more vegetables were consumed, dishes became essential. In summer, the leaves of broad-leaf trees could hold food, but there is evidence that in winter and early spring, wide dishes made of wood or stone would be used for the purpose. Wood hammered flat by stone tools and then hollowed out into a somewhat sunken shape seems to have been the method of making a bowl-like dish to hold food. People from this period did not yet have containers that could hold foods with a high liquid content for a long period of time, however. Animal horns or skulls proved useful for holding water and for storage that could be embedded in the ground. Later this custom would manifest in earthenware vessels with pointed bottoms.

It is unknown whether Paleolithic people cooked vegetables or nuts together with their meat, but investigating the way current tribal peoples cook in remote areas of Northeast Asia or Africa may offer some clues. For example, a present-day method of cooking involves digging a hole to make a pool of water and then placing hot stones or gravel in the water with meat or vegetables on top in order to cook them.

Twelve thousand years ago in the Pleistocene Age, which ended with the close of the Upper Paleolithic era, Northeast Asian humans had not yet actively procured food from rivers or seas. However, as the Middle Paleolithic moved into the Upper Paleolithic, people began to familiarize themselves with the water, so that by the end of the Upper Paleolithic they began supplementing their diet with food pulled from rivers or wetlands, using spear-like tools made from animal bones or stone to acquire clams, frogs, mollusks, and fish. Since they did not yet know how to store these kinds of quick-rotting foods, they had to eat what they caught immediately, which is why they could not rely on marine animals as a staple part of their diet. However, Paleolithic people's gradual move toward larger bodies of water led to an increase in the use of marine resources, which was one step closer to the Neolithic culture that would form along the riverbanks and coasts.

In the past, theorists presumed that the absence of any archeological remains at a given location meant that the environment must have been unlivable. For example, it was thought that during periods of glaciation, the land became barren, and that after each thaw, an entirely different branch of people from distant lands migrated to the area. However, the succeeding theory, that Paleolithic peoples continuously developed and transmitted their culture over time as they repeatedly migrated against the ice north, south, and back again, is borne out by conclusions made in recent archeological studies: the Northeast Asian region, with its center in Manchuria and the Korean Peninsula, was situated on the periphery of the ice during Pleistocene glaciation, unlike the highlands of western China and Siberia, and therefore the advancing glaciation provided sufficient time and space for people to adapt as they took their long migration from northeastern Siberia, down through the Korean Peninsula and into the southern reaches of the Japanese Archipelago. Paleolithic peoples on the Korean Peninsula continued to adapt each time they migrated, gradually moving closer to the rivers and sea coasts. As they settled on coasts in the Neolithic era, marine life became their main source of food, thus completing their transformation from carnivorous mountain cave dwellers into littoral hunter-gatherers.

References

Bae, Gi-Dong. 1992. Guseokgisidae [Paleolithic age]. In *Hanguk seonsagogohaksa* [Prehistoric Korean archeology], 9–75. Gimje: Ggachi.

Barnes, Gina L. 1993. *China, Korea and Japan: The rise of civilization in East Asia*. London: Thames and Hudson.

Chard, Chester S. 1974. *Northeast Asia in Prehistory*. Madison, WI: University of Wisconsin Press.

Choi, Bok-Gyu. 1983a. Guseokgimunhwa ui bigyo II (Dongasiawa ui bigyo) [Comparison of Paleolithic cultures (Northeast Asia)]. In *Hanguk ui gogohak I* [Korean archeology], Hanguk saron 12 [Review of Korean History], 415–478. Seoul: National Institute of Korean History.

Choi, Mu-Jang. 1983b. Guseokgimunhwa ui bigyo II (Chunggukgwa ui bigyo) [Comparison of Paleolithic cultures (China)]. In *Hanguk ui gogohak I* [Korean archeology], Hanguk saron 12 [Review of Korean History], 307–366. Seoul: National Institute of Korean History.

Choi, Mong-Ryong. 1992. Hanguk gogohad ui yeongu (1987-89) – Hoegowa jeonmang [Studies on Korean archeology (1987-89): retrospect and prospect]. In *Hanguk seonsagogohaksa* [Prehistoric Korean archeology], 381–397. Gimje: Ggachi.

Gu, Cheon-Seo. 1994. *Segye ui siksaenghwalmunhwa* [food cultures of the world]. Seoul: Hyangmunsa.

Han, Chang-Gyun. 1983a. Je 4 gi ui jijil mit jayeonhwangyeong [Soil and natural environment in the 4th glacial period]. In *Hanguk ui gogohak I* [Korean archeology], Hanguk saron [Review of Korean History], 79–90. Seoul: National Institute of Korean History.

Han, Young-Hee. 1983b. Jiyeokjeok bigyo [Regional comparison]. In *Hanguk ui gogohak I* [Korean archeology], Hanguk saron 12 [Review of Korean History], 479–521. Seoul: National Institute of Korean History.

———. 1996. Hanminjok ui giwon [The origin of Korean folk]. In *Hallimgwahagwon chongseo 41: Hanguk minjok ui giwongwa hyeongseong* [Hallym Academy of Sciences Series: Origin and formation of the Korean nation], 73–118. Seoul: Sohwa.

Jin, Je-Heon, Yoon Jin, Kim Keun-Sik, and Ryu Jung-Gil. 1986. *Ryonggok donggul yujeok* [Ryonggok Cave site]. Pyongyang: Kim Il-sung University Press.

Jin, Yong-Ok. 1998. Idongseong ui wonhyeongjile isseoso Hangugingwa Mongolinjong ui yusajeomgwa chaijeom [similarities and differences in migratory protoplasm in Koreans and Mongolians]. In *Han-Mong gukjehaksuldaehoe nonmunjip* [Korea-Mongol International Symposium, Korea-Mongol Society].

Lee, Cherl-Ho. 1998a. Hanbandowa Dongbugasia ui guseokgi sidae siksaenghwal hwangyeong [The foodways of Paleolithic peoples in Northeast Asia and on the Korean Peninsula]. *Minjokmunhwa yeongu* [Korean Cultural Studies] 31: 418–458.

Lee, Yung-Jo. 1998b. Cheongwon, segyeeseo gajang oraedoen byeo chulto [Cheongwon, the site with the oldest excavated rice seeds in the world]. *Hangyeore sinmun* [Hankyoreh] 3: 16.

Lee, Cherl-Ho. 2001. *Fermentation Technology in Korea*. Seoul: Korea University Press.

———. 2017. *Hanguk eumsik ui yeoksa* [History of Korean food]. Seoul: Jayu Academy.
———. 2018. Korean Foods: History, Culture and Characteristics. In *Korean Functional Foods, Composition, Processing and Health Benefits*, ed. Park Kun-Young, Dae-Young Kwon, Lee Ki-Won, and Park Sunmin, 1–22. New York: CRC Press.
Lee, Seon-Bok. 1996. Dongbugasia guseokgi gogohakgwa minjok giwon [Paleolithic archeology in Northeast Asia and the origin of ethnic groups]. In *Hallimgwahagwon chongseo 41: Hanguk minjok ui giwongwa hyeongseong* [Hallym Academy of Sciences Series: Origin and formation of the Korean nation], 15–72. Seoul: Sohwa.
Lee, Sung-Woo. 1992. *Dongasiasok ui godae Hanguk siksaenghwalsa yeongu* [The history of ancient Korean food life in East Asia]. Seoul: Hyangmunsa.
Lee, Yung-Jo. 1983. Pyeonnyeon [chronology]. In *Hanguk ui gogohak* I [Korean archeology], Hanguk saron 12 [Review of Korean History], 367–414. Seoul: National Institute of Korean History.
———. 1989. Upper Paleolithic stone artifacts, with special reference to microblade cores from Suyanggae site, Korea. In *Paper presented at the symposium on the 60th anniversary of Peking man in Beijing*.
Liu, Li, and Xingcan Chen. 2012. *The Archeology of China*. New York: Cambridge University Press.
Needham, Joseph. 1954. *Science and Civilization in China*. Vol. 1. London: Cambridge University Press.
Park, Heu-Hyun. 1983. Dongmulsanggwa singmulsang [Fauna and flora]. In *Hanguk ui gogohak I* [Korean archeology], Hanguk saron 12 [Review of Korean History], 91–186. Seoul: National Institute of Korean History.
———. 1989. Jewonchangnae hugi guseokgimunhwa ui yeongu [A study on Upper Paleolithic culture in Jewonchangnae]. Doctoral thesis, Yonsei University.
Shim, Jae-Hoon. 2016. *Godae Jungguge ppajeo Hanguksareul boda* [The view of Korean history from within ancient China]. Seoul: Pureunyeoksa.
Sohn, Pow-Key. 1972. Seokjang-ri ui jeongi – junggi guseokgi munhwacheung [Lower and Middle Palaeolithic Industries of the Stratified Sŏkchang-ni Cultures]. *The Journal of Korean History* 7: 369–426.
———. 1978. The Early Paleolithic Industries of Sŏkchang-ni, Korea. In *Early Paleolithic in South and East Asia*, ed. Fumiko-Ikawa Smith. Berlin: De Gruyter Mouton.
———. 1983. Paleoenvironment of Middle and Upper Pleistocene Korea (2). In *Conference on the Paleoenvironment of East Asia from the Mid-Tertiary, Hong Kong*.

Chapter 2
Primitive Pottery Culture on the Korean Peninsula

Abstract The transition between the Paleolithic and early Neolithic eras marks a sea change in the history of human food culture, as nomadic migrations yield to settled lifestyles and the eventual emergence of agriculture. Patterns of hunting, fishing, and gathering, as well as the cultivation of plants and domestication of animals, vary greatly around the world, depending on the topography and climate of the land. In this chapter, the period I call Primitive Pottery culture (8000–5000 BCE) in the Korea Strait region redefines the origins and characteristics of food culture in Northeast Asia. The geopolitical basis for primitive pottery's origin in the Korea Strait coastal region and the technological development and usage of potteries were discussed. The food techniques originated with pottery use such as *Jjigae* (stew) culture, sea salt making, and fermentation of cereals, vegetables, and marine products were highlighted. The nutritional anthropological contribution of the primitive pottery culture to the people in the region before the beginning of agriculture was elucidated.

Cooking can be credited with jump-starting the evolution of humanity: In the Paleolithic era, ancestral primates must have discovered that meat could be readily consumed when roasted over a fire, and over time, cooked meat would have provided enough nutrients to facilitate the expansion of the primate brain into that of *Homo sapiens*. The processing of food by cooking heralded the beginning of human dietary life, and the use of fire for roasting and drying meat marked two key developments in food preservation. These food storage methods—eating behaviors that distinguished hominins from other primates—led to the human ability to migrate long distances and form communal hunter-gatherer lifestyles. However, there were not yet containers sufficient for boiling or storing water, so early humans were forced to rely on a limited diet of animal carcasses and palatable vegetation.

The transition between the Paleolithic and early Neolithic eras marks a sea change in the history of human food culture, as nomadic migrations yielded to settled lifestyles and the eventual emergence of agriculture. Patterns of hunting, fishing, and gathering, as well as the cultivation of plants and domestication of animals, varied greatly around the world, depending on the topography and climate of the land. Lifestyles and traditions formed differently in the east and west, as well as

C.-H. Lee, *Korean Food and Foodways*,
https://doi.org/10.1007/978-981-19-0023-5_2

within Northeast Asia. Cooking culture and food storage technology, whether roasting or boiling, drying or fermenting, developed in unique ways depending on the type of earthenware vessels made in a given region. This chapter demonstrates how the period I call Primitive Pottery culture (8000–5000 BCE), which appeared along the shores of the Korea Strait, redefines the origins and characteristics of early food culture in Northeast Asia.

2.1 The Beginning of the Neolithic Period and the Invention of Earthenware

2.1.1 Overview of Northeast Asian Topography and Lifestyle at the End of the Paleolithic Era

As the sea level decreased during each of the four glacial ages, the Yellow Sea on the west side of the Korean Peninsula was exposed to land, and the East Sea became a large lake (see Fig. 1.3, previous chapter). It is estimated that the waters of the Yellow Sea and the Gulf of Bohai, west of what is the Korean Peninsula today, receded to the point at which the seafloor became land. The resulting great plain is presumed to have been inhabited by various animals, such as deer, roe deer, bison, mammoth, horse, and rabbit (Barnes 1993). In addition, as the water level in the Korea Strait dropped, the southeast coast of the Korean Peninsula and the northwest coast of Kyushu, Japan drew close enough that crossing the remaining body of water could have been accomplished on a primitive raft. This increase in land surface probably accelerated the movement of humans and animals across Northeast Asia.

As described in Chap. 1, the long-distance migrations of Paleolithic peoples in Northeast Asia during glaciation and interglacial periods appears to have stretched from the southern reaches of the Korean Peninsula to the Okhotsk Sea in northern Maritime Province, or alternatively, beyond the Heilong River basin to the north shore of Lake Baikal. This hypothesis is supported by Paleolithic relics excavated in these northern regions that show striking similarities to those unearthed on the Korean Peninsula (Lee 1998, 2017). Whether moving in a northerly or southerly direction, long-distance migrations spanned a period of several years while groups of people slowly progressed over the land, taking shelter while pausing to hunt and gather. This model is consistent with the hallmarks of impermanence embodied by artifacts found at Paleolithic sites.

Meanwhile, seasonal migrations were more likely to have encompassed the length of the Korean Peninsula or the distance between the northern edge of the peninsula, through the Manchurian field, and on to the Heilongjiang Basin. Either distance could probably have been crossed on foot over the span of about 30 days. It is judged that Paleolithic humans in Northeast Asia repeated long-distance migrations in tandem with glaciation and warming, as well as shorter seasonal migrations, both undertaken to follow prey. The repetitious nature of these migrations serves as the basis for understanding the cultural commonalities across significant stretches of land in Northeast Asia during this period (Lee 1998, 2017).

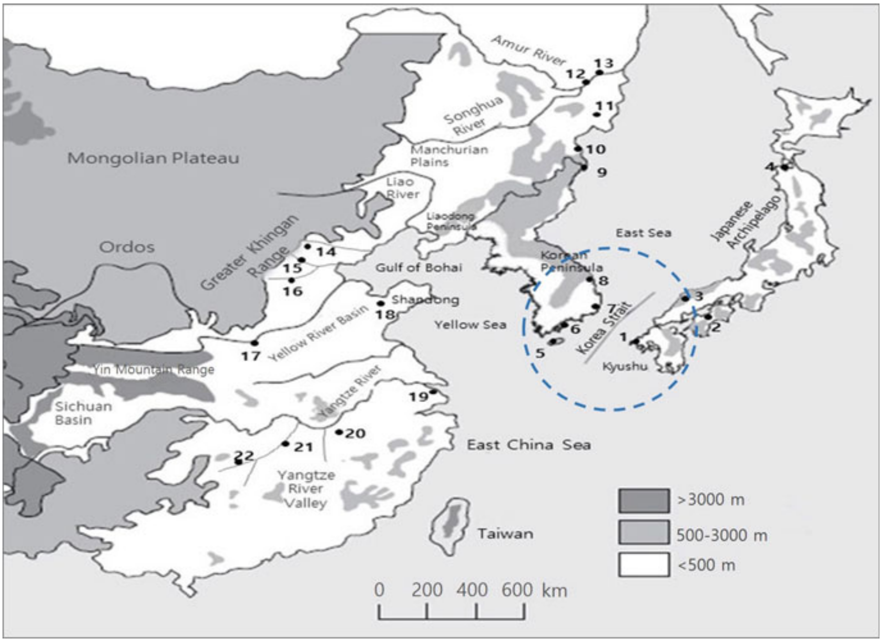
2.1.2 Generation of Primitive Earthenware

Primitive pottery represents a breakthrough technological development among humans alive during the Pleistocene-Holocene, or Paleolithic-Neolithic, transition. Pottery contributed greatly to stabilizing the food supply, which allowed for sedentism among former nomads prior to the advent of agriculture. Baked clay ornaments and other objects dating from 28,000 YBP have been discovered in Eastern Europe, but Northeast Asian artifacts from a similar period indicate the advanced development of fire-baked earthenware for cooking and storing food. For a time, earthenware sherds found at Fukui Cave in Kyushu, southern Japan, and Kamikuroiwa Cave in Shigoku, estimated to date to 12,000 YBP, were known to be the earliest (Barnes 1993). As researchers from China and the Russian Far East unearth older pieces of pottery, however, the origin of primitive pottery is expanding (Aikens and Lee 2013).

It is believed that in East Asia the invention of earthenware took place during the Last Glacial Maximum (18,000–14,000 YBP). The oldest piece of pottery discovered thus far was found in Yuchanyan Cave along the Yangtze River in South China and is dated between 18,300–15,300 YBP (Liu and Chen 2012). On the coast of the Yangtze River, primitive pottery fragments are also being excavated from Zengpiam Cave (12,000–11,000 YBP) and Shangshan Ruins (11,400–8600 YBP) in Guangxi Province. The oldest Paleolithic sherds found in northern China come from the Hutouliang shell tomb (16,300–14,700 YBP) along the Sanggan River in Northwest Hebei Province. Additional remains of very old pottery have been found at sites along the Yellow River, at Nanzhuangtou (12,600–11,300 YBP) in Hebei Province and Donghulin near Beijing (11,000–9000 YBP). Sculptures made from primitive earthenware have been excavated at Lijiagou (10,500–8600 YBP) and the Bianbiandong cave site in Shandong Province (11,000–9600 YBP) (Liu and Chen 2012).

Meanwhile, in the Russian Far East, the oldest pieces of earthenware were discovered in the Amur River Basin, at Gasya (12,960–10,875 YBP) and Khummy (13,000–10,000 YBP). These pottery sherds reveal fibrous patterns and are considered to be the earliest example of a primitive form of earthenware in which a basket was covered with clay soil (Zhushchikhovskaya 1997). In the Maritime region, pieces of earthenware have been excavated from the Almazinka (7500 YBP) and Ustinovka sites (8500–8000 YBP). Some archeologists have proposed that Russian comb-pattern pottery (Kammkeramik) flourished first in Finland and Germany, later taking hold in Siberia and then spreading to the northeast coast of the Korean Peninsula, but Zhushchikhovskaya (1997) views the regions surrounding the East Sea, that is, the Korean Peninsula, Russian Maritime Province, and Japanese Archipelago, as a single cultural unit constituting the origin point of primitive pottery in Northeast Asia.

The oldest known pottery unearthed in Korea comprises sherds of Mumun (patternless) pottery from the Gosan-ri site in Jeju (10,000–8000 BP) and the Osan-ri site in Gangwon Province (8000–7000 YBP) (Lee 2017). At the



1 Fukui
2 Kamikuroiwa
3 Mawatari
4 Odai Yamamoto
5 Gosan-ri
6 Sangnodaedo
7 Dongsamdong
8 Osan-ri
9 Seopohang
10 Ustinovka
11 Almazinka
12 Gasya
13 Khummy
14 Hutouliang
15 Donghulin
16 Nanzhuangtou
17 Lijiagou
18 Bianbiandong
19 Shangshan
20 Xianrendong
21 Yuchanyan
22 Zengpiyan

Fig. 2.1 Primitive earthenware excavation sites in northeast Asia

Dongsamdong site in Busan, the Sangnodaedo site in the South Sea, and the Seopohang site in the northeast, both primitive Mumun pottery and Yunggimun (raised-pattern) pottery and have been excavated from a stratigraphic layer older than Jeulmun (comb-pattern) pottery (Han 1974). The drop in sea level that occurred during the last ice age, causing the southeast coast of Korea and the northwest coast of Kyushu, Japan, to be divided by a manageable river where the Korea Strait once stood, means that the archeological sites on the Korean side, including Gosan-ri, Dongsamdong, Sangnodaedo, Osan-ri, and Seopohang, and the sites on the Japanese side, including Fukui Cave and Kamikuroiwa, should be viewed as belonging to the same culture. Figure 2.1 shows excavation sites of primitive earthenware in early East Asia.

As Fig. 2.1 indicates, most of China's early primitive pottery sites are located along inland rivers, while early pottery sites in Korea are shell middens located on the coast of the Korea Strait. Considering that the earthenware vessels in the shell midden were easily decayed and returned to the soil, we can conclude that the Korea Strait region was one of the birthplaces of Primitive Pottery Culture (8000–5000 BCE). Incipient Korean foodways can be identified by examining the characteristics of meals that can occur when littoral foragers use earthenware and by examining the characteristics of the food culture formed therefrom.

2.2 Development of Primitive Pottery on the Korean Peninsula

The shell mounds, or middens, of Northeast Asia, have been a boon to archeologists studying Northeast Asian pottery culture. Several of these sites, including the Dongsamdong shell mound in Yeongdo District, Busan; the Sangni shell mound on Sangnodaedo Island, Tongyeong; and the Seopohang shell mound in Unggi, which are distributed around focal areas of the southeast coast of Korea, differ significantly from cave sites in China and Japan. The middens contain clamshells, animal bone chips, stone tools, pottery sherds, fishing gear, and other relics of Neolithic human habitation. Various types of primitive pottery-era artifacts have been discovered in the lower anthropologic layers of shell mounds, each type offering clues to the puzzle of how people lived in the time period represented by each layer.

At the Dongsamdong and Seopohang sites, excavations revealed a layer of primitive pottery deeper than comb-pattern pottery, which was previously understood to be the oldest. As archeologists continued to dig, they discovered patternless pottery and raised-design pottery (Yunggimun) from an earlier period (Han 1974). In the 1990s primitive patternless pottery dating to around 10,000 YBP was discovered at the Gosan-ri site on Jeju Island and the Ojin-ri rock overhang site in Cheongdo-gun, North Gyeongsang Province. Several prehistoric sites dating from about 8000 YBP were discovered along the southeast coast of Korea. Remains indicating extensive use of primitive pottery in this area form the basis of the suggestion that the coastal areas in Korea and Japan that flank the Korea Strait may in fact constitute the birthplace of primitive pottery culture in Northeast Asia (Barnes 1993).

2.2.1 Geopolitical Basis for Primitive Pottery's Origin in the Korea Strait Coastal Region

The geologic basis for the coasts of the Korea Strait becoming the cradle of Primitive Pottery culture rests on the fact that the waters of the strait now blocked the ice-age migration path of peoples moving from the Japanese Archipelago to areas further north through the Korean Peninsula (refer to Fig. 1.3 in the previous chapter). People remained near the coast as they discovered more food sources there, even investigating ways to cross the channel of water that was once a land bridge. As mentioned above, around 10,000 BCE, in the waning years of Würm, the fourth and final glaciation period of the Pleistocene Epoch, most of the Gulf of Bohai and the Yellow Sea remained a landmass, and the narrowness of the Korea Strait made it possible to cross on a raft between the southeast coast of Korea and Tsushima Island, and from there to North Kyushu.

With the start of the Alluvial epoch, about 10,000 years ago, the earth's temperature gradually increased. Around 5000 BCE, the earth's average temperature was 2° C higher than now, and the sea level rose by 20–25 m (Barnes 1993). According to Liu and Chen (2012), compared to the present level, sea level in Northeast Asia was 40 m lower than today in 10,000 BCE, but 4 m higher in 6000 BCE. Around 2500 BCE, the air became cool, and from around beginning of the Common Era, the current temperature was restored.

From the start of the Alluvial epoch, as temperatures gradually began to rise, cold-region animals living in the south during glaciation slowly began migrating north through the Korean Peninsula and into the mountainous regions of Manchuria and Siberia. Since Paleolithic peoples followed prey, they periodically migrated north and south, but they began to gather instead along the coasts of the Korea Strait as they found the work of harvesting clams and catching fish for food somewhat easier than hunting wild game (Lee 2001). As fishing developed into the dominant industry along the Korea Strait, the coasts on both sides began to host a greater density of people.

On the southeast coast of the Korean Peninsula, paintings and patterns carved on rocks have been found at about 20 sites, including Ulsan Bangudae, Pohang Inbi-ri, Gyeongju Seokjang-ri, Namhae Sangju-ri, and Yeosu Orimdong. The concentration of these petroglyphs in the southeastern part of the Korean Peninsula reflects the many people who stayed for extended periods of time, in what became a hub of prehistoric culture in the era of Primitive Pottery culture (Lee 2017).

Shell middens in the region are also characteristic of human habitations in the Primitive Pottery era. According to Kim (1999), a total of 164 shell mounds have been found on the Korean Peninsula: 18 in the northeast region of the lower Tumen River (Seopohang shell mound, for example), 9 in the northwest region (Sinam-ri, etc.), 38 in the central region of the west coast (Amsadong, etc.), and the remaining 96 concentrated on the south coast. Numerous middens and primitive pottery sites have been excavated along the southern coast of the Korean Peninsula and the southwest coast of Japan, suggesting that this area was an important maritime passage and center of culture in the early Neolithic period (Han 1983).

According to Professor Lee (2011) of the University of Oregon, the calibrated age (cal. BP) of early Neolithic artifacts measured by Accelerator Mass Spectrometry (AMS) is estimated to hover in the range of the 5000 s BCE (7000 cal. BP) (Table 2.1). Among these, the remains at Bibong-ri, Sejuk-ri, Sangnodaedo, and Dongsamdong on the southern coast predate other areas.

Table 2.1 Estimated date of early Ruins on the Korean Peninsula, Jeulmun Pottery period, measured by accelerated mass spectrometry (AMS) (Lee 2011)

Site	Material	Lab ID	Provenance	Cal. age (BP)
Seoul, Amsadong	Charred wood	N-2337	House	7130 ± 130
Ilsan, Gyeonggi Province	Wood	Beta46227	Layer 1-Ga	7120 ± 90
Osan-ri, Gangwon P.	Charred wood	KSU-616	Layer V7	7040 ± 90
South Gyeongsang P.				
Bibong-ri	Wooden plank	Bete219086	Layer 45	7580 ± 50
	Juglans shell	SNU06204	Layer 41, shell layer 5	7470 ± 40
Sejuk-ri	Incrustation	SNU00385	Pit B2, layer III-3a	7390 ± 110
Sangnodaedo	Charred wood		Layer V	7300 ± 180
Dongsamdong	Bone	SNU00092	D-X-IX	7340 ± 60

Early tools used by Paleolithic peoples to catch fish, such as microliths and flint arrowheads, have been discovered at eastern coastal sites in Korea such as Osan-ri and Seopohang. Local polished stone tools have been excavated at the Dongsamdong site on the southern coast. The development of such tools increased the catch of fish, and when clams and crustaceans were in season, storage became urgent for the large amounts harvested. Marine products such as fish and clams were prone to rotting quickly and therefore required prompt cooking or immediate storage. This was likely the motive behind the invention of earthenware vessels that could preserve or boil fish. It is believed that the manufacture and use of pottery began as early as 8000 BCE in sedentary areas along the coasts of the Korea Strait, and not until later did techniques improve enough for earthenware to be used for cooking or for storing liquid. Pottery came into use long before farming culture flourished in this region (Lee 2001).

2.2.2 Primitive Pottery Sites along the Korea Strait Coastal Region

Pottery patterns and shapes changed over the passage of thousands of years. Using radiocarbon dating for pieces unearthed at the Dongsamdong archeological site, the production of certain styles of pottery can be estimated to coincide with the following dates: primitive patternless before 6000 BCE, raised-pattern 6000–5000 BCE, fingernail impression 5000–4500 BCE, stamped 4500–3500 BCE, thick-lined fishbone pattern (*taeseon-eogol*) 3500–2500 BCE, and late patternless 2500–1500 BCE (Lim 1983). The raised-pattern pottery dominant in 6000 BCE has been found at sites such as Dongsamdong, Sinam-ri, and Sangnodaedo Island along the southeastern coast of Korea, and Osan-ri on the eastern shore (Shin 1983, 1984).

Table 2.2 shows the estimated dates of the primitive pottery excavated on the Korean Peninsula and vicinities, classified by geographic location (Lee 1999). Of note are the similarities among early pottery cultures along the coasts of the Korea Strait, Hutouliang in the lower Yellow River of China, Bianbiandong on the Shandong Peninsula, and Gashia and Khummy in Russia's Maritime Province. As mentioned, these are now known to represent parts of the same early pottery culture.

When comparing the estimated periods of primitive pottery in Northeast Asia by region, the coastal areas along the Korea Strait, i.e., North Kyushu and the southeastern coast of Korea, reveal pronounced similarities (Lee 1999). The production and use of pottery along the coasts of the Korea Strait began in about 10,000 BCE, while 4000 years elapsed before the entire region of the Korean Peninsula was using earthenware by 5000 BCE (Lee and Kim 2016) (see Table 2.1).

Excavation sites containing the oldest (early 5000 s BCE) comb-pattern pottery in Korea are located along the Korea Strait, and similar Early Jomon pottery (5000–2500 BCE) sites in Japan are found on the opposite coast. In time, pottery-making techniques spread throughout the rest of Northeast Asia. Most of the archeological sites on the Korean Peninsula that contain pottery sherds dating to 5000 BCE are located in coastal areas. Gradually the nomadic hunter-gatherer model of Paleolithic life gave way to a more settled, coastal life where fish and other marine products abounded. Primitive pottery usage in these fishing cultures spanned a period from about 8000–5000 BCE, predating the agricultural era in Northeast Asia. An examination of shell middens and artifacts unearthed near riverbank or coastal dwellings on the Korean Peninsula reveals that people from this period subsisted mainly on fish and clams, using bone implements for fishing. Continued use of bows and arrows persisted for limited hunting. Additional food sources included acorns and other tree nuts, wild grains, greens, and plant roots (Lim 1986, Lee 1998). The Neolithic peoples of the Korean Peninsula, then, lived as littoral foragers during the period of Primitive Pottery culture (8000–5000 BCE), while in the early period of Jeulmun pottery (5000–3000 BCE) the gathering of marine life for food was supplemented with experiments in cultivation.

2.2.3 Pottery Usage and the Development of Related Techniques

Early primitive pottery consisted of thick-walled, concave clay dishes shaped by hand and heated outdoors over a fire. When fired over a low-temperature flame, the resulting vessels would have a high moisture absorption rate and not harden sufficiently to store large amounts of food for long periods of time. Such vessels were not suitable for cooking. As these early attempts at pottery moldered underground for

Table 2.2 The estimated ages of primitive pottery artifacts of the Paleolithic Era in northeast Asia (Lee 1999)

Approximate Year	Korean Peninsula, Korea Strait coasts	Korean Peninsula, northwestern region (Liaodong, Manchuria)	Korean Peninsula, northeastern region (Maritime Province of Siberia)	Korean Peninsula, Midwest region	China mainland
10,000 BCE	Kyushu Hukui cave, Shigoku Kamikuroiwa cave		Gasya Khummy		Hutouliang Nanzhuangtou
8000 BCE	Gosan-ri, Jeju Sangnodaedo Xth layer		Ustinovka Almazinska		Pendoushan In Yangzi Bianbiandong
6000 BCE	Dongsamdong Jodogi, Sangnodaedo first culture, Osan-ri B,	Manchuria Shinuishan, Misong-ri lower layer Chongho-ri	Sopohang 1st Osan-ri Munam-ri		Peiligang Dadiwan
5000 BCE	Dongsamdong Mokdogi, Sangnodaedo second culture,	Ssanghak-ri, Tosong-ri	Sopohang first layer, Osan-ri lower layer	Amsadong, Jitap-ri 1 dwelling site	Bampo, Xinglongwa Bexin, Hemudu, Majiabang
4000 BCE	Dongsamdong Busangi, Sangnodaedo third layer, Suga-ri first layer	Manchuria Shinuishan, Dongsan lower layer, Ogachon	Seopohang third layer, Osan-ri middle-upper layers	Misa-ri, Keumtan-ri, Namkgyeong first era	Miadigou Hongshan Dawenkou Daxi
3000 BCE	Dongsamdong Dudo Sugari second layer	Manchuria Shinnuishan Dangsan upper layer, Ssangtaja first layer, Shinam-ri first layer	Seopohang fourth layer	Sunyudo, Namgyeong second layer	Majiayao, Banshan Qujialing, Liangzhu
2000 BCE	Dongsamdong Youngdogi, Sangnodaedo fourth layer, Suga-ri third layer	Sinam-ri second layer, Sangmasok A	Seopohang fifth layer	Sobudo, Joido, Shido	Quijia, Longshan L.Xiajiadian Qinglongquan, Yueshi

thousands of years, the clay continued to absorb moisture, eventually reverting to a form almost indistinguishable from the surrounding dirt. For this reason, most pottery from 10,000–6000 BCE is unrecoverable. Level X at the Sangnodaedo site, the oldest and lowest stratigraphic level, reveals only tiny fragments of such pottery.

Early pottery development indicates that during this period people tried to make earthenware containers that could store watery foods or be used for boiling food over a fire. Analysis of pottery materials, shapes, and techniques reveals an effort toward forging larger vessels that would be stronger, impermeable to water, and able to withstand the heat of fire (Lee 1999). Table 2.3 presents an analysis of production characteristics of excavated pottery by layer at the Sangnodaedo site, based on the research of Professor Shin (1983) of Yonsei University (Lee 1999).

In its early days, pottery was baked over an open fire at a comparatively low temperature of about 500 °C (932 °F). The resulting vessels were not strong, crumbled easily, and absorbed too much liquid; the form they took is unknown due to their near-complete reintegration back into the earth. Beginning around 6000 BCE, people succeeded in hardening their pottery by increasing firing temperatures dramatically, a development that could point to the use of early kilns. The improved durability of earthenware vessels means that more sherds from this period have been found at archeological digs. By 3000–4000 BCE, firing temperatures increased again, this time reaching 700–750 °C (1292–1382 °F). The discovery of this technique ushered in a revolution in the utility of pottery.

Early earthenware was made of saline base clay that was sticky and iron-bearing, but after 4000 BCE, the use of sandy, iron-bearing clay became more prevalent. This shift gave rise to new pottery shapes and a lower damage rate during firing, two indicators of technological advancement. Less developed pottery-making techniques included the tempering of clay with granodiorite, a substance made of quartz and feldspar that shattered easily, the sherds turning to dust and mingling with the saline clay. However, between 4000 BCE and 3000 BCE, people began using seashells to temper their earthenware. The main ingredient of seashells is calcium carbonate, which melts and fills in the gaps and pores of the earthenware when heated to around 700 °C. Upon recrystallization, the pottery's moisture absorption rate decreases, while density and hardness increase.

Widely divergent levels of moisture absorption (5%–25%) appear in pottery made during this time. At first, such variation may have reflected an unintended consequence, but as the impact of higher and lower levels of hardness and moisture came to be understood, it seems likely that different types of pottery were produced for different purposes. Vessels built to store liquid foods for a longer period would have a low moisture absorption rate, but those made to store grain, fruit, or roots would have more pores and be more absorbent. Pottery used for boiling would not need to be elaborate, but it would be important to know what degree of porousness would allow the vessel to endure while cooking food over a fire.

Thus, the period between 6000–4000 BCE was marked by trial and error in pottery making, the use of a given vessel assigned after firing, based on its resultant

Table 2.3 Chronology and manufacturing characteristics of pottery excavated at Sangnodaedo (Lee 1999)

Layer name (estimated year)	Main ingredient/additive	Molding technique	Finishing technique	Baking temperature	Water absorbency	Color/Wall thickness	Shape/Rim diameter
Layer X, before 6000 BCE	Traces of small pottery debris						
Layer IX, before 6000 BCE	Clay, ferrous salt clay/quartz, granite, pottery powder (70/30)	Sunal, Kwonsang dough width 1-3 cm	Wall rubbing, thick layer of paint, white/red dye	Below 700 °C	9.5–25.3%	Brown/7–8 mm	No pattern, attached strips, round bottom, flat bottom, big vessel, half-egg bowls/12–38 cm
Layer VII, 6000 BCE	Ferrous salt clay, rock powder/pottery powder, quartz (55/45)	Kwonsang dough width 3–3.5 cm	Thick layer of paint, inner wall rubbing	Below 700 °C	9.7–17%	Light brown/4–12 mm	Round-bottom, small bowl/18–34 cm
Layer VII, before 6–5000 BCE	Ferrous salt clay, rock powder/quartz, feldspar, pottery powder (55/45)	Kwonsang	Thick layer of paint	Below 700 °C	10–16.8%	Brown, grey/7–8 mm	Attached strip, no pattern, round bottom, large vessel/14–38 cm
Layer V, 4000 BCE	Ferrous salt clay, rock powder/quartz, pottery powder, clamshell powder, biotite	Kwonsang, Yonjok	Thin layer of paint, no paint	Near 700 °C	5.2–17.2%	Brown, grey/5–6 mm	Fish-bone pattern, comb, dot, or scale pattern, round bottom, flat bottom, large vessel, crocks, trays/6–42 cm
Layer IV, 3000 BCE	Sandy soil/clamshell powder, pottery powder, mica	Kwonsang, Yonjok	Inner wall rubbing, thick layer of paint	700–750 °C	6.2–15.1%	Black-brown, grey-brown/6 mm	Slash, wave, or comb pattern, inclined lips, double lips, round bottom, big vessel/12–42 cm

(continued)

Table 2.3 (continued)

Layer name (estimated year)	Main ingredient/additive	Molding technique	Finishing technique	Baking temperature	Water absorbency	Color/Wall thickness	Shape/Rim diameter
Layer III, 2000 BCE	Sandy soil/clamshell powder, quartz	Kwonsang, Yonjok	Wall rubbing, double lip	700–750 °C	7.2–16.9%	Brown, grey, black/ 6 mm	Comb, dot, or wave pattern, round bottom, flat bottom, pointy bottom, single lip/14–40 cm Double lip/26–48 cm

hardness. After 4000 BCE, however, techniques improved to the point where people were able to design pots for a specific purpose by adjusting materials and heat levels. This evolution marked the beginning of specialization in pottery manufacture. From this time on, fire pits dedicated to making pottery were created; flat, open kilns led to kilns built on an inclined plane, which eventually led to enclosed kilns.

2.2.4 The Shapes and Uses of Pottery

Neolithic people shaped early pottery by rolling lumps of clay into long, thin cylinders and then coiling them on top of one another. Before 6000 BCE, the coils were made by hand-rolling heavy clay, which resulted in crude pottery with rough, thick walls. Later, amendments added to the clay and improved firing techniques together led to coil pottery with a more uniform shape and thinner walls.

From 6000–4000 BCE the range of earthenware wall thickness varied from 4–12 mm, but after 4000 BCE, 6 mm became the standard. All vessels excavated from the period of incipient pottery have round or flat bottoms and vary in shape from small bowls and half-oval-shaped containers to large, round bowls. At first, the diameter of the mouth hovered around 12–24 cm for a small dish or bowl-shaped container, but as time passed, the diameter of vessel openings expanded to 48 cm and were sometimes marked by a double rim, or lip. Scholars presume that small vessels were used to cook over fires, and large vessels were used to store grains, while medium-sized vessels, which were about the size of traditional kimchi crocks, were used for pickling and fermenting vegetables.

Pottery excavated on the coast of the Korea Strait can be categorized according to shape and size. For example, each of the following types of vessels has a characteristic size and shape: a pot for cooking over a fire (*ttukbaegi*), a crock for fermentation (*hang-ari*), and a jar for storing dried grains (*dok*) (Fig. 2.2).

Cooking pot (ttukbaegi)	Fermentation crock (hang-ari)	Storage jar (dok)
Mouth dia. 6-12 cm or 12-24 cm Small bowl shape, circular or cone-shaped bottom Low moisture absorption rate	Medium-sized pot 4-17 L volume Round shape Mouth & bottom small Low moisture absorption rate	Large container 17-56 L volume Round or flat bottom High moisture absorption rate

Fig. 2.2 Usages and characteristics of primitive pottery

The *ttukbaegi*, which was used for cooking, typically had a mouth 6–12 cm or 12–24 cm in diameter; it was a relatively small vessel, did not absorb much moisture, and the bottom was round or conical. Fermentation crocks were medium-sized vessels, with a volume of 4–7 liters and low absorption rate, and the bottom narrow and conical. Storage jars were larger, with a volume of 17–56 liters, high absorption rate, and round or flat bottoms.

Most of the pottery unearthed from the Sangnodaedo excavation site consists of bowl-shaped vessels with a diameter of about 24 centimeters at the mouth, big enough to cook one meal for a single family. Earthenware was not made to hold individual servings of food; large leaves, clamshells, or pieces of wood were probably used instead. Larger cooking vessels, which begin to be seen later, are indicative of family groups making meals together. The discovery of small earthenware vessels with a diameter of 6–12 cm at Sangnodaedo garnered much interest in the academic world: The hypothesis was that if earthenware dishes for personal use were unnecessary at this time, then perhaps the small vessels were created for a specialized use.

After examining similar pieces at Japan's Jomon excavation sites, one scholar has suggested that small pottery vessels may have been used to make salt from seawater. Pouring concentrated saltwater into several small dishes and placing them over a fire until the water evaporated would produce a residue of salt crystals (Ishige 1998). During the Primitive Pottery era, people who lived along the coasts, where earthenware was developed to cook food, would have grown used to the taste of salt by using seawater to cook or boil their food. It follows that if small earthenware vessels embodied the specialized purpose of producing salt from seawater, then the use of salt for cooking and storing seafood would have been part of the food culture well before the archeological evidence of small vessels. The invention of pottery was a groundbreaking event in the history of humanity's food culture for many reasons, not least of which concerns the use of salt in food preservation.

During the Primitive Pottery era, practicality of form was paramount. For example, cone-shaped vessels—pottery with pointed bottoms—are frequently seen during this period. Although cone-shaped pottery would not sit upright in modern homes with flat floors, most Neolithic dwellings had dirt floors, into which holes could be dug to secure the vessels. The more frequent appearance of flat-bottomed pottery at Seopohang and other sites in the northeast region of the Korean Peninsula reflects the prevalent practice of tamping down floors with clamshells and ocher clay to make them firm and level (Lim 1985).

Cone-shaped pottery had certain advantages, especially when it came to storing pickled foods or cooking food over a fire. Whether fermenting seafood or pickling vegetables in a crock, the food must be continuously submerged in liquid. Cone-shaped vessels held the liquid higher in the jar, keeping the solids covered. In flatter vessels liquid would pool toward the bottom, thus risking exposure of the solid foods and leading to spoilage. When cooking with hot stones, cone-shaped pottery was able to provide a large area of heat transfer because it could be nestled in among the rocks, thus achieving greater thermal efficiency than its flat-bottomed counterparts, which were more likely to be placed on top of the rocks. Archeologists have found a correlation between the frequency of certain shapes of pottery at archeological sites and the types of dwellings found there.

Pottery designs made for aesthetic rather than practical purposes help archeologists to distinguish groups of humans by time period and region. For Neolithic pottery in Korea and Northeast Asia, the designations primitive patternless, middle patternless, and late patternless are used to categorize the progression of designs over time (Han 1983, Lim 1983). However, Sin Sook-Jeong's efforts to classify the pottery at Sangnodaedo (Shin 1984) led to the discovery that plain and patterned pottery sherds appear with nearly equal rates of frequency throughout the Neolithic era. Whether or not patterns exist on pottery may depend less on time or place, and more on aspects of functional use. For example, certain Indian tribes used rough, patternless pottery with wide mouths and narrow necks for cooking, but for storage, they preferred more refined, patterned pottery with wide mouths (Plog 1980). The fibrous patterns in early pottery found in the Yangtze River Basin in South China and along the Amur River in Russia have been interpreted as a primitive form of earthenware made in a basket of vegetable matter that was used for cooking wet food with hot stones (Liu and Chen 2012, Zhushchikhovskaya 1997).

Pottery with a red finish is now being excavated at the Sangnodaedo site. In the first stratigraphic layer, before 6000 BCE, sherds bearing two kinds of paint application have been found: plain pottery, in which the pottery is sanded and painted white, followed by a topcoat of red paint, and patterned pottery, where the piece is painted a light color, and then only the pattern is painted red. These two techniques echo the well-known painted pottery methods of Yangshao culture, which thrived in China around 4000 BCE, yet 2000 years earlier we find the use of painted pottery along the coasts of the Korea Strait. The assumption among scholars that Korean red pottery was influenced by Yangshao culture must now be corrected. The topographical proximity of the west coast of Kyushu, the southern coast of the Korean Peninsula, and the east coast of China until the end of the Pleistocene provided an area of exchange, and thus, the earlier pottery culture along the coasts of the Korea Strait would rather have been passed on to China via this route.

2.3 Primitive Pottery-Era Tools and Living Environment

Around 10,000 BCE, when the Pleistocene epoch ended and the Holocene epoch began, land which had iced over during the previous glaciation, as in northern Manchuria and Siberia, gradually began to thaw. Warmer temperatures on the grasslands of Korea and the rising Yellow Sea brought about the extinction of the woolly mammoth and rhinoceros, animals that had thrived there during the Upper Paleolithic era, and reindeer, polar bears, and other cold-weather animals migrated to alpine regions in Siberia. Animals such as deer, wild boars, hares, foxes, and roe deer living on grassland that became the floor of the Yellow Sea, along with similar animals inhabiting islands in the southern region of Japan, migrated to the Korean

Peninsula. People in southern Japan followed their animal prey on a migratory path north. In time, however, as people of this era became more accustomed to gathering algae and other marine products along the coasts and found a greater abundance of grasses, fruits, and vegetables growing near previous human dwellings, they no longer needed to follow the migration of large game. As they adapted to the changing climate, people began to forsake their nomadic ways. Many pit dwellings from this period have been discovered in the northern region of the Korean Peninsula (Lim 1985), and the remains of tools used for small-mammal hunting and fishing have been found in littoral and riparian sites across Northeast Asia (Hwang 1983).

2.3.1 Tool Development

As group hunting for large game gave way to individual hunting for smaller animals, harpoons, spears, and bows and arrows became the tools of choice during this period. The milder climate led to a proliferation of snails and shellfish, which gained importance as a source of food alongside fish. Once angling rods and nets were invented, people were able to catch plentiful amounts of marine life. The need to preserve a harvest that would spoil quickly spurred the rise of primitive pottery culture in this region. On the Korean Peninsula and elsewhere in Northeast Asia, fishing and gathering cultures were able to flourish with the use of pottery as the Paleolithic era entered into the Neolithic, about 5000 years before the dawn of agriculture. While stone microliths and bone tools similar to those excavated from Europe's Middle Paleolithic and Early Neolithic sites have also been found in Northeast Asia, the discovery of pottery was a much more impactful cultural phenomenon for Northeast Asian peoples, and so rather than define this period as the Middle Paleolithic era, as in Europe, it is more accurate to refer to it in Northeast Asia as the Primitive Pottery era (Lee and Lee 2016).

Many microliths have been excavated in Korea, Siberia's eastern and southern regions, Inner and Outer Mongolia, regions flanking the Great Wall of China, Shaanxi Province, Manchuria, and Japan (Choi 1983). On the Korean Peninsula, obsidian blade tools, arrowheads, and spearheads made of bone or horn that date from the end of the Upper Paleolithic era or the early Primitive Pottery era have been found at the Donggwanjin site, and obsidian blade tools have been excavated at the Seokjang-ri site. Stone axes and flint arrowheads from the middle of the Primitive Pottery era, 6000–5000 BCE, have been discovered at the northeastern site of Seopohang (Lee 1999).

Half-polished stone axes made of igneous rock have been discovered at the Dongsamdong 1 site, situated on the coast of the Korea Strait, and polished, double-edged stone axes have been unearthed at the Sinam-ri site. At the Osan-ri site, 2 polished stone blades, 1 unfinished stone arrowhead, 1 stone hoe, obsidian fragments, and 10 kinds of fishing tools have been excavated. Various bone tools and chipped and polished stone tools that date from the end of Northeast Asia's Primitive Pottery era (around 4000 BCE) have also been found. In the northeast

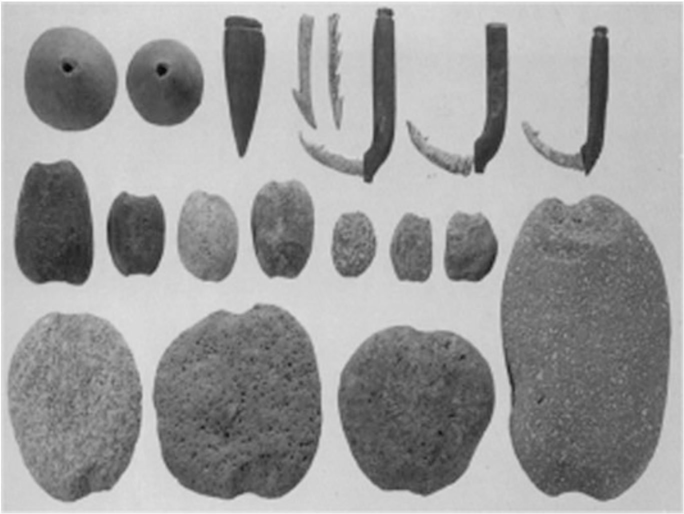


Fig. 2.3 Primitive pottery culture fishing tools (National Museum of Korea)

region of the Korean Peninsula, tools discovered at archeological sites such as Seopohang, Najin-ri, Socheong-dong, and Ssangpo-dong include chipped stone axes, polished stone axes, chipped and polished arrowheads, stone weights for fishing nets, grinding stones, stone spearheads, hoes, obsidian, charcoal, awls, and spindle whorls (Hwang 1983). In the northwest region, at Geumtan-ri and Cheongho-ri, chipped stone axes, chipped and polished stone arrowheads, stone blades, stone weights for fishing nets, and grinding stones have been unearthed. Chipped and polished stone axes, chipped arrowheads, stone blades, stone chisels, stone net weights, and grinding stones have been discovered at the mid-western sites Amsa-ri, Masa-ri, and Sido. In the southeast, along the coast of the Korea Strait, tools found at the Dongsamdong, Suga-ri, and Osan-ri sites include chipped and polished stone axes, chipped and polished stone arrowheads, stone blades, grinding stones, and obsidian. Bone implements excavated at Seopohang, Osan-ri, Suga-ri, and Dongsamdong include medium-sized needles, large needles used for straw weaving, cutting spears, barbed and smooth harpoons, awls, leaf-shaped arrowheads, and net weights (Fig. 2.3).

Korean archeologists have established that toward the beginning of the Upper Neolithic, around 3000 BCE, people living on the Korean Peninsula and across Northeast Asia began to replace chipped stone tools with polished stone tools, the latter being indicative of early farm culture.

2.3.2 Petroglyph Sites

Petroglyphs provide important evidence about people's lives in prehistoric times. Thus far, about 20 sites with petroglyphs have been discovered along the southeastern coast of the Korean Peninsula. Among these, representative rock drawings have been found at the following sites: Cheonjeon-ri and Daegok-ri in Ulsan; Inbi-ri and Chilpo-ri in Pohang; Seokjang-ri in Gyeongju; Poseong-ri in Yeongcheon; Sangju-ri in Namhae; and Orim-dong in Yeosu. The concentration of petroglyphs in the southeast region of the peninsula suggests that people settled there for extended periods of time, challenging the theory held by some that the area served mainly as a migratory route during the Primitive Pottery era.

In 1971 petroglyphs were discovered on a rock face in Ulsan along the banks of Daegok stream, a tributary of Taehwa River. Known as the Bangudae petroglyphs, this block of drawings measures 10 meters high by 3 meters wide and is thought to have been carved continuously from 5000–1500 BCE (up until the Iron Age). Whales feature prominently among the 75 subjects found in approximately 260 engravings, along with other sea creatures, land animals, and people. With its unique expression of nautical culture, the rock art at Bangudae imparts a trove of information regarding the food culture and lifestyle of North Pacific prehistoric peoples, as well as evidence of the first known whaling community. About 40 land animals are depicted, including tigers, wild boars, and deer, with tigers depicted in pit traps or pregnant with young. Wild boars are shown mating, and deer can be seen pregnant or caring for their young. There are drawings of pregnant whales, whales with their young, and whales being harpooned. Scenes of hunting, with a shaman wearing a mask and a hunter chasing beasts, and whaling, with men capturing a whale from a boat, grace the rock. Fishnets and boats are also discernable (Fig. 2.4).

An important record of Primitive Pottery culture along the coasts of the Korea Strait around 5000 BCE, the Bangudae petroglyphs reveal that people hunted and fished with considerable knowledge of animal ecology and fishing techniques. As in Paleolithic times, deer meat comprised the majority of land meats consumed, but in the Bangudae region, navigational skills had clearly developed to the point where whale meat also constituted an important source of food.

What may be evidence of one of the world's oldest wooden boats has been found at the Neolithic site Bibong-ri, located in Bugok-myeon, Changnyeong-gun, South Gyeongsang Province (August 2013, Gimhae Museum). The remains of this dugout canoe indicate that the boat was probably made at the beginning of the Neolithic era, about 8000 YBP. In contrast, a solar barge made for Egypt's King Khufu is dated 3400 years later, and the oldest boat remains known in Japan, excavated from the Torhiama 1 and Ikiriki sites, are dated about 2000 years later. The Bibong-ri boat measures 310 cm long (about 10 feet), 60 cm wide (about 2 feet), and about 20 cm deep (about 8 inches), and was made using a method of scorching the wood and then shaping it with stone tools. The canoe was likely used for fishing and transport. This

Fig. 2.4 Rubbing of Bangudae Petroglyphs at Daegok Creek in Ulsan (©Andongdae Museum, Director Im Se-Gwon)

discovery sheds further light on the remarkable lifestyle and skills of the people of Primitive Pottery culture living along the coasts of the Korea Strait.

2.4 Food Techniques in the Primitive Pottery Era

Until the end of the Paleolithic era, Northeast Asians relied mainly on migratory hunting for food, and their food consisted of the meat, intestines, and blood of deer, wild boar, bison, and roe deer. It seems that plants such as acorns, chestnuts, wild grapes, kudzu roots, and deodeok roots were gathered to supplement the meat-based diet (Lee 1998). As techniques for drying meat developed, and people learned that plant and animal life flourished in the vicinity of previously inhabited dwellings, family groups gradually increased their stay in certain areas, and grass seeds, millet, and wild beans were collected and added to food stores. As they moved closer to rivers and seas and became familiar with underwater life forms, they collected crustaceans, frogs, and mollusks for food. In the shell middens of the late Paleolithic era, the most frequently excavated items are shellfish, especially oyster. In terms of fish, the remains of sea bream, mackerel, and shark have been discovered, and it is assumed that various types of seaweed were gathered, although no actual remains have been found due to the rapid decomposition of sea vegetables (Park 1965).

Due to autolysis, or self-digestion, these marine resources quickly degenerate and are not easily dried, so they would have to be eaten on the spot and could not be depended on as a staple source of nutrition. The invention of pottery at this juncture was a watershed that significantly altered the foodways of Paleolithic humans, even ushering in a new era. Pottery made it possible to cook food over a fire and to store moist foods. Early earthenware, with its propensity to absorb too much water, would not likely have endured over a fire, but they could have been used for dry storage. The method of drying fish or shellfish after boiling may have been used for storing animal marine foods, just as wild game was dried for storage. In an effort to achieve consistent results in cooking and storage, the physical properties of earthenware would continue to be improved and developed. Through this process, the Primitive Pottery-era peoples of Northeast Asia experienced important technical developments in their food culture.

2.4.1 The Origin of **Jjigae** *Culture*

When people lived as hunter-gatherer nomads, the salt and minerals they required were provided by the animal blood and organs they ate. For littoral foragers and fishers, these nutrients were supplied mainly by marine foods, and the people soon became familiar with the taste of salt. When game was difficult to find or hunts were unsuccessful, people learned they could substitute plant matter into their diet and make it more palatable with salt. Primitive Pottery cultures, particularly along the Korea Strait, came to appreciate the taste of salt and learned methods for acquiring it while living along the coasts. They boiled seawater in earthenware vessels and added seafood, then mixed in greens, grains, roots, and nuts collected in the fields. This stew-like concoction became the basis of what is still considered Korean food culture's representative specialty: *jjigae*. To this day, *jjigae* continues to be cooked in earthenware pots, *ttukbaegi*. The Neolithic method of boiling seafood in earthenware vessels with sea vegetables gathered from the water and greens and roots collected in the fields fundamentally mirrors the recipe used for *ttukbaegi jjigae* today. *Jjigae* is distinguishable from clear broth soups, such as Japanese miso soup, by its thicker base and the addition of chunky fish or meat and vegetables.

When the people of Primitive Pottery culture learned to boil their food, *jjigae* culture was set in motion. At some point, Neolithic peoples placed water in a vessel and cooked fish or shellfish over a fire for the first time, and soon thereafter, *jjigae* became a favored way to make a meal. A seafood *jjigae*, boiled together with grains and tree nuts like acorn and chestnut, would provide an entire meal in one dish. Boiling the food was more sanitary than eating raw seafood, and it would last longer in storage. Koreans today can easily imagine a family sitting around an earthenware pot filled with boiled *jjigae*. Of necessity, *jjigae* culture required the use of spoons or chopsticks, and at this time there may have been a flowering of tools used for scooping or ladling, but because these implements would probably have been made of wood, no evidence of such utensils has been found.

Kwak et al. (2017) used gas chromatography–mass spectrometry (GC-MS) to analyze organic matter in the earthenware fragments excavated at Songguk-ri culture sites (2900–2400 YBP), which are located along the banks of the Geum River in central Korea. The existence of organic matter was confirmed in 18 of 27 samples. The greatest amount of organic matter in a vessel, 59 mg/g (the average being 33 mg/g), was found to be lipids, most of which consisted of palmitic acid (C16:0) and stearic acid (C18:0), thus indicating that the earthenware bowl last held boiled animal parts.

Boiling culture developed in tandem with the advent of agriculture, the latter leading to the practice of eating rice together with *jjigae* or *tang* (soup), another tradition that became a fixed staple of native Korean food culture. Today Koreans enjoy the custom of placing a *ttukbaegi* bubbling with *doenjang jjigae* (fermented soybean-paste stew) on the dining table to gather around and enjoy. *Gim* (dried laver, oiled and salted), *miyeok* (dried sea mustard), and other types of seaweed are frequently added to *jjigae*. This practice began thousands of years ago with the rise of Primitive Pottery culture in 6000 BCE on the coasts of the Korean Peninsula (Lee and Kim 2016).

In modern times, aborigines living by the sea in Papua New Guinea have been found to combine fresh water with saltwater in their cooking in order to adjust the salt seasoning in their boiled foods (Ishige 1976). Similarly, Neolithic Northeast Asians on the coasts of the Korea Strait, who previously relied mainly on hunting, now turned to seafood and foraged vegetables boiled in saltwater as the mainstay of their diet. As boiling prevented spoilage, *jjigae* became the logical choice for preparing seafood for consumption, and the resulting saltiness from the seawater enhanced the flavor of the wild vegetables that were added to the pot.

2.4.2 The Origin of Salt-Making Techniques

Although it is impossible to know how far back the history of salt manufacture goes, the process of boiling seafood with saltwater in a clay pot would have resulted in an increasingly salty broth as the water boiled down. If the water boiled away completely, a salty white residue would remain in the pot. According to Ishige (1995), there is archeological evidence from the latest Jomon period of pottery that salt was manufactured using the boiling method. He indicates that the oldest known pottery used for salt making, discovered at sites in the Kanto region, dates from around 500 BCE, well into the era of agricultural society. Yet the Primitive Pottery era began along the coasts of the Korea Strait 10,000 years ago, and the use of earthenware by these people to boil *jjigae* suggests the manufacture of salt by boiling seawater began well before the dawn of agriculture (Lee 1999).

Rock salt was not discovered by Stone Age peoples on the Korean Peninsula, so their supply of sodium came from animal liver and blood. In the late Paleolithic and Lower Neolithic, as familial groups moved closer to river banks and sea coasts, sodium was supplied mainly by seafood. The transition from a nomadic hunting lifestyle to that of littoral foragers may have ensured a more reliable supply of sodium. As Neolithic peoples boiled *jjigae*, they would have observed salt crystals forming on the insides of their clay pots, a phenomenon that would, in time, foster the development of deliberate salt-making. As foragers along the Korea Strait began using earthenware vessels to make salt from seawater, they also developed methods of preserving food in salt, thus facilitating long-term food storage and introducing foodways that employed more grains and root vegetables.

2.4.3 *The Making of* Nuruk *and the Origin of Cereal Fermentation Culture*

In hot and humid areas, storing grains such as rice, common millet, barnyard millet, foxtail millet, and starchy nuts and tubers in earthenware when not completely dried induces the growth of mold, some of which contains strong enzymes for breaking down raw starches. These molds—for example, *Rhizopus* species—quickly reduce starches into sugars, and with the help of natural yeast (*Saccharomyces cerevisiae*) in the environment, the grains soon turn into alcohol. If a little water is added to the moldy grains or roots, the scent begins to improve, and in 2–3 days the concoction becomes an alcoholic drink. It is not hard to imagine that people in the Primitive Pottery era would have experienced this phenomenon (Fig. 2.5).

Fig. 2.5 Natural fermentation of alcohol in earthenware

Seeds, nuts, or roots in an earthenware vessel

↓ Hot and humid environment

Growth of mold (*Rhizopus* sp., decomposes raw starch)

↓ Saccharification

Formation of sugar

↓

Growth of yeast (*Saccharomyces cerevisia*)

↓ Alcohol fermentation

Fermented alcoholic beverage

Mold growing on grains and grass seeds stored in an earthenware vessel created the fermentation starter known as *nuruk* in Korea, which today is formed into a yeast cake and used throughout Northeast Asia. When *nuruk* is placed in an earthenware jar with water and grain and left to ferment, the result is *makgeolli*, a turbid grain beer, and when filtered, the clear liquor is *cheongju*, or refined rice wine. Thus, early grain wine was made by fermenting non-steamed starchy grains in earthenware pottery (Lee and Kim 2016).

The history of alcohol begins well before the written word, and indeed, ancient records in Northeast Asia mention grain wine in such a way that indicates reader familiarity with the drink. At first, grain wines would probably have taken the form of unfiltered, porridge-like drinks. With the development of weaving, cloth would have been used to filter out coarse ingredients, thus allowing for a clearer alcoholic drink. Early fermentation techniques in Northeast Asia included mixing water with grains or roots that had grown mold in an earthenware crock. The use of yeasty *nuruk*, with its high level of enzymatic activity, birthed a new method of brewing cooked grains. Not long before 2000 BCE, it seems likely that the manufacture of grain wine underwent a sea change; *The Annals of Lü Buwei* (China) credits the daughter of Yu the Great (c. 2123–2025 BCE) as being the first person to brew grain wine (Lee 1984a).

A passage from *Shijing* (*Book of Songs*, a compilation of Chinese poetry from 1100–600 BCE) compellingly mentions “Yao’s one thousand wines.” It is likely, then, that before King Yu the Great, and as early as Emperor Yao’s reign (2356–2255 BCE), there were already many types of grain wine. Other ancient records depict the transmission of grain wine from Korea to Japan and China: A story in Japan’s oldest history book, *Kojiki* (*Record of Ancient Matters*), relates that during Emperor Ōjin’s rule (third century CE), a man named Inbeon from Baekje, a Korean kingdom, brought wine-making techniques to Japan. Also, a Mr. Jin from the Silla kingdom in Korea, recognized as the first to brew high-quality rice wine in the Kyoto region of Japan, is currently enshrined as a god of wine at Matsuo Taisha, a Shinto shrine built in 701 CE. That story and a record from the Unified Silla period (668–935 CE) stating that high-quality Silla rice wine was exported to Tang China, suggest that Silla might have been the origin point of rice wine manufacture in East Asia (Lee and Kwon 2003).

Alcoholic drinks are probably the oldest processed food in human history. Beer was being made in Egypt around 4000 BCE, and evidence of jars used for making alcohol discovered at archeological sites from Shang dynasty China (1600–1046 BCE) are the oldest artifacts specifically having to do with alcohol discovered to date (Lee 1984b). Alcohol is universally treated as a well-known drink in records referring to the Heroic Age of Northeast Asia, 4000–3000 BCE. Countless myths that include alcohol have been passed down over the years. Thus, the hypothesis that by 6000 BCE people of the primitive pottery culture living along the Korea Strait made grain alcohol along with their earthenware pottery has temporal validity.

Taking into consideration, then, that Northeast Asians began making grain alcohol together with early earthenware vessels during the Primitive Pottery era, fermentation techniques would have been well known by 3000 BCE, when alcohol began to be manufactured broadly. Soon after this, agriculture would establish its roots. Perhaps the knowledge of how to make grain alcohol hastened the advent of a farming culture centered on grains, given that farmers would have placed a high value on the grains used to make alcohol.

2.4.4 The Origin of Kimchi Fermentation

When vegetables like cabbage or radish are submerged in a 3% salt solution in a container, lactobacilli will create the sour taste and smell of fermentation within 3 or 4 days. Fermentation would have occurred during the Primitive Pottery era when, after gathering wild greens and root vegetables from a field, people stored them in seawater, which would result almost without exception in lactic acid fermentation. Among the countless bacteria that grow naturally under these conditions, *Leuconostoc mesenteroides* is the most beneficial in the early stages of this process (Lee 1997, Rhee et al. 2011). This bacterium produces both lactic acid and acetic acid, resulting in a slightly acidic, heterolactic fermentation, with a pH of just over 4.8. The predominance of this strain of bacteria at the beginning of fermentation prevents the putrefaction that occurs when harmful bacteria proliferate. Homolactic fermentation takes over when the bacterium *Lactobacillus plantarum* becomes dominant, and the large quantities of lactic acid it produces lower the pH to 3.0 or less, resulting in the strongly acidic bath of pickled vegetables (Lee 2009) (Fig. 2.6).

The phenomenon of fermentation occurs in the natural world whenever similar conditions are met. Indeed, in nearly every region of the world naturally lacto-fermented products have a place among traditional foodways, including ensilage for livestock, which is fodder preserved by primary lactic acid fermentation. Representative traditional foods include Korean kimchi, German sauerkraut, Vietnamese *dua muoi*, Thai *dakguadong*, and Philippine *burong mustala*, to name a few (Lee 1994, 2009). Among these lactic acid ferments, some require no salt, but as in ensilage, air is prevented from entering so that lactic acid fermentation can begin,

Fig. 2.6 Natural fermentation of Kimchi in earthenware

Vegetables in an earthenware vessel filled with sea water

↓3% Salt brine

Growth of *Leuconostoc mesenteriodes* (lactic acid bacteria)

↓Production of acetic acid and lactic acid

pH 4.5, growth of *Lactobacillus plantarum*

↓Lactic acid production

pH 3.0, kimchi

resulting in a strong sour taste. It is thought that the pickled vegetables of Chinese antiquity, *ju*, appertain to this category of anaerobic fermented food.

Ju is mentioned in *Shijing* and in a verse from *The Annals of Lü Buwei*, which reads, "When Confucius heard that King Wen of Zhou enjoyed eating ju, he decided to imitate the actions of his esteemed king by also eating ju, but for three years he held his nose while eating it before finally learning to enjoy the taste." This story illustrates how strong the pickled vegetables must have been (Lee 1984a). *Shuowen Jezi* (an explication of written characters), a Chinese dictionary compiled in about 100 CE, defines ju as "sour vegetables." However, the fermented vegetables and salted pickles traditionally made in Korea and the broader Northeast Asian region do not have such a strong sour taste. In Korea, as mentioned above, lactic acid fermentation was discovered after storing vegetables in seawater in earthenware vessels. Yet when vegetables were mixed with seawater only, they were apt to become contaminated and spoil. Over time the concentration of salt in preserves gradually increased, until by 1000 BCE, the era of record, pickles were recorded as being made with a high concentration of salt. A characteristic unique to Korean kimchi is the mitigation of salt in lactic acid fermentation by the addition of various spices to aid in suppressing harmful microorganisms, thus bolstering the lactobacilli and producing a harmonious flavor.

2.4.5 *The Origin of Jeotgal (Salt-Fermented Seafood Condiment)*

If the motivating factor behind incipient pottery use by Paleolithic peoples along the coast of the Korea Strait was that they required containers to quickly cook or store seafood, there remains the question of what techniques they used to store the seafood. During the Primitive Pottery era, there would not yet have been the quantities of salt needed for storage involved in today's manufacture of fish sauce and jeotgal. Without ample salt, there would be few ways of storing seafood for long periods of time. One method would be to mix dried seafood with lacto-fermented vegetables or sour fruit, such as *maesil* (green plum). Combining quick-rotting seafood with fermented vegetables would lower the pH to below 4.5, thus preventing the propagation of noxious microorganisms and allowing the seafood to be preserved for a longer period of time (Lee 1997, 1999) (Fig. 2.7).

Fig. 2.7 Natural fermentation of Jeotgal/*Sikhae* in earthenware

Fish and shellfish in an earthenware vessel

↓Mix with acidic fruit or acidic kimchi

pH 4.0, suppression of spoilage microorganisms

↓Activity of gut enzymes

Autolysis, decomposition of proteins

↓Formation of flavor components

Savory jeotgal/sikhae (fish with grains) fermentation

Low concentrations of salt would cause rapid autolysis by the enzymes in the entrails and innards of fish and shellfish, releasing a strong, rancid flavor. The putrid smell and taste thusly formed would be unpalatable to Northeast Asians today, but to people living in the Primitive Pottery era, raw seafood fermented with cooked acorns, plant roots, or grasses could well have been reminiscent of the powerful flavor of the raw animal meat and organs to which they were accustomed. Even today the fermented fish sauce made in Southeast Asia smells too strong to be palatable to some people. In conditions where harmful bacteria cannot flourish, the sense of whether food is perceived as rotten or pleasingly fermented often stems from culturally-based subjectivities. Fish sauce, jeotgal, kimchi, cheese, and yogurt, to name a few, are fermented foods that taste delicious to the communities that traditionally consume them, but to out-groups, such dishes often seem unacceptably putrid (Lee and Kwon 2003).

During the Primitive Pottery era, as people moved away from a carnivorous diet and toward a marine and vegetable-based diet, the combination of fermented vegetables with seafood introduced an inevitable flavor profile that may have served as the origin of dishes such as the *sikhae* (fermented fish mixed with grains) and various types of jeotgal enjoyed throughout East Asia today. Efforts were made over time to reduce the strong scent of decaying fish, which was achieved by a gradual increase in the concentration of salt in such dishes (Lee 1999).

In the manufacture of jeotgal, there are several methods whereby the level of sodium can be increased without using salt crystals. One involves heating saltwater in a pot until much of the water has evaporated, and then, after cooling, adding seafood to the salt solution. This method easily attains a level of 20% salt concentration. As the concentration of salt increases, pure jeotgal can be made without the addition of lacto-fermented vegetables or sour fruit. This is the jeotgal typically produced in Korea today.

As the level of salt concentrate increases, *nuruk* may be added instead of fermented vegetables in order to speed up the process of decomposition. The enzymatic action of *nuruk* has a mollifying effect on the smell and taste of the food, and its use in fermentation marked a technological advance that led to the creation of *jang*, any number of seasoning pastes or sauces in Northeast Asia used in preserved foods. *Jang* (Chi. *jiang*) first appears in literature in China's *Zhou li* (*Rites of Zhou*, 200 BCE): "There are two kinds of jang, *hae* and *hye*. Hae is made by drying any kind of meat in the sun—fowl, flesh, or fish—then grinding it to a fine powder and soaking it in alcohol. Add to this a nuruk cake made of millet and some salt, seal it in a jar and let it ripen in a dark place for 100 days. Hye is made using the same ingredients as hae, but the juice of green plums is added to give it a sour taste." The jang described in *Zhou Li* refers to *yukjang*, which appeared thousands of years after the Primitive Pottery era in a comparatively refined form. The basic principle of *yukjang* (a ferment of meat), however, originated in the rudimentary jeotgal developed in the natural environment of Primitive Pottery culture along the Korea Strait (Lee and Kwon 2003).

2.5 The Nutritional Anthropological Contribution of Primitive Pottery Culture

The *jjigae* and fermentation techniques developed in tandem with primitive pottery by the peoples living on the coasts of the Korea Strait, and later throughout the peninsula and Northeast Asia, had a significant effect on the state of human nutrition and the development of society. The method of adding several different ingredients to a pot of boiling water for *jjigae* supplied a well-balanced meal and constituted a major step forward in hygiene. As foods began to be seasoned with salt, their flavor improved, and various hitherto inedible vegetables became suitable as cooked ingredients. Due to fermentation techniques, quick-rotting seafood and vegetables could now be stored for longer periods of time, thus securing a stable food supply and even improving the taste of such foods. The development of such techniques during the Primitive Pottery era multiplied the nutrients available to these people, and when compared with Paleolithic groups elsewhere, their life spans and birth rates increased, leading to a mushrooming population. Improved nutrition and food sanitation also led to stronger and larger physiques compared to people living in surrounding areas. These societal advances facilitated agriculture and the formation of tribal nations in the 3000 s BCE, especially the Dongyi tribes, who became leaders in the emerging chieftain-based system of the Northeast Asian megalithic culture (Lee 1999).

Despite the fact that the Primitive Pottery culture of the Korean Peninsula played an important role in the developmental stage of humanity, especially regarding the ancient history of Northeast Asia, it has not yet been properly evaluated on the world stage. The early historical categories used by European historians, Paleolithic-Mesolithic-Neolithic-Bronze Age, remain the dominant archeological framework across the globe. Ro (1994, 1997), however, divides the early history of Korea into the following periods: Paleolithic-Jeulmun hunting and fishing culture-Mumun agriculture-Liaoning bronze culture-Korean-style agricultural bronze culture-state formation period-Three Kingdoms Period.

Lee et al. (2011) compared the prehistoric eras of North China, South Korea, and the southwestern region of Japan, and classified the epochs of Korea into Jeulmun pottery-Mumun pottery-Samhan-Three Kingdoms. The Primitive Pottery era, which occurred circa 8000–5000 BCE, preceded the Jeulmun pottery period, as shown in Fig. 2.8. As Japan set Initial Jomon in front of Early Jomon, I propose that the Primitive Pottery era, or Initial Jeulmun, be set as the prehistoric culture preceding Jeulmun on the southern coast of the Korean Peninsula.

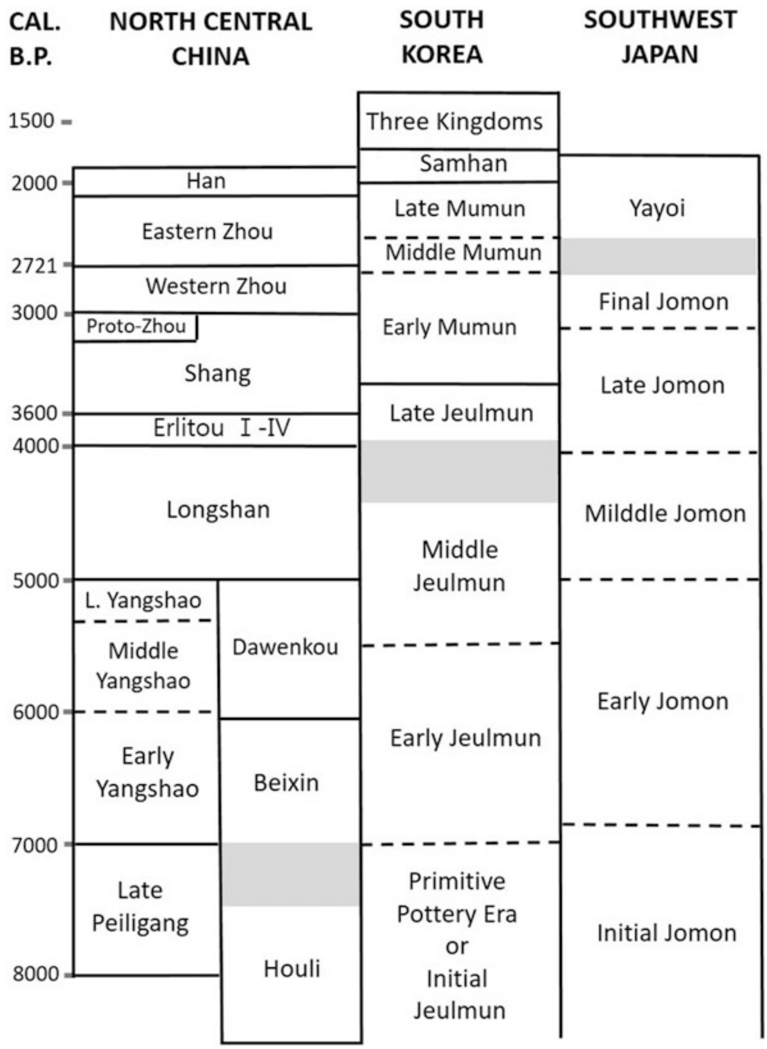


Fig. 2.8 Comparison of Prehistoric Times in China, Korea, and Japan (Lee et al. 2011, Modified by Lee, Cherl-Ho)

References

Aikens, C. Melvin, and Gyoung-Ah Lee. 2013. Postglacial inception and growth of anthropogenic landscapes in China, Korea, Japan, and the Russian Far East. *Anthropocene* 4: 46–56. https://doi.org/10.1016/j.ancene.2014.02.005.

Barnes, Gina L. 1993. *China, Korea and Japan: The rise of civilization in East Asia*. London: Thames and Hudson.

Choi, Bok-Gyu. 1983. Jungseokgi munhwa [Mesolithic culture]. In *Hanguk ui gogohak I* [Korean archeology], Hanguk saron 12 [Review of Korean History], 415–478. Seoul: National Institute of Korean History.
Han, Byeong-Sam. 1974. Togiwa cheongdonggi [pottery and bronze]. In *Gyoyangguksachongseo* [Cultural Korean History Series], vol. 8. Seoul: King Sejong Memorial Committee.
Han, Young-Hee. 1983. Jiyeokjeok bigyo [regional comparison]. In *Hanguk ui gogohak I [Korean archeology]*, Hanguk saron 12 [review of Korean history], 479–521. Seoul: National Institute of Korean History.
Hwang, Yong-Hwy. 1983. *Seokgi golgakgi [Stone tools and bone tools], Hankuksaron 12, Korean Archeology 1(ha)*. National Institute of Korean History.
Ishige, Naomichi. 1976. Salt Making at Kumupa, Central Highland, Irian Jaya. *Bulletin of the National Museum of Ethnology* 1 (2): 357–373.
———. 1995. *Eojanggwa sigyeom ui yeongu* [A study on fish sauce and salt] (trans: Kim Sang-Bo). Seoul: Suhaksa.
———. 1998, Personal communication.
Kim, Gun-Su. 1999. *Hanguk wonsi-godae ui eoromunhwa* [Korean native and ancient fishing culture]. Seoul: Hagyeon munhwasa.
Kwak, Seungki, Gyeongtaek Kim, and Gyoung-Ah Lee. 2017. Beyond Rice Farming: Evidence from Central Korea Reveals Wide Resource Utilization in the Songgukri Culture during the Late-Holocene. *The Holocene* 27 (8): 1092–1103.
Lee, Cherl-Ho. 1994. Importance of Lactic Acid Bacteria in Non-dairy Food Fermentation. In *Lactic Acid Fermentation of Non-dairy Food and Beverages*, ed. Lee Cherl-Ho, J. Adler-Nissen, and G. Barwald. Seoul: Harn Lim Won.
———. 1997. Lactic acid fermented foods and their benefit in Asia. *Food Control* 9 (5/6): 259–269.
———. 1998. Hanbandowa Dongbugasia ui guseokgi sidae siksaenghwal hwangyeong [The foodways of Paleolithic peoples in Northeast Asia and on the Korean Peninsula]. *Minjokmunhwa yeongu* [Korean Cultural Studies] 31: 418–458.
———. 1999. Dongbugasia wonsitogimunhwa sidae ui teukjanggwa sikpumsajeok jungyoseong [the primitive pottery age of Northeast Asia and its importance in Korean food history]. *Minjokmunhwa yeongu* [Korea Cultural Studies] 32: 325–357.
———. 2001. *Fermentation Technology in Korea*. Seoul: Korea University Press.
———. 2009. Food biotechnology. In *Food science and technology*, ed. G. Campbell-Platt, 85–114. Oxford: Wiley-Blackwell.
———. 2017. *Hanguk eumsik ui yeoksa* [History of Korean food]. Seoul: Jayu Academy.
Lee, Cherl-Ho, and Kwon Tai-Wan. 2003. *Hanguk sikpumhak immun* [Introduction to Korean food science]. Seoul: Korea University Press.
Lee, Gyoung-Ah. 2011. The Transition from Foraging to Farming in Prehistoric Korea. *Current Anthropology* 52 (Supplement 4): 5307–5329.
———. 2017. In *The Chulmun period of Korea: Current findings and disclosure on Korean Neolithic culture, in Handbook of East and Southeast Asian Archeology*, ed. J. Habu, P.V. Lape, and J.W. Olsen, 451–481. Springer.
Lee, Gyoung-Ah, Gary W. Crawford, Li Liu, Sasaki Yuka, and Chen Xuexiang. 2011. Archeological Soybean (Glycine max) in East Asia: Does Size Matter? *PLoS One* 6 (11): 1–12.
Lee, Cherl-Ho, and Kim Moonsil Lee. 2016. History of Fermented Foods in Northeast Asia. In *Ethnic Fermented Foods and Alcoholic Beverages of Asia*, ed. J.P. Tamang, 1–16. New Delhi: Springer.
Lee, Sung-Woo. 1984a. *Hanguk sikpummunhwasa* [History of Korean food culture]. Paju: Kyomunsa.
———. 1984b. *Hanguk sikpumsahoesa* [Social history of Korean food]. Paju: Kyomunsa.
Lim, Hyo-Jae. 1983. Togi ui sidaejeok byeoncheongwajeong [Chronological changes in earthenware]. In *Hanguk ui gogohak I* [Korean archeology], Hanguk saron 12 [Review of Korean History], 615–654. Seoul: National Institute of Korean History.

———. 1986. *Sinseokgisidaeui han-il munhwagyoryu [Cultural exchange between Korean and Japan during Neolithic Era], Hankuksaron 16, Ancient Korea-Japan Relationship*. National Institute of Korea History.

Lim, Young-Gin. 1985. Umjip ui bullyuwa byeoncheon [Classification of and changes in pit-dwellings]. *Hanguk gogohakbo* [Korean Journal of Archeology] 17: 107–162.

Liu, Li, and Xingcan Chen. 2012. *The Archeology of China: From the Late Paleolithic to the Early Bronze Age*. Cambridge: Cambridge University Press.

Park, Gu-Byong. 1965. Hanguk eoeopgisulsa [History of Korean fishery technology]. In *Hanguk munhwasadaegye III* [Encyclopedia of Korean culture]. Seoul: Institute of Korean Culture, Korea University.

Plog, Stephen. 1980. *Stylistic Variations in Prehistotic Ceramics: Design Analysis in the American Southwest*. London: Cambridge University Press. (Cited in Shin Sook-Jeong 1984).

Rhee, Sook-Jong, Jang-Eun Lee, and Cherl-Ho Lee. 2011. Importance of Lactic Acid Bacteria in Asian Fermented Foods. *Microbial Cell Factories* 10 (Suppl 1): S5.

Ro, Hyeok-Jin. 1994. Hanguk seonsamunhwa hyeongseonggwajeong ui sidaegubun [Classification of eras during the formation of Korean prehistoric culture]. *Hanguk sanggosahakbo* [Journal of Korean Ancient History] 15: 7–36.

———. 1997. Cheongdonggi sidae [Bronze Age]. In *Hanguk minjok ui giwongwa hyeongseong* 1 [The origin and formation of the Korean people]. *Hallym Science Series* 41: 119–184.

Shin, Sook-Jeong. 1983. Togi ui seongbunbunseok [Chemical analysis of primitive potteries]. In *Hanguk ui gogohak I [Korean archeology]*, Hanguk saron 12 [Review of Korean History], 592–614. Seoul: National Institute of Korean History.

———. 1984. Sangnodaedo jogaedeomi yujeokui togiyeongu [Studies on the primitive potteries in the midden of Snagnodaedo site]. *Byeksanhakbo* 28: 212–271.

Zhushchikhovskaya, Irina. 1997. On Early Pottery-Making in the Russian Far East. *Asian Perspective* 36 (2): 159–174.

Chapter 3
The Onset of Agriculture and Northeast Asian Neolithic Farm Culture

Abstract In the history of humanity, the beginning of agriculture is estimated to have occurred in the Near East, East Asia, and Central and South America at around the same time, about 12,000 years before present (YBP). Regions with a historically independent civilization are making efforts to discover the origins of their food culture. Europe, which developed archeological digs and analyses relatively early, asserts that wheat and barley were first grown in Mesopotamia, and that goats, sheep, and cattle were also first domesticated in that region. Russian plant breeder Vavilov (1887–1943) argued that rice originated in India, but archeological studies in China, which began in the early 1900s, about a century later than Europe, show that China preceded India in cultivating rice for the first time. On the Korean Peninsula, where archeological studies were initiated half a century later than Japan or China, the discovery of rice seeds at Soro-ri that are estimated to have been cultivated around 12,500 BCE, have challenged theories of the origin of rice cultivation once again. In this chapter, the history of agriculture, especially rice and soybean cultivation in East Asia was reviewed.

In the history of humanity, the beginning of agriculture is estimated to have occurred in the Near East, East Asia, and Central and South America at around the same time, about 12,000 years before present (YBP). Regions with a historically independent civilization are making efforts to discover the origins of their food culture. Europe, which developed archeological digs and analyses relatively early, asserts that wheat and barley were first grown in Mesopotamia, and that goats, sheep, and cattle were also first domesticated in that region. Russian plant breeder Nikolai I. Vavilov (1887–1943) argued that rice originated in India, but archeological studies in China, which began in the early 1900s, about a century later than Europe, show that China preceded India in cultivating rice for the first time (Ho 1975; Liu and Chen 2012). On the Korean Peninsula, where archeological studies were initiated half a century later than Japan or China, the discovery of rice seeds at Soro-ri that are estimated to have been cultivated around 12,500 BCE, have challenged theories of the origin of rice cultivation once again (Lee 2014).

C.-H. Lee, *Korean Food and Foodways*,
https://doi.org/10.1007/978-981-19-0023-5_3

3.1 The Beginning of Agriculture

Archeological studies indicate that by about 20,000 YBP the flow of human history brought people to most of the world's continents, including the Americas, and that by 12,000 YBP agriculture had begun in some of these regions, replacing the hunter-gatherer way of life with a more settled lifestyle. As humanity spread across the globe from its origins in Africa, people gradually began sowing seeds, taking root themselves when they found suitable locales for farming. According to Jared Diamond in *Guns, Germs, and Steel*, suitable places for growing crops included Southwest Asia's Fertile Crescent, China, Central America, the Andes Mountains, the Amazon River Basin, and the eastern region of the United States (Diamond 1997). Agriculture began with the cultivation of wild grains such as rice, wheat, barley, broomcorn millet, and corn, and as people began to grasp how to raise pigs, cows, dogs, horses, and other wild animals, they also discovered new ways of using them for food. The Near East and East Asia have the oldest artifacts yet discovered that were made for the purpose of preparing domesticated animals for food. In about 8000 BCE in Iraq's Jarmo region, traces of tools used to raise cows and cultivate wheat and barley have been unearthed, and in Thailand artifacts used with domesticated pigs have been found. Tools used for agriculture or animal husbandry that date to 7000 BCE have been excavated in Thessaly, Greece (pigs and sheep); in Jarmo, Iraq (donkeys); in the Near East (barley); and in Mexico (corn and pulses). From 6000 BCE archeological remains point to cow husbandry in northern Iran and the cultivation of pulses in Thessaly and Macedonia. There is a record of horse breeding from 4350 BCE in Ukraine and Central Asia. Broomcorn millet and rice grew wild in East Asia, but these began to be cultivated around 3000 BCE in the Yunnan area of China and Assam, India (Fig. 3.1).

Shin (2014) delineates seven independent civilizations around the world at the onset of farming culture, as follows:

1. Mesopotamia (Tigris and Euphrates River Civilizations): Grew wheat and supplied the Middle East and Europe with winter cereals (barley, rye, oats); the beginning of bread-based cultures, such as those around the Aegean Sea and Rome.
2. Egypt (Nile River Civilization): Cultivated Einkorn wheat (*Tritucum monococcum*) introduced from Mesopotamia; bread-based culture.
3. India (Indus and Ganges River Civilization): Cultivated Indica rice (long-grain); Indica rice-based culture.
4. Gojoseon (Han, Daedong, and Liao River Civilizations): Cultivated Japonica rice (short-grain) and soybeans (*Glycine max*); rice and soybean-based culture.
5. Ancient China (Yellow River Civilization): Grew short-grain rice, long-grain rice, and wheat; rice and noodle-based culture.
6. Central America (Maya Civilization): Cultivated maize; maize-based culture.
7. Andes (Inca Civilization): Cultivated potatoes (*Solanum tuberosum*); potato-based culture.

Fig. 3.1 Origins of plant cultivation and animal domestication

Shin, Yong-Ha inserts Gojoseon into a generally accepted list of global civilizations, maintaining that evidence supports the independent civilization of the Korean Peninsula, which included parts of northeastern China and southeastern Russia at the time.

Humans eventually migrated from their place of origin in Africa east through the Eurasian continent, and on to the Far East, including the Korean Peninsula. About 53,000 YBP, during the final glacial period of the Pleistocene epoch (the fourth Würm glaciation), people could not survive north of the 40th parallel (which passes through current-day Sinuiju and Beijing), and Paleolithic peoples living in Korea congregated in limestone caves (Shin 2018). About 13,000 YBP, when the last glacial period ended, amid rising temperatures Paleolithic families moved out of caves and began living along river banks and coastal areas to fish and farm. The Korean Peninsula was the most populous area of Northeast Asia at the time, especially in the fertile regions of the South Han River (*Namhangang*) and upper Geum River (*Geumgang*), which are thought to be the areas in which rice and broomcorn millet were first cultivated (Shin 2014). When charred rice seeds from about 12,500 YBP were excavated at Soro-ri archeological site along the South Han River, the previously held origin date of initial rice farming was tentatively adjusted back by almost 5000 years. A number of Korean academics, including this author, hold that the dissemination of short-grain rice cultivation may have spread from its origin near the South Han River to the Daedong River region, and then north to the Liaodong Peninsula (Dazuizi site) and to Shandong Peninsula (where rice seeds dating to about 2040 BCE had been discovered). Thousands of years after its inception, rice cultivation was broadcast throughout the Liaodong Peninsula by the nomadic Eastern Archer tribes, the Dongyi.

3.2 The Origin of Rice Cultivation

3.2.1 Origin of Rice Cultivation in East Asia

The origin of rice cultivation was once thought to have been located in the Assam region of India's Ganges River, from whence it was said to have spread to Myanmar, Thailand, Laos, and Yunnan China. This generally accepted view was updated when evidence of older rice grains was found in China. According to findings at the Gaho archeological site in Henan, and sites such as Pengtoushan, Bashidang, and Yuchanyan in Hunan, rice cultivation is now believed by many to have begun in the Yangtze River Valley about 11,500 YBP (Huang 2000). Signs of the conversion from wild to cultivated rice species are judged by changes in the morphology of seeds, phytoliths, and panicle rachis. Some scientists argue that it would have taken about 5000 years to transition from wild to fully cultivated rice (Liu and Chen 2012). Therefore, in gathering cultures where wild rice was collected and eaten, the time difference between the first deliberately sown rice plants and the generalized practice of rice cultivation was vast. Regular cultivation of rice occurs around the same period as wheat and barley cultivation in the Near East, around 10,000 YBP.

India's oldest ancient rice dates to 1700 BCE (although carbonized rice has been reported from the 3000s BCE, both wild and cultivated). India's oldest Sanskrit book, the *Rig Veda*, which was written in 1000 BCE, mentions wheat and barley, but there is no record of rice. On the other hand, in China, several records of rice and rice wine are found in the literature of the Shang dynasty (1600–1046 BCE) and Zhou dynasty (1050–256 BCE). Archeologically, cultivated rice (*Oryza sativa*) from around 4000 BCE was excavated at the Ching-lien-kang site in the Yangtze River basin, but Indica (long-grain) rice and Japonica (short-grain) rice are mixed here. Most rice produced in China until 1000 CE, however, was short-grained, although some long-grained rice was produced in southern China (Ho 1975).

However, as mentioned above, 12,500-year-old rice seeds have since been excavated in Korea's North Chungcheong Province at the Soro-ri archeological site in Cheongwon-gun (Lee 2014). North of Soro-ri stands the Charyeong mountain range, while about 900 meters south of the site the Miho stream, a tributary of the Geum River, flows through a flat area of land that has been researched extensively. At the request of the Korea Land Development Corporation, the Chungbuk University Museum implemented an investigation of the earth's strata for cultural artifacts here in 1994. Through this investigation, a wide array of Paleolithic tools was discovered, including choppers, scrapers, notches, cores, and flakes. In total, 127 grains of ancient rice were excavated at this site. Of the 18 grains of rice recovered, 17 were Japonica and 1 was Indica. 109 grains of "quasi-rice," types 1 and 2, were also discovered, making quasi-rice the dominant species at the site.

Fig. 3.2 The World's Oldest Cultivated Rice Seeds, Discovered at the Soro-ri Site, Cheongwon-gun, North Chungcheong Province, Korea

The rice seeds were mostly excavated from the upper part of the middle peat deposit layer; in the middle part, one grain each of ancient rice and quasi-rice were detected; and the lower part revealed only 1 grain of quasi-rice. The form of the rachilla (the spikelet that bears the seeds atop the plant's stem) on these ancient rice grains is truncated, different from that of wild varieties, which are elongated and pointy, but not due to natural variation; rather, SEM (Scanning Electron Microscope) images indicate that the rachilla shows traits of having been cut by an outside force, which is characteristic of cultivated rice (Fig. 3.2). Cambridge University's worldwide public survey program has dated Soro-ri rice seeds as far back as 15,118 BCE, or about 17,000 YBP. These seeds have been given the scientific name *Oryza sativa coreaca*.

In Korea "weedy rice" is the extant species closest to ancestral wild rice; the actual wild ancestor of today's rice no longer exists. In light of the fact that the Soro-sri rice seeds are the oldest generation of rice found to date, the current lack of ancestral wild rice stems from the natural selection that would have occurred over time during the continual process of people planting and harvesting rice. The results of a DNA analysis of the Soro-ri rice seeds show a 39.6% genetic similarity between quasi-rice and cultivated rice, thus indicating an evolutionary process at work. Soro-ri rice seeds have been shown to have about a 57% rate of similarity to wild rice. Soro-ri rice fits into the evolutionary process of gradual refinement between the semi-agricultural stage and the early farming stage. In other words, it may be surmised that Soro-ri rice is a grain in the early stages of refinement, an ancestor to Korean cultivated rice (Lee 2014).

The regions with the largest concentration of common wild rice in China comprise Hainan Island, Guangdong Province, and part of Guangxi, while north of the 24th parallel wild rice is rare. However, Beijing University Professor Yan (2000) uses Harlan's theory (Harlan 1997) to argue that the cultivation of rice did not begin in the fertile South China region where wild rice grew in abundance, but rather in the northern reaches of the Yangtze River, where winters are cold and food must be stored. By looking at an aggregate of archeological sources, including pictographs found on bones and tortoise shells, Dr. Huang, Hsing-Tsung, research biochemist (Huang 2000), concludes that during the Shang (1520–1030 BCE) and Western Zhou (1030–722 BCE) dynasties the main types of grain consumed consisted of foxtail millet (*Setaria italica* (L.) Beauv), sorghum (broomcorn millet, *Panicum*

Table 3.1 Staple grains and major livestock of ancient China (Huang 2000)

Province	Location	Staple grains	Livestock
Yang-chou	Lower Yangtze & South	Rice	Bird, beast
Ching-chou	Middle Yangtze & South	Rice	Bird, beast
Yü-chou	Honan & Huai valley	Five grains[a]	Six beasts[b]
Ching-chou	East Shantung	Rice, wheat/barley	Chicken, dog
Yen-chou	N. Honan, W. Shantung, S. Hopei	Four grains[c]	Six beasts[b]
Yung-chou	Shensi, E. Kansu	*Panicum* & *Setaria* millets	Ox, horse
Yu-chou	S. Liaoning, N. Shantung, N. Hopei	Three grains[d]	Four beasts[e]
Chi-chou	S. Shansi	*Panicum* & *Setaria* millets	Ox, sheep
Ping-chou	N. Shansi, N, Hopei	Five grains[a]	Six beasts[f]

[a]Five grains: *Panicum* & *Setaria* millets, soybean, wheat/barley, and rice
[b]Six beasts: Horse, ox, sheep, pig, dog, and chicken
[c]Four grains: *Panicum* & *Setaria* millets, rice, and wheat/barley
[d]Three grains: *Panicum* & *Setaria* millets, and rice
[e]Four beasts: Horse, ox, sheep, and pig
[f]Five beasts: Horse, cattle, sheep, dog, and pig

miliacium (L) Beauv), rice (*Oryza sativa* L), barley (or wheat), and hemp (*Cannabis sativa* L.). Table 3.1 shows that rice cultivation is predominant in the Yangtze River basin and the south, while millet and rice are the staple grains in the northeastern region.

3.2.2 *Origin of Rice Culture on the Korean Peninsula*

Theories on the origin of rice culture in Korea have until now rested on the supposition that the practice was introduced from China or Southeast Asia, but with the discovery of the Soro-ri rice seeds, Korea is now posited as one of the original locations of rice cultivation. Rice farming began in Korea towards the end of the Neolithic era and became universal during the Bronze Age (Cho 2000). Rice paddies from Bronze Age farm sites have been confirmed at Majeon-ri in Nonsan, South Chungcheong Province (Sohn 2000) and at Okhyeon in Ulsan (Lee 1999b).

Based on findings at the Hemudu site (about 5000 BCE) at the mouth of the Yangtze River (near present-day Shanghai), Chinese scholars assert a Yangtze River origin theory for rice farming. Meanwhile, the 50:50 ratio of long-grain to short-grain rice excavated at a nearby Liangzhu culture archeological site (2760 BCE) indicates that by the twenty-eighth century BCE ancient Chinese civilizations had been influenced by Korean short-grain rice cultivation. The types of grain domesticated and cultivated in both the Taedong and Han River civilizations (now in North and South Korea, respectively) included short-grain rice, soybeans, foxtail millet, broomcorn millet, sorghum, wheat, barley, and perilla seeds. Ancient grains have been found at archeological sites dotting the land between the upper Geum River, as at Soro-ri, North Chungcheong Province, and the South Han River in South Central Korea, such as at the Jodong-ri site in Chungju. The latter site reveals food remains from 6200 YBP (4250 BCE) and 6140 YBP, including short-grain rice hulls, charcoal rice, wheat, barley, sorghum, unknown fruit, acorn, gourd seeds, and peach seeds. At the Daecheon-ri site in Okcheon, near the upper reaches of the South Han River, excavated food remains carbon-dated to about 5500 YBP (around 3500 BCE) include rice, wheat, barley, broomcorn millet, foxtail millet, legume seeds (of an unknown species), and hemp seed. Japan also benefitted from Gojoseon civilization's short-grain rice cultivation, which spread to the Japanese Archipelago between the seventh and fifth centuries BCE, when Japan entered the short-grain rice cultural sphere (Shin 2014).

Working from within the historical framework of rice cultivation originating during China's Han dynasty, Lee (1965) asserts that barnyard grass, broomcorn millet, foxtail millet, and other grains were cultivated early in Korea, while rice and winter cereals were transmitted later from northern China. However, as mentioned above, due to recent discoveries of various ancient grains at archeological sites, including the world's oldest rice grains at Soro-ri, a re-evaluation of the early history of farming on the Korean Peninsula is needed. In terms of plant taxonomy, barnyard grass, broomcorn millet, and foxtail millet all pertain to the rice family, and, as mentioned in Chap. 1, pollen from the rice family has been found at Paleolithic sites in Korea. Thus, wild varieties of rice are believed to have existed on the Korean Peninsula before the advent of Neolithic farm culture.

Rice appears to have been highly valued compared to other early grains because Silla and Baekje fostered the production of rice on a national level during the Three Kingdoms period (57 BCE-668 CE). By the Unified Silla period (668–935 CE), rice had surpassed all others to become the queen of staple grains. As rice gradually became the main target of taxes, the term *jo* (of *jose*, meaning "tax") came to stand in for the word "rice." Further, a scene in a mural dating to the Goguryeo (37 BCE-668 CE) dynasty at Anak Tombs, Hwanghae Province, depicts rice steaming in an earthenware pot, which indicates that rice had long been a staple part of the diet of wealthy families (Lee and Kwon 2003).

Joseon rice—rice that came from the Korean Peninsula—was famous for its delicious flavor; there is a story that Japanese warriors kept watch for an opportunity to invade the peninsula with the goal of obtaining this rice. Following the Japanese annexation of Korea in 1910, one of the important missions of the Japanese government was to research Korean varieties of rice. According to a report from 1911–1912, a total of 1451 varieties of rice were found, 876 of which were non-glutinous types, 383 glutinous, and 192 dry-field varieties. Japan brought some of these rice varieties home to cultivate there, and they were so well-liked that they comprise most of the rice consumed in Japan today (Lee and Kwon 2003).

3.3 Northeast Asia's Neolithic Farm Culture

The Hongshan culture archeological site in Chifeng, the oldest Neolithic farm site connected to comb-pattern pottery culture on the Bohai coast, Inner Mongolian Autonomous District, provides a picture of the beginning of Neolithic farming in Northeast Asia. Scholars have demonstrated that Hongshan culture (4500–3000 BCE) comprised part of the Dongyi tribal civilization. In 1979 and 1983 newly discovered Neolithic sites, at Dongshanzui, Harqin Zuoyi Mongol Autonomous County, and nearby Niuheliang, received global attention for the discovery of artifacts representing a hitherto unknown ancient culture. Relics of ancestral rites were discovered at Dongshanzui, and burial cairns, shrines, and altars were excavated at Niuheliang. Burial cairns are the representative tomb style used by the Dongyi tribes, and the particular style seen at Niuheliang appears continually until the Three Kingdoms (Korea) period. No such cairns have been discovered further south or inland in China.

In Korean archeological studies, the Neolithic era is situated between 5000–1000 BCE (Kim 1973; Choi 1986). Lee (1965) posits that farming began in Korea around 3000 BCE. If one allows that the Korea-centered Primitive Pottery culture constituted the main lifestyle in this area from before 8000 BCE to 5000 BCE, then 5000–3000 BCE demarcates the parallel development of the littoral forager and early Neolithic farming eras. The full expression of the Neolithic agricultural period, including the early years, is defined as flourishing between 5000–1000 BCE.

Table 3.2 shows the AMS (Accelerator Mass Spectrometry) dates of Neolithic relics identified on the Korean Peninsula (Lee 2011). The oldest (3450 BCE) grains (millet) have been identified at the Neunggok site in the central region of the Korean Peninsula, and grain discoveries from ensuing years have been excavated mainly in South Gyeongsang Province. In particular, the earliest carbonized soybean was identified at Pyeonggye-dong (2720 BCE). From these results, it has been concluded that the beginning of agriculture on the Korean Peninsula occurred, at the latest, circa 3500–3000 BCE (Lee 2011). This supports the chronology of Neolithic peoples of the Korean Peninsula living as littoral foragers during the period of Primitive Pottery culture (8000–5000 BCE). It is believed that in the early days of the Jeulmun pottery period (5000–3000 BCE), people lived a sedentary life in which hunting and gathering were combined with early experiments in plant cultivation.

Neolithic farming on the Korean Peninsula largely consisted of slash-and-burn and hoeing techniques. Stone tools found at sites from this period include grinding stones, stone blades, stone plows, stone sickles, and stone spades. Acorns, hoes, and grinding stones dating from around 5000 BCE were excavated from the floor of a dwelling at the Osan-ri 1 site in Yangyang-gun, Gangwon Province, and similar artifacts dating from 4000 BCE were unearthed at the Misa-ri site in Amsadong, suggesting primitive farming. Farm implements dating from around 3000 BCE were discovered at Jitap-ri in Bongsan-gun, North Hwanghae Province, and at the Namgyeong site in Pyongyang. Farm sites dating from 2000–1000 BCE include

Table 3.2 AMS Dates of Plant Seeds at Neolithic Sites on the Korean Peninsula (Lee 2011)

Site	Material	Lab ID	Provenience	Cal. age (BP)
Neunggok, Gyeonggi Province	Foxtail millet	Beta 252,973	Floor fill, house 41	5470 ± 100
South Gyeongsang Province:				
Dongsamdong	Foxtail millet	TO8783	Floor fill, house 1	5260 ± 170
Pyeonggeodong	Adzuki bean	KCCAMS60748	Grid 20, pit 3C	4910 ± 40
	Soybean	SNU252972	Grid 20, pit 3-A	4740 ± 40
	Broomcorn millet		Grid 21, pit 50	4920 ± 50
Sangchon B	Acorn shell	SNU01377	Elongated 6–1	4710 ± 80
	Foxtail millet	TO8608	Outdoor hearth 1	4560 ± 200
Bonggaeri	Walnut	NUTA1034	III phase, house 9	4600 ± 160
Oun 1	Foxtail millet	TO860	Outdoor hearth 6	4560 ± 170
	Rice	TO8605	Floor fill, house 104	3970 ± 370
Okbang	Soybean	TO8611	Pit in house 658	2900 ± 70
Daundong	Adzuki bean	TO8965	Floor fill, house 7	2580 ± 120
	Soybean	KCCAMS60750	Floor fill, house 7	2590 ± 80

Beomuiguseok in Musan-gun, Cheongjin; Odong in Hoeryeong-gun, North Hamgyeong Province; Gaheung-ri in Muan-gun, South Jeolla Province; and Heunam-ri in Yeoju-gun, Gyeonggi Province (Table 3.3). In terms of crop types, charred remains of barnyard grass and foxtail millet have been found at Jitap-ri, foxtail millet, and adzuki beans at Seoktan-ri in Hwanghae Province; soybeans at Odong; and broomcorn millet and sorghum at Beomuiguseok. Rice, foxtail millet, broomcorn millet, sorghum, and soybeans were excavated at Namgyeong, and rice, barley, foxtail millet, and sorghum were discovered at Heunam-ri. Rice, adzuki beans, sorghum, foxtail millet, and various other grains were cultivated evenly across the entirety of the Korean Peninsula during this period, pointing to an active farming lifestyle (Choi 1986).

The first and second layers of the Seopohang site in Unggi, North Hamgyong Province, yielded hoes made of severed deer horn and shaped like a shoe sole. Their existence locates the onset of hoe farming between 5000–4000 BCE (Choi 1986). At the dawn of 3000 BCE, farm implements began to increase greatly in number and type, and included such tools as T-shaped stone hoes, stone shovels, plowshares, semilunar knives made from clamshells, and sickles, mortars, and pestles made of boar tusk (Fig. 3.3).

There are few archeological finds having to do with animal domestication during the Neolithic, but it is known that dogs, pigs, cows, hens, and more began to be raised by humans toward the end of the era. At Neolithic sites in the Tumen River region of North Hamgyong Province, such as Odong, Chodo (in Najin), and

Table 3.3 Ancient grains found in Neolithic/Bronze Age dwellings on the Korean Peninsula

Sites and dwellings	Time period	Types of grain	Book source
Dwelling #2, Jitap-ri site, Bongsan-gun, North Hwanghae Province	Neolithic, early 3000s BCE	Barnyard grass Foxtail millet	*Jitap-ri wonsiyujeok balgul bogo* (Report on excavations at Jitap-ri primitive archeological site), Institute of Science Press, 1961
Dwelling #15, Beomuiguseok site, Musan-gun, Cheongjin City	Bronze age, later 2000s BCE	Broomcorn millet sorghum	*Gogominsognonmunjip 6* (Collected theories of ancient folklore 6), Social Science Press, 1975 (165–205)
Lot #31, Beomuiguseok site	Late 2000s-early 1000s BCE	Broomcorn millet	Ibid
Odong site, Hoeryeong-gun, North Hamgyong Province	Bronze age, later 2000s BCE	Soybeans, adzuki beans, broomcorn millet	*Heoryeong Odong wonsiyujeok balgul bogo* (Report of excavations at Hoeryeong Odong primitive site), Institute of Science Press, 1960
Lot #39, Seoktan-ri site, Songnim City, North Hwanghae Province	Bronze age, eighth–seventh centuries BCE	Foxtail millet Adzuki beans	*Seoktan-ri yujeok balgul bogo* (Report of excavations at Seoktan-ri site), Science and Encyclopedia Press, 1980
Lot #31, Namgyong site, Samsok-guyok, Pyongyang City	Neolithic, later 3000s BCE	Foxtail millet	Choi (1986).
Lot #36, Namgyong site	Bronze age, late 2000s-early 1000s BCE	Rice, foxtail millet, broomcorn millet, sorghum, soybeans	Ibid
Giheung-ri Yeongsan'gang site, Dasi-myeon, Muan-gun, south Jeolla Province	Around 1050 BCE	Pine tree pollen Rice	
Dwelling #12, Heunam-ri site, Jeomdong-myeon, Yeoju-gun, Gyeonggi Province	1260, 1030, 970, 670 BCE		

Beomuiguseok, bones of cows, dogs, and deer have been excavated, along with bones of rabbit and weasel, which suggests that in addition to keeping domesticated animals, people continued to rely on hunting as a source of protein.

Fig. 3.3 Neolithic farming tools unearthed on the Korean Peninsula

3.4 Soybeans: Place of Origin and Dissemination

3.4.1 The Origin of Soybeans as Food

Soybeans may have originated in the area of Northeast Asia comprising southern Manchuria and the Korean Peninsula, the area inhabited by the Dongyi tribes. In botany, a major factor on which the determination of a crop's place of origin hinges is the distribution matrix of the native species, and in southern Manchuria and the Korean Peninsula, one finds a high concentration of native soybeans (Lee and Park 2006). On this basis, Fukuda (1933) pinpointed the greater Korean Peninsula as the origin of soybeans. On the other hand, Hymowitz (1970) of the United States targets China as the land of soybean origin on the basis of the existence of the character for *shu*, meaning soybean, in the *Book of Songs* (*Shijing*, eleventh to sixth century BCE), which contains poems from the Zhou Dynasty.

According to Kwon (1985), the ancestral strain of soybean cultivated in Korea has the same characteristics as soybeans planted around the world today in terms of plant height, time to maturity, leaf shape, seed coat color, seed size, and fat and protein content. Numerous mutations accumulated in the ancestral strain cultivated in Korea, while retaining the key qualities mentioned above. Many useful genes, such as those related to protein content and disease resistance, may have been lost during the process of human selection following domestication. As native Korean strains gradually became more widely dispersed, they gave rise to an intermediate strain of soybeans between wild (*Glycine soja* Sieb. & Zucc.) and cultivated (that is, the semi-wild *Glycine gracilis*), which retained the desirable gene traits mentioned above. This intermediate strain has been discovered in Manchuria and on the Korean Peninsula. The dominant genes for desirable traits in the soybean plant have remained intact from ancient Korean strains, through semi-wild soybean plants, and on to present-day domesticated soybeans (*Glycine max*).

Dr. Lee Suk-Ha, a professor at the Plant Genomics and Breeding Institute, Seoul National University, Korea, has suggested that the soybean was domesticated from the *G. soja/G. max* complex that diverged from a common ancestor of these two species of *Glycine* (Kim et al. 2012). The single-origin hypothesis, that all domesticated soybeans derived from a single cluster of *G. soja* wild soybeans, is challenged by the multiple-origin hypothesis. In this context, Sedivy et al. (2017) assert that the Huanghe region around the Yellow River is another candidate for the origin of soybean domestication.

No convincing evidence of soybean cultivation or use has been found at pre-Neolithic sites in China (Liu and Chen 2012). Traces of wild soybeans were collected at the Jiahu (7000–5500 BCE) and Bancun (ca. 5500 BCE) sites in Henan, North China, as well as at the Yuezhuang (ca. 6000 BCE) site in Shangdong, but there is no basis for claiming edible use. Soybeans have also been found at the late Yangshao (3000 BCE) Dahecun site, Henan Province, and in the Yiluo River basin in China, through the period of Lungshan culture (3000–2000 BCE) and the Shang Dynasty (1600–1046 BCE). In Japan, the soybean specimens at Shimoyakebe site from the middle Jomon period (around 3000 BCE) are reported to be the oldest in the country, but no soybeans appear until the late Jomon period (Lee et al. 2011). Professor Lee Gyoung-Ah measured and compared the sizes of 949 carbonized beans dating to the Neolithic period in the three countries Korea, China, and Japan. The length (L) and width (W) of Korean soybeans from the Mumun pottery era (1600–600 BCE) were found to be significantly larger than those from other regions (Fig. 3.4). As a result, it was concluded that most of the carbonized beans excavated from the Yangshao and Lungshan cultural sites in China were wild beans, whereas beans from the Korean Peninsula during the same time period were cultivated. This finding bolsters the theory that cultivated soybeans originated on the Korean Peninsula around 2000 BCE (Lee et al. 2011).

Yi Zhou shu, a Chinese text from the sixth century BCE, contains two passages that mention soybeans: “The *Sanyung* [Chi. *shanrong*] are a Dongyi tribe. *Yungsuk* are the large soybeans they grow.” And, “Western Zhou (ca. 1046 BCE) conquered Shang and received soybeans from the Sanyung as tribute.” Based on this, Ho (1975) of the University of Hong Kong argues that cultivated soybeans originated from Proto-Tungusic peoples, geographically and racially.

Sima Qian’s *Shiji* (*Records of the Grand Historian*) refers to soybeans in this way: “In 623 BCE the Shanrong struck the state of Yan. When the state of Qi heard of Yan’s distress, Duke Huan of Qi saved Yan by conquering the Shanrong. Qi pushed them as far north as Guzhu, where his army was able to obtain yungsuk

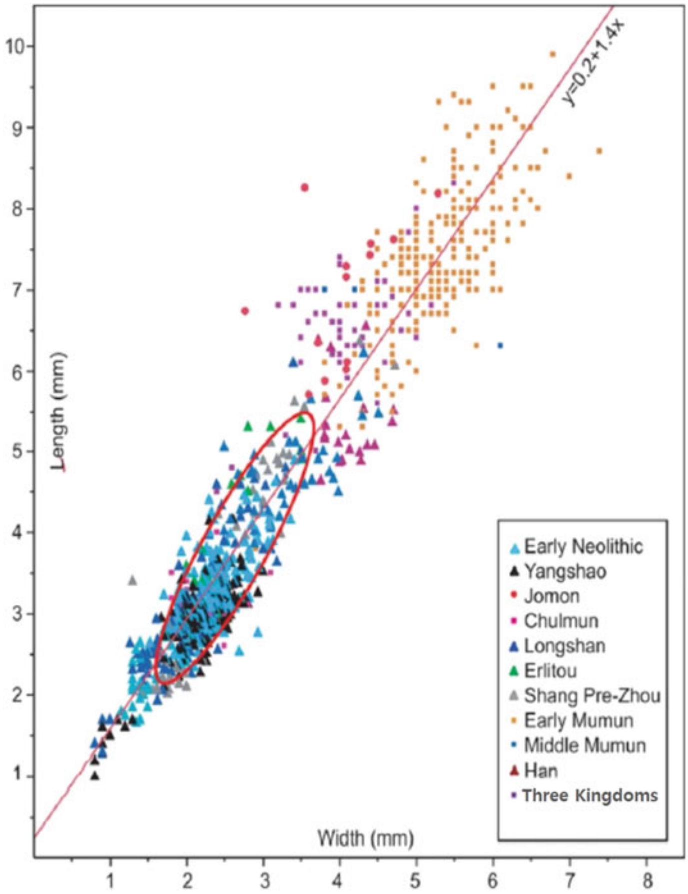


Fig. 3.4 Comparison of the Size of Carbonized Soybeans Excavated from Archeological Sites in Korea, China, and Japan (Lee et al. 2011). *Note*: The red circle designates the limit of 90% reliability of the sample size of modern wild beans

(Sanyung beans, or 'yung' beans), and then returned. Duke Huan presented these beans to the neighboring state of Lu." *Guanzi* (Writings of Master Guan), a text written by Guan Zhong (Prime Minister to Duke Huan of Qi) in the seventh century BCE, likewise affirms, "During Qi's attack on the Shanrong in the north, long green onions and yungsuk were carried back and soon spread across the land." According to these records, the soybeans cultivated at the time by the Dongyi tribes in southern Manchuria were so superior to the beans grown in Qi that *yungsuk*, as they called them, were brought back and introduced for cultivation across the entire state.

It seems, then, archeologically and historically valid that southern Manchurian-cultivated soybeans were transferred to China in the seventh century BCE (Committee for the Establishment of a Korean Soybean Museum 2017). In conclusion, wild soybeans were known and collected in Northeast Asia since the early Neolithic period, but the use of soybeans for food is believed to have begun around 2000 BCE, when large beans in southern Manchuria and the Korean Peninsula were evidently cultivated for human consumption.

During the Primitive Pottery era, native peoples of the Korean Peninsula who became littoral foragers gradually developed a grain-and-vegetable culture based on various plants that grew wild in their region, such as rice, barnyard grass, broomcorn millet, and foxtail millet. The nomadic, horseback-riding Dongyi tribes that came to the Korean Peninsula from the north settled down to farm, but being unable to raise much livestock, they needed a stable supply of substitute protein. To this end, the people collected soybeans growing wild in the area, and, after soaking them, placed them in an earthenware pot to boil, which resulted in eliminating the impediments to nutritional health found in raw soybeans, such as trypsin inhibitors (Lee 1999a). It is thought that the people of the Yemaek tribe (a subset of Dongyi) were the first in human history to use soybeans as food (Lee 1984). Early nation formation in Northeast Asia is believed to stem from that period (4000–1000 BCE), and northern nomads who settled in the Baekdu Mountains region of southern Manchuria and northern Korea were the first in Northeast Asia to begin farming during the Neolithic era. Their crops included domesticated soybeans. By the early Bronze Age (1500 BCE), cultivating soybeans for food had become a universal practice across Northeast Asia (Lee and Kwon 2005).

In archeology, the origin of soybean cultivation is thought to have begun about 4000 years ago during the Neolithic era, and on the Korean Peninsula, there are two Neolithic sites and several Early Bronze Age sites at which charred soybeans have been excavated. Table 3.4 lists the sites on the Korean Peninsula where early soybeans have been found (Lee 2017).

Among the sites on the Korean Peninsula connected with soybeans, the Sangchon-ri site in Jinju, South Gyeongsang Province, held what was thought to be the oldest soybean remains of the Neolithic era. Recently, however, over 20 specimens of charred grains, including rice and pulses, were unearthed at the Daecheon-ri Neolithic site in Okcheon, North Chungcheong Province. The results of radiocarbon dating reveal that these grains date from the Upper Neolithic era, between 3000–3500 BCE, and are currently the oldest examples of excavated soybeans on the Korean Peninsula (Cho 2005). Older still are pottery sherds bearing impressions of the bean family (such as soybeans and adzuki beans) discovered at the Osan-ri site that date to about 5300–5070 BCE, thus potentially pushing soybean cultivation to an earlier start date than previously supposed (Cho et al. 2014; Shin 2018).

Bronze Age sites provide firmer evidence of soybean cultivation. Irrigated rice farms had already become universal by the Bronze Age, and traditional items of Korean food culture such as *ogok*, the five staple grains, were already established. The twelve Bronze Age sites in Korea that contained remnants of beans are Odong in Heoryeong, North Hamgyong Province; Namgyong in Pyongyang; Seoktan-ri in Hwanghae Province; Yangeun-ri in Yangpyeong, Gyeonggi Province; Gungpyeong-ri in Cheongwon, North Chungcheong Province; Pyeongna-ri in Boryeong, South Chungcheong Province; Baekseokdong in Cheonan, South Chungcheong Province; Bonggyeri in Hapcheon, South Gyeongsang Province;

Table 3.4 Korean Peninsula sites where Soybeans have been unearthed

Site location	Types of grain	Other findings	Era/pottery
Daecheon-ri site, Okcheon-gun, north Chungcheong Province	Rice hulls, charred rice, barley, wheat, foxtail millet, one seed of a legume	Pit dwellings, mortar and pestle, stone ax	Neolithic era (discovered in 2000 during the construction of Gyeongbu highway)
Sangchon-ri site, Jinju City, south Gyeongsang Province	Charred legume, wheat, barley, foxtail millet, broomcorn millet, acorn, wild grapes	Dwellings, mortar, stone plowshares, polishing stones	Neolithic era/comb-pattern pottery (1996–1998 Nam River dam submerged areas)
Dwelling #10, Wondong site, Pohang City, north Gyeongsang Province	Wild soybeans, semi-wild soybeans, cultivated soybeans, wild adzuki beans	1800 charred beans; by far the highest volume found at a single site in Korea	Bronze Age (2000–2001, excavated during land readjustment work)
Honamri Namgyeong site, Samseok-guyeok, Pyeongyang	Foxtail millet (char), broomcorn millet (char), sorghum (char), and soybeans (char)	36 dwellings, Neolithic mortar and pestle	Bronze age/pointy-bottom pottery
Yanggeun-ri site, Yangpyeong, Gyeonggi Province	Soybeans, adzuki beans	Soybeans embedded at the bottom of an earthenware vessel	Bronze age (Paldang submerged area)
Gungpyeong-ri site, Cheongwon-gun, north Chungcheong Province	Charred adzuki beans, soybeans, rice, and barnyard grass	Dwellings, pottery kiln	Bronze age/patternless pottery (1993–1994, Gyeongbuk highway construction)
Daepyeong sites I and II, Jinyang-gun, south Gyeongsang Province	Rice, charred rice, foxtail millet, broomcorn millet, soybeans, adzuki beans, mung beans	Residential area, rice paddy outlines (1600 *pyeong*), stone tombs, stone tools	Bronze age/patternless pottery (1997–1998, Nam River dam construction)

Fig. 3.5 Carbonized Soybeans at Bronze Age Dwelling Site No. 10, Wondong, Pohang (Committee for the Establishment of a Korean Soybean Museum 2017)

Daepyeong in Jinyang, South Gyeongsang Province; and Daundong in Ulsan (Hyeon-Jong 2005). Another site, Wondong in Pohang City, is notable for having unearthed the highest number of intact charred beans, with over 1800 specimens (Fig. 3.5). Here, a strain of soybeans between *sorip*, a variety of wild soybeans

(*Glycine soja*), and cultivated soybeans can be found: the semi-wild *Glycine gracilis*. Cultivated soybeans (*Glycine max*) have also been found at this site.

While it is possible that soybean remains excavated from dwellings, areas of scattered artifacts, or pottery kilns could consist of plants gathered or cultivated elsewhere and relocated after harvest, materials unearthed in places like Daepyeong in Jinyang indicate that the site supported a large farm, in which case it is more likely that soybeans would have been cultivated on the premises (Committee for the Establishment of a Korean Soybean Museum 2017).

Figure 3.6 lists sites on the Korean Peninsula where legumes (including soybeans) have been excavated. It appears that by the beginning of the Bronze Age, soybeans were being cultivated in every region of the peninsula (Yeongju City, North Gyeongsang Province 2015)

Soybeans were not originally a product of China, but arrived with the Dongyi tribes when they overran the Great Wall in an attack; since the Han Chinese called these people Sanyung, their soybeans came to be known as *yungsuk* (Yung beans). The beans were disseminated into southern China, Southeast Asia, and Japan between the third and fourth century BCE. It is interesting to note that the timeframe of the initial use of soybeans as food by the ancestors of the Korean people aligns with the anecdotal 5000-year-old history of Korea.

3.4.2 Routes of Soybean Dissemination

Busan University Professor Choi (2004) writes, “By referencing China’s historical records, it is clear that soybeans began to be cultivated in the northeast region of China during the early Zhou dynasty (1046-256 BCE) and were disseminated throughout northern China by the mid Spring and Autumn period (722-481 BCE). After the Jin and Han periods, the area in which soybeans were cultivated expanded to every region of China, and the name ‘suk’ gradually changed to ‘*daedu’* (large beans).”

Soybeans are generally thought to have spread throughout southeastern China and Southeast Asia by 700 CE. The reach of soybean plants into Southeast Asia occurred in tandem with Chinese immigration to that region. Although by the fourth century CE poor people from China had migrated south and created a presence in Southeast Asia, the 9th–13th centuries saw large-scale immigration from China to the south, spurring soybean cultivation and use across the Indochinese Peninsula and all of Southeast Asia.

Soybeans were brought to Europe for the first time on record when German scholar Engelbert Kaempfer returned to his country from a visit to Japan in 1712, bringing with him soybeans for personal use. A formal introduction followed in 1739, when a missionary brought soybean seeds from China and planted them in a botanical garden in Paris. In 1790, soybeans were cultivated in a British botanical garden, after which Britain also experimented with soybean cultivation in her colonies in East and West Africa (Yeongju City, North Gyeongsang Province 2015).

Neolithic Sites	**Type of Beans Excavated**
1. Daecheon-ri site, Okcheon	Legumes
2. Sangchon-ri site, Jinju	Legumes
Bronze Age Sites	
3. Wongdong site, Pohang	Wild adzuki beans, transitional soybeans (semi-wild), perhaps cultivated beans
4. Odong site, Heoryeong	Soybeans, adzuki beans
5. Namgyong site, Pyongyang	Soybeans
6. Seoktan-ri site, Hwanghae Province	Adzuki beans
7. Yanggeun-ri site, Yangpyeong	Soybeans, clay impressions of adzuki beans
8. Gungpyeong-ri site, Cheongwon	Soybeans, adzuki beans
9. Baekseokdong site, Cheonan	Soybeans, adzuki beans, cowpeas
10. Pyeongna-ri site, Boryeong	Pulse family
11. Bonggye-ri site, Hapcheon	Clay impressions of soybeans
12. Daepyeong I site, Jinyang	Pulse family
13. Daepyong II site, Jinyang	Adzuki beans, mung beans
14. Daundong site, Ulsan	Soybeans, mung beans, adzuki beans
Early Iron Age	
15. Gawaji site, Goyang	Pulse family
16. Samyangdong site, Jeju	Soybeans
Proto-Three Kingdoms	
17. Juwol-ri site, Paju	Pulses
18. Dunnae site, Hwangseong	Soybeans, adzuki beans
19. Garyeong-ri site, Yangyang	Soybeans, adzuki beans
20. Anin-ri site, Myeongju	Soybeans
21. Suyanggae site, Danyang	Soybeans, adzuki beans, mung beans
22. Gwanwon-ri site, Gunsan	Adzuki beans
Three Kingdoms	
23. Bangok-ri site, Buan	Clay impressions of soybeans
24. Tosan-ri site, Buan	Clay impressions of pulses
25. Simpo-ri site, Kimje	Adzuki beans
26. Buwondong site, Kimhae	Soybean hulls, adzuki beans
27. Sonam-ri site, Sancheong	Soybeans, adzuki beans, cowpeas
28. Jeopo C zone site, Hapcheon	Adzuki beans, mung beans
29. Wonbuk-ri site, Nonsan	Wild adzuki beans
30. Wanggung-ri site, Aksan	Pulses

Fig. 3.6 Sites on the Korean Peninsula with Excavated Legumes

The spread of soybeans to the Americas is twofold. First, Samuel Bowen, a sailor with the East India Trading Company who lived in Guangdong, China for a time, brought soybean seeds back to his farm in Savannah, Georgia in 1764. Second, Benjamin Franklin, as ambassador to France, is said to have obtained soybean seeds in England in 1770 and mailed them to his home in Philadelphia. Although Eastern soybeans were becoming known in the Western world in the latter half of the eighteenth century, they would not draw interest as a cash crop until more than a century later. After the first Opium War (1839–1842), American agronomists saw how the Chinese used soybeans for food and dubbed the crop "the dairy cow of the fields." They proceeded to research soybean production techniques in earnest. In the twentieth century, the two World Wars and the Great Depression brought such destruction that soybeans, which until then had been cultivated as a green manure crop or for fodder, now emerged as an important source of protein for destitute Westerners. Soybeans were so successful in times of strife they were dubbed a "Cinderella crop," or a "miracle crop." Today soybeans have become a staple food across the globe (Lee and Kwon 2005).

References

Cho, Hyeon-Jong. 2000. Dojaknonggyeong ui giwongwa jeongae [the origin and development of rice cultivation]. In *Hanguk godaemunhwa ui byeoncheongwa gyoseop* [Negotiations and changes in Korea's ancient culture], ed. Lee Hong-Jong. Seoul: Seogyeongmunhwasa.

———. 2005. Seonsa godae yujeokjung ui kong [Soybeans at prehistoric and ancient excavation sites]. In *Kong* [Soybean], ed. Committee for the Establishment of a Korean Soybean Museum, 45–80. Seoul: Korea University Press.

Cho, Mi-Soon, Cho Eun-Ha, Shin Yi-Seul, Seo Min-Seok, Obata Hiroaki, and Lee Gyoung-Ah. 2014. Togi apheunbeopeul hwalyonghan jungbu Donghaeanjiyeok sinseokgisidae singmuljawon iyong yeongu, Goseong Munam-ri yujeok, Yangyang Osan-ri/Songjeon-ri yujeokeul jungsimeuro [Neolithic use of plant resources along the central east coast, Korea: Grain impression analysis on pottery from the Munam-ri, Osan-ri C, and Songjeon-ri sites in Gangwondo]. *Hanguk sinseokgi yeongu* [Journal of Korean Neolithic Research Society] 28: 93–113.

Choi, Duk-Kyung. 2004. Daedu ui giwongwa jangsi mit dubu ui bogeupe daehan jaegeomto [Reexamination of the Origin of Soybean (sic) and the Distribution of Soybean Sauce, Soybean Malt, and Sundubu]. *Yeoksa minsokhak* [Korea Historical Folklore] 30: 363–427.

Choi, Mong-Ryong. 1986. Gogohaksangeuro bon Hanguk ui singmunhwa [archeological consideration of Korean dietary culture]. *Hanguk singmunhwahakhoeji* [Korean Journal of Dietary Culture] 14 (4): 416–418.

Committee for the Establishment of a Korean Soybean Museum. 2017. *Kong seutoritelling* [Soybean storytelling]. Seoul: Sikanyeon.

Diamond, Jared. 1997. *Guns, Germs and Steel*. New York: Brackman.

Fukuda, Y. 1933. Cytogenetical studies on wild and cultivated Manchurian soybeans (Glycine L.). *Japanese Journal of Botany* 6: 489–506. (in Japanese).

Harlan, Jack R. 1997. The Origins of Old World Cereal Agriculture. In *Origins of Agriculture*, ed. Charles A. Reed, 357–383. The Hague: Mouton Publishers.

Ho, Ping-Ti. 1975. *The Cradle of the East*. Hong Kong: The Chinese University of Hong Kong.

Huang, Hsing-Tsung. 2000. *Science and Civilisation in China, Volume 6, Biology and Biological Technology, Part V: Fermentations and Food Science* (trans: Joseph Needham). Cambridge: Cambridge University Press.

Hymowitz, Theodore. 1970. On the Domestication of the Soybean. *Economic Botany* 24 (4): 408–421.

Kim, Moon-Young, Van Kyujung, Kang Yang-Jae, Kil-Hyun Kim, and Suk-Ha Lee. 2012. Tracing Soybean Domestication History: From Nucleotide to Genome. *Breed Science* 61 (5): 445–452.

Kim, Won-Ryong. 1973. *Hanguk gogohak gaeron* [Korean archeology]. Seoul: Ilgisa.

Kwon, Shin-Han. 1985. Daedu ui giwon [The origin of soybeans]. *Hanguk kongyeonguhoeji* [Korea Soybean Digest] 2: 4–8.

Lee, Cherl-Ho. 1999a. Dongbugasia wonsitogimunhwa sidae ui teukjanggwa sikpumsajeok jungyoseong [The Primitive Pottery age of Northeast Asia and its importance in Korean food history.]. *Minjokmunhwa yeongu* [Korea Cultural Studies] 32: 325–357.

Lee, Hyun-Seok. 1999b. Ulsan Mugeo-dong Okhyeon yujeoke daehayeo, cheongdonggisidae Ulsan ui jipgwa maeul [On the Okhyeon excavation in Ulsan, Mugeo-dong]. In *Ulsan Research*, vol. 12. Ulsan: Ulsan University Museum.

———. 2017. *Hanguk eumsik ui yeoksa* [History of Korean food]. Seoul: Jayu Academy.

Lee, Cherl-Ho, and Kwon Tai-Wan. 2003. *Hanguk sikpumhak immun* [Introduction to Korean food science]. Seoul: Korea University Press.

———. 2005. Kong ui iyongyeoksa [History of soybean utilization]. In *Kong* [Soybean], ed. The Committee for the Establishment of a Korean Soybean Museum, 3–44. Seoul: Korea University Press.

Lee, Chun-Nyoung. 1965. Hanguk nongeopgisulsa [History of Korean agricultural technology]. In *Hanguk munhwasadaegye III* [Encyclopedia of Korean Culture], ed. Research Institute of Korean Culture, 17–54. Seoul: Korea University.

Lee, Gyoung-Ah. 2011. The Transition from Foraging to Farming in Prehistoric Korea. *Current Anthropology* 52 (Suppl 4): 5307–5329.

Lee, Gyoung-Ah, Gary W. Crawford, Li Liu, Sasaki Yuka, and Chen Xuexiang. 2011. Archeological Soybean (Glycine max) in East Asia: Does Size Matter? *PLoS One* 6 (11): 1–12.

Lee, Sung-Woo. 1984. *Hanguk sikpummunhwasa* [History of Korean food culture]. Paju: Kyomunsa.

Lee, Yeong-Ho, and Park Tae-Shik. 2006. Chultoyumulgwa yujeonjeok dayangseongeuro bon Hanbando ui duryujaebae giwon [Origin of Legumes Cultivation on the Korean Peninsula by Viewpoint of Excavated Grain Remains and Genetic Diversity of Legumes]. *Nongeopsa yeongu* [Agricultural History Studies] 5 (1): 1–31.

Lee, Yung-Jo. 2014. Soro-ri byeopssi, wae jungyohanga? [Soro-ri carbonized rice: Why is it important?]. In *Paper presented at the Hanguk seonsamunhwa yeonguwon* [Korean Prehistoric Culture Research Institute], 72nd meeting, Jeungwon Forum.

Liu, Li, and Xingcan Chen. 2012. *The archeology of China*. New York: Cambridge University Press.

Sedivy, Eric J., Wu Faqiang, and Hanzawa Yoshie. 2017. Soybean domestication: The origin, genetic architecture and molecular bases. *New Phytologist* 214 (2): 539–553.

Shin, Yong-Ha. 2014. Gojoseon munmyeong hyeongseong ui gibangwa Hangang munhwa ui segyechoecho dallipbyeo mit Kong ui jaebae gyeongjak [Han River culture's first cultivation of *Japonica* rice and beans in Gojoseon civilization.]. *Gojoseon Dangunhak* [Gojoseon Dangun Studies] 31: 127–185.

———. 2018. *Gojoseon munmyeong ui sahoesa* [History of the society of Gojoseon civilization]. Seoul: Jisiksanupsa.

Sohn, Jun-Ho. 2000. Nonsan Majeon-ri C jigu balgul seonggwa, 21segi Hanguk gogohak ui banghyang [Excavation of Nonsan Majeon-ri site, zone C: The direction of Korean archeology in the 21st century.]. In *Paper presented at the 24th Annual Conference of the Hanguk gogohakhoe* [Korean Archeological Society].

Yan, Wen-Ming. 2000. *Origins of agriculture and civilization*. Beijing: Science Publishing. (in Chinese).

Yeongju City, North Gyeongsang Province. 2015. *Kongsegye gwahakgwandorok* [Soyworld Science Museum]. Seoul: Sikanyeon.

Chapter 4
Food Culture of the Han Korean Ethnic Group During Northeast Asian State Formation

Abstract The period of early state formation in Northeast Asia (3000–1000 BCE) has proved to be a topic of intense debate in Korean historical circles. Questions arise regarding the degree to which ancient mythological kingdoms can be regarded as historical. These include kingdoms ruled by China's Liao, Shun, and Xia kings, as well as the semi-mythological Shang and Zhou dynasties, along with Korea's Hwanguk, Baedalguk, and Dangun Joseon (or Gojoseon) kingdoms, This chapter discusses the prehistoric cultures of Northeast Asia including the establishment of Gojoseon and Dongyi (eastern archers) tribes, and the food cultures of Dongyi tribes which are characterized by fermented soybean products, soybean sprouts, *tofu* (soybean curd) and *bulgogi* (roasted beef marinated with soybean sauce).

The period of early state formation in Northeast Asia (3000–1000 BCE) has proved to be a topic of intense debate in Korean historical circles. Questions arise regarding the degree to which ancient mythological kingdoms can be regarded as historical. These include kingdoms ruled by China's Liao, Shun, and Xia kings, as well as the semi-mythological Shang and Zhou dynasties, along with Korea's Hwanguk, Baedalguk, and Dangun Joseon (or Gojoseon) kingdoms. China has designated the Liao, Shun, and Xia civilizations as belonging to the Heroic Age of myth, and the Shang and Zhou as historical dynasties; until recently, however, Korean scholars struggled to justify a decision regarding the Korean kingdoms due to insufficient research materials.

This lack of research can be ascribed to geopolitical historical events: In the wake of the collapse of the Baekje (660 CE) and Goguryeo (668 CE) kingdoms into Unified Silla (668–935 CE), the newly united country was unable to retain the northern territory of Goguryeo beyond the Amnok (Chi. Yalu) River. China occupied this northern border and remained stationed there upwards of a 1000 years, during which time the memory of ancient Korean hegemony in that region was lost. In modern times, the first half of the twentieth century proved highly unfavorable for productive scholarly research into ancient Korean food culture, and until recently, scholarly discussion of ancient Korean food culture could only scratch the surface due to a lack of records, whether written or archeological. In order to pick up the thread of Korean foodways, the hegemonic Dongyi tribes of southern Manchuria

C.-H. Lee, *Korean Food and Foodways*,
https://doi.org/10.1007/978-981-19-0023-5_4

and the Korean Peninsula must be assessed culturally and historically as a single area of research.

4.1 Prehistoric Cultures of Northeast Asia

Three major ethnic groups that lived in ancient East Asia were the Dongyi tribes, who lived along the Liao River in northeastern China; the Huaxia tribes, who dwelt in the Yellow River region; and the Miaoman tribes, who occupied the Yangtze River region (Barnes 1993). Figure 4.1 maps the territories of these prehistoric tribes. Foundational stories and the fates of these tribes were transmitted over the years in the form of legends. Most Chinese myths concern these three tribes, especially the historic struggle spanning thousands of years between the Dongyi and Huaxia tribes as they continually vied to gain ascendancy over each other. Recent excavations of the Liao River civilization have garnered international interest, especially in the Hongshan culture discovered there. The objects unearthed provide archeological evidence of the existence of the Dongyi tribes, which were

Fig. 4.1 Three prehistoric northeast Asian ethnic groups and their location

previously known only in myths. Excavations also led to the discovery of Liao River artifacts 2000 years older than the previously understood start date of Chinese civilization, which was thought to be located in the Yangshao (5000–3000 BCE) and Longshan (3000–2000 BCE) cultures of the Yellow River Basin. These discoveries necessitated a correction to the history of the emergence of civilization in Northeast Asia.

Hongshan culture was discovered in 1908 by Japanese anthropologist Torii Ryūzō (1870–1953), and soon thereafter, Emile Licent (1876–1952), a French Jesuit priest living in China, discovered 22 Neolithic sites. In 1934 Liang Siyong, a Chinese archeologist who had studied at Harvard University, presented his analyses on excavations in four northeastern provinces (Liaoning, Jilin, Heilong, and Rehe) in his "Report on archeology in Rehe." In 1935 Japan's Hamada Kōsaku and Mizuno Seiichi implemented a large-scale investigation of the area. After World War II the Chinese government continued the excavation work, naming the culture discovered in this region Hongshan. Characteristic artifacts include painted pottery, jade work, and microliths. Once full-scale excavations were achieved in the 1980s, Chinese scholars proposed that the cultures found along the entirety of the Liao River, including Xinglongwa, Hongshan, Zhaobaogou, and Xinle, constituted a Neolithic civilization new to the world; taken as a whole, the ancient peoples of this area were named the Liao River civilization. In June 2003, through China's "Process for Discovering the Origins of Chinese Civilization," China stipulated that the Liao River civilization, which predates the Yellow River civilization, would be known as the root of Chinese civilization. Until that point, the region of the Liao River civilization had been considered to be the land of the Dongyi tribes, outliers often depicted in Chinese historical texts as "foreign barbarians"—but now Chinese scholars began to see the region as one of the starting points of Chinese civilization, thus squarely situating the Dongyi as ancestors of the Chinese race and a foundational part of Chinese history. However, based on the discovery of stone mound tombs in Hongshan culture and the presence of similar stone mound tombs found in the regions of the Korean kingdoms of Gojoseon, Goguryeo, Baekje, and Silla, the Korean archeological academy argues that Hongshan culture is the progenitor of Korean culture.

Figure 4.2 shows the location of excavation sites of ancient Liao River cultures and the territory of Gojoseon. Details of each cultural, including artifacts unearthed, are summarized below.

1. Xiaohe West culture, Inner Mongolia, Aohan banner, Chifeng city: 7000–6500 BCE

   Neolithic Xiaohe cultural relics: semi-pit dwellings, various earthenware, stoneware and earthenware image of a face, etc.
2. Xinglongwa culture, Inner Mongolia, Aohan banner, Chifeng city: 6200 BCE–5200 BCE

   Neolithic Xinglongwa cultural relics: large-scale residential area, the first dragon-shaped water container, the world's oldest jade ware, comb-pattern pottery, flat-bottom pottery, baked clay male statue, etc.

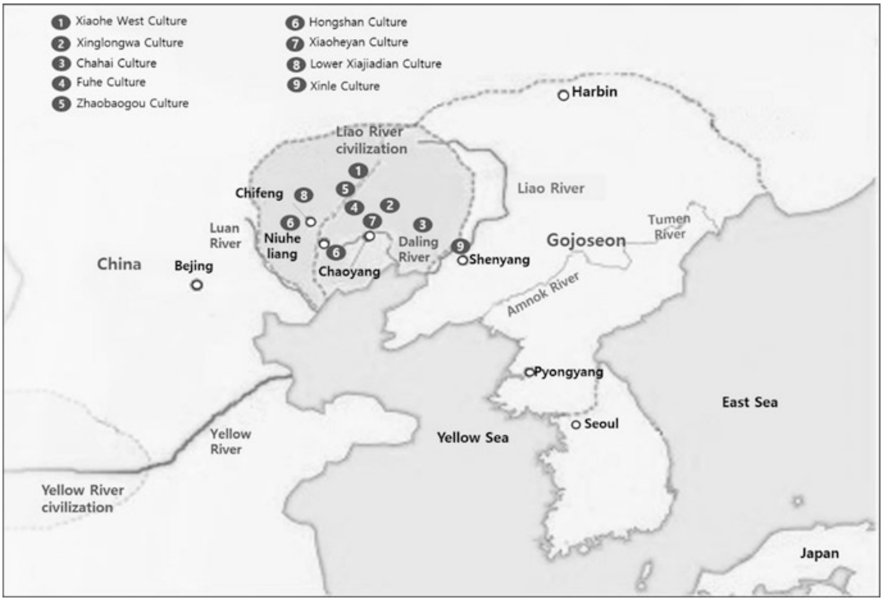


Fig. 4.2 The territory of Gojoseon and Liao River civilization

3. Chahai culture, bordering Inner Mongolia, Chahai region: 6000–5200 BCE
   Neolithic Chahai cultural relics: dragon-shaped stone statues, collective residences, various jade objects, comb pattern pottery, etc.
4. Fuhe culture, Inner Mongolia, Aohangi Fuhe Basin, Chifeng city: 5200–5000 BCE
   Neolithic Fuhe cultural relics: the oldest prognosticator bone, stone tools, bone tools, comb-pattern pottery, etc.
5. Zhaobaogou culture, Inner Mongolia, Luanhe Valley, northern Hebei Province: 5000–4400 BCE
   Neolithic Zhaobaogou cultural relics: the first rod-shaped earthenware, spiritual objects, fine stoneware, comb-pattern pottery, the first colored pottery in West Liaoning, etc.
6. Hongshan culture, Inner Mongolia, Hebei Province, Liaodong: 4500–3000 BCE
   Neolithic Niuheliang cultural relics: the first "mausoleum" (stone mound tomb), an object representing the existence of a state; statue of a goddess, various jade objects, bronze-casting relics, stoneware, colored pottery, plain pottery, pottery for rites, etc.
7. Xiaoheyan culture, Inner Mongolia, Aohangi Xiaoheyan Basin, Chifeng city: 3000–2000 BCE Bronze-stone combination period Xiaoheyan cultural relics: various patterns of pottery with symbols, stoneware, fine stoneware, bone ware, etc.
8. Lower Xiajiadian culture, Inner Mongolia, Aohan Mengke River Basin, Chifeng city: 2000–1500 BCE

Early Bronze Age, Lower Xiajiadian cultural relics.

9. Xinle culture in northern Liaoning Province, Shenyang City: 8000–7000 BCE
   Neolithic relics show evidence of maternal clans in settlement villages.

Hongshan peoples settled on the land, engaged in agriculture, and developed animal husbandry with domesticated pigs or sheep. They continued to hunt for wild animals and gather wild plants. Cultures that relied mainly on farming left archeological remnants such as broken stone tools, polished stone tools, microliths, and other implements used in daily life, as well as tools directly related to farming, such as plowshares, plows, and hoes. Comb-pattern pottery, which originated along the Korea Strait, appeared later at Hongshan archeological sites. Clay pottery bearing designs painted with a brush are thought to have been used for cooking and eating, while utilitarian brown pottery engraved with a design may have been used for storing food. The kind of painted pottery found in the contemporary Yangshao culture did not develop in Hongshan culture.

From the viewpoint of historical studies, the most significant evidence of a society moving in the direction of statehood entails the use of bronze tools and writing; although Hongshan culture had neither writing nor bronze, the great quantity and variety of artistically rendered jade implements and verifies that the culture had entered the stage of incipient state formation. Many ornaments made of jade and other stones have been found in Hongshan graves, including carved objects in the shapes of pigs, tigers, birds, and dragons. High artistic achievement in jade is a hallmark of Hongshan culture.

In Yeosu, South Jeolla Province, South Korea (the southern tip of the peninsula), similar jade objects were found arranged with human bones at a tomb site in 2007. They match the style of Hongshan jade, but date back as far as 6000 BCE, earlier than the estimated start date of Hongshan culture. Jade ornaments thought to date from the same era have also been discovered at the Munam-ri site in Jugwang-myeon, Goseong-gun, Gangwon Province, South Korea (northeastern coast). Around the same time Hongshan culture was being formed, there was an influx of jade ornaments on the Korean Peninsula. Analysis of the physical components of the jade excavated at Hongshan sites reveals that the jade came from Xiuyan, a region of Liaoning Province, China, about 400 km (249 miles) from Munam-ri. Xiuyan is not far from the Amnok River, and by continuing from there along the Tumen River, traders could have sailed down the east coast of Korea and arrived at Munam-ri. Comb-pattern pottery found across the region, including that of Hongshan culture, has also been found at Munam-ri. These discoveries suggest that in 6000 BCE the Hongshan culture in East and West Liaoning and the culture found in the northern area of the Korean Peninsula were likely one and the same.

Artifacts from Hongshan archeological sites provide important evidence substantiating the ancient history of the Korean race, which until recently had been known only in myths. For a thousand years the Korean race's ancient culture was denigrated by hegemonic Chinese kingdoms as "eastern barbarian" (Dongyi) culture, but current archeological discoveries attest that regardless of how the Dongyi tribes were viewed by outsiders, their culture in fact developed before heartland Chinese civilizations (Shin 2018). In fact, it appears that the Dongyi tribes exerted equal influence on the ancient histories of China and Korea. Research into numerous historical texts has revealed that the Dongyi tribes comprised a massive race that played a leading role in Chinese civilization at that time. In a passage from *Zi yuan* (Essays on Chinese characters 266–420 CE) quoted in *Xin Tang shu* (New Book of Tang, or New History of Tang, 1060 CE), the author expresses a favorable impression of Dongyi peoples. Alluding to the natives of the Dongyi region, the writer distinguishes them as benevolent, gentle, and virtuous people. In *Hanshu: de li zhi* (Book of Han: treatise on geography) there is a passage describing the Dongyi as having placid natures, different from other foreign tribes the Chinese called "barbarians" (Lee and Kwon 2005).

Once the Goguryeo and Baekje kingdoms came under the rule of Unified Silla (668–918 CE), however, Goguryeo land north of the Amnok River was forfeited to Tang China, which resulted in a loss of competing power with China. In the passage of time, ancient Korean history came to be viewed erroneously through the lens of subservience to China. Much later, Japanese colonizers in the twentieth century (1910–1945) further distorted ancient Korean history by advancing the jingoistic falsehood that Korea had always been subservient to Japan or China. Seventy years after liberation, Korea has not yet completely emerged from this colonial fog. Over 200,000 Korean records were extorted or destroyed during the Japanese colonial period, and only 1400 *Uigwe* (Joseon Kingdom documents) were returned to Korea from Japan in 2011. Due to these narrative distortions and the damage done to ancient Korean records by Japanese occupiers (Kim 2011), no widely accepted theories of ancient Korean history have been identified—only rampant disputes. Thus, research on the Liao River civilization provided by findings at archeological excavations has the invaluable potential of recovering missing pieces of Korea's ancient history.

4.2 The Heroic Age

The representative mythological figures *Sanhuang wudi*, or Three Sovereigns and Five Emperors, are the subjects of orally transmitted stories that depict the beginnings of Chinese civilization. The oral history of China's ancient progenitors was first systematized and recorded during the Spring and Autumn (770–476 BCE) and Warring States (475–221 BCE) periods, and over the course of thousands of years, many theories were created and recreated by the assertions of prevailing philosophers and scholars. The Sanhuang wudi were long revered as historically factual personages until Qing (1644–1912 CE) leaders Kang You-Wei and Gu Jie-Gang, with others of the Han Learning school, who favored evidence-based scholarship, denied the historicity of the Sanhuang wudi and clarified that these were myths that had been fabricated by influential religious leaders.

Samguk yusa (Memorabilia of the Three Kingdoms) and *Jewang ungi* (Rhymed record of emperors and kings) are ancient texts containing the Korean founding myths, but a book of myths that has more recently garnered attention among Korean historians is *Hwandan gogi* (Ancient record of bright heaven and earth) (Lim 1986). *Hwandan gogi* (or *Handan gogi*) is treated as a forgery by some historians in North and South Korea, and is not quoted in any historical work, but *jaeya* historians (lay historians) nevertheless judge it as a potential reference work for recovering Korea's lost ancient history. *Hwandan gogi* is described as a compilation of ancient texts brought forth in a single volume in 1911 by Gye Yeon-Su, a historian who fought for Korean independence in Manchuria. The supposed ancient texts consist of *Samseonggi* 1, written by High Priest An Ham-No under the Silla King Jinpyung; *Samseonggi* 2, by Won Dong-Jung; *Dangun segi*, by Yi Am-yi of the late Goryeo dynasty; *Bukbuyeogi*, by Hyuaegeosa Beomjang; and *Taebaek'ilsa*, by Yi Maek-Yi of the Joseon dynasty. *Samseonggi* 1 and 2 chronicle the history of Hwanin (God), who oversaw a land called Hwanguk, which was ruled by seven kings over a span of 3301 years, and of his son Hwanung, who founded the kingdom Baedal and its capital city, Sinsi, which was ruled for 1565 years by 18 kings. These narratives constitute the leading origin myths of the Korean race. Another founding myth, *Dangun segi*, which is well known among Koreans from Gojoseon histories, tells the story of the kingdom of Dangun Wanggeom, which was established and ruled over by Dangun and 47 kings for 2096 years after Baedal. *Bukbuyeogi* picks up with the histories of the six kings following Dangun, the bulk of which concerns the northern kingdom of Buyeo, a precedent of Goguryeo. *Taebaek'ilsa* contains the histories of the kingdoms of Hwanguk, Baedalguk, Samhan, Goguryeo, Balhae, and Goryeo. Although the publication process of *Hwandan gogi* is suspect, and professional historians deem some of the content to be incorrect, most agree that it would be a waste to discard or completely repudiate it.

4.2.1 China's Three Sovereigns and Five Emperors

The story of the Three Sovereigns of China appears in various texts, including *Shiji* (*Records of the Grand Historian*, 94 BCE) and *Fengsu tongyi* (Comprehensive meaning of customs and mores, 195 CE). The Three Sovereigns are more than kings; they are revered as gods in Chinese history because of the groundbreaking innovations they brought to the people. According to *Shiba silue* (Eighteen concise histories, 1279–1368), the Three Sovereigns are Fu Xi, Shennong, and Huangdi (the Yellow Emperor). The first of the Three Sovereigns, Fu Xi, is said to have had the body of a snake and the head of a human. He taught the people how to hunt and use fire. The second is Shennong, the god of the sun and farming, who is depicted as having a human body with the head of an ox. Shennong tested all wild plants for the people by ingesting them himself to discover which ones were good and which were noxious. He taught the people how to set up a weekly farmer's market, among other things. In the end, he died after eating a poisonous plant. The third Sovereign is known as Huangdi, who invented the wagon and taught people how to build houses and make clothes. He introduced the concept of writing, the fields of astronomy and mathematics, and taught the art of medicine. All the gods under heaven followed Huangdi except for Chiyou, who rebelled. Huangdi gathered an army and ultimately defeated Chiyou at Zhuolu and Banquan. Chiyou and his henchmen Feng Bo and Yu Shi (the wind and rain gods) surrendered to Huangdi (Sima Qian, *Shiji*, “Wu di ben ji” [Biography of the Five Emperors]). These myths depict the Huaxia tribes, ancestors of the now-dominant Han Chinese culture, although the story of the Huaxia conquering the Dongyi tribes (led by Chiyou) differs from that found in Korea’s *Hwandan gogi*.

There are several divergent myths about the Five Emperors, but according to *Shiba silue*, the Five Emperors constitute five descendants of the Yellow Emperor, namely, Emperors Shao Hao Jin Tian, Zhuan Xu Gao Yang, Ku Gao Xin, Yao Tao Tang, and Shun You Yu. Shao Hao is the Yellow Emperor’s son, and Zhuan Xu is Shao Hao’s nephew, who established a strict law decisively separating heaven from earth and fortifying the relationships between master and servant, man and woman. After Zhuan Xu came Shao Hao’s son Emperor Ku, who brought merriment to the people by creating all manner of music and musical instruments. Emperor Ku’s son, Emperor Yao, is also called Tang Yao because he ruled the region of China occupied by the Tang (referring to the Han Chinese). Emperor Yao taught the people the right timing for planting crops, designated a 366-day calendar, and organized a government based on a system of public officials. Seventy years after ascending to the throne, Emperor Yao sought a successor, requesting that his subjects recommend one. They suggested Shun, a descendent of Zhuan Xu, a man of exceeding filial devotion. Emperor Yao sent Shun two of his daughters as brides, entrusted him with a great number of tasks, and tested his abilities and character. After 3 years he declared Shun would be his successor and “tasked him with everything under heaven.” 20 years later Emperor Yao retired and made Shun regent, and 8 years later Yao died. Some scholars assert that around the time of Emperor Yao a centralized government was established in the Yellow River civilization. Together, Emperors Yao and Shun can be seen as representative sage kings who ruled during a golden age, and along with Xia’s King Yu (who succeeded Emperor Shun) and Shang’s King Tang (who overthrew the last ruler of Xia), this period of benevolent rulers is referred to as “Yao Shun Yu Tang.”

The Three Sovereigns and Five Emperors represent mythological figures of China, but some Chinese records indicate that they belonged to the Dongyi tribes. A counterargument asserts that the Dongyi tribes preceding the Qin dynasty (221–206 BCE) and the tribes following the Han dynasty (206 BCE-220 CE) constitute different tribes, but the Han Korean ethnic group that held and defended southern Manchuria and the Korean Peninsula is without question the mainstream of the Dongyi tribes. In writings like *Hwandan gogi*, some or all of the Three Sovereigns and Five Emperors are depicted ethnically as either Dongyi or Han Korean (Lim 1986). The formation of early states in Northeast Asia entailed several ethnic tribes striving to hold their ground in order to expand their power, but hegemonic groups among their posterity refashioned or reinvented the myths to legitimize their rule.

4.2.2 Korea's Dangun Myth

According to *Hwandan gogi*, whose foundational myths were purportedly compiled between the Silla (57 BCE–935 CE) and Joseon (1392–1897 CE), in 7197 BCE Hwanin, founder of the Dongyi tribes, lived in heaven between Baekdu Mountain and the Heilong River (Lim 1986). Through seven successive emperors over a period of 3300 years, there were no battles or wars in the land. The concept of extraordinarily long-lived leaders finds a parallel in the Bible (the record of foundational myths on which western culture is broadly based): the book of Genesis records the life spans of the ancient patriarchs, including Adam, Methuselah, and Noah, as reaching nearly a thousand years each. In 3897 BCE Hwanin sent his son Hwanung to earth with the lords of wind, rain, and clouds, and 3000 followers to establish Baedalguk in Sinsi (city of gods), the kingdom said to precede Gojoseon. Hwanung's kingdom continued for 1565 years, through 18 emperors. In 2707 BCE, the 14th emperor, Chi'u, expanded the kingdom's arable land and produced the copper and iron needed for use in war. Chi'u (Chi. Chiyou) also appears in the aforementioned myths of the Three Sovereigns and Five Emperors. In 2333 BCE Dangun Wanggeom established a third kingdom, Dangun Joseon. Dangun Joseon was the last legendary country to appear in the Hwanguk ("heavenly kingdom") myths, and it survived until 295 BCE, when it fell during the reign of its 47th emperor, Goyeolga.

In *Hwandan gogi*, the legendary land Hwanguk is said to have been established in the 7000 s BCE, which, in an archeological context, locates it as nearly coinciding with both the Primitive Pottery era in Korea, which began circa 8000 BCE, and the Xinle culture (5500–4800 BCE) of northeastern Manchuria, which itself overlaps with early Hongshan culture. Traces of pottery use from the 6000 s BCE have been found across the Korean Peninsula, indicating that a settled clan society had likely emerged there by then. Each clan would have formed a settlement in which people lived in communal homes centered around a leader.

As discussed in Chap. 2, pottery use led to the development of *jjigae* (stew) culture and fermentation techniques, methods of preservation that greatly increased the ability of people to secure and store food, simultaneously improving the nutrition and hygiene of their diet. The ability to consume a greater variety and volume of nutritious foods led to stronger physiques and increased population, which, not incidentally, likely positioned the Dongyi tribes as an early ruling class in Northeast Asia. Fermentation techniques that produced rice wine have been traced to Korean origins. The famous passage in China's *Shijing* (an anthology of poetry from the Yellow River and Yangtze River valleys) that "there are a thousand types of wine in Liao" refers to the reign of Emperor Yao in the Liaodong territory of the Dongyi. It is reasonable that elements of culture developed by the Dongyi tribes in 6000 BCE would have spread to the Yellow River valley and influenced Huaxia tribal civilization there.

Yoon (2015) argues that *Hwandan gogi*'s earliest myths explain the progression of the formation of the Korean race: the era of Hwanin represents the stage when

Table 4.1 Formative stages of the Korean race and comparison with China

Archeological period	Korean civilization	Yellow river valley civilization
Old stone age	Group society before 8000 BCE	Social bands/tribes before 8000 BCE
Middle stone age	Tribal society 8000 s BCE	Hamlet society 8000 s BCE
Early Neolithic era	Joint villages 4000 s BCE	Groups of villages 3500 BCE
Iron age	State of Gojoseon 2333 BCE	States of Xia, Shang, and Zhou 2200 BCE
Bronze age	Gojoseon, several states period, fourth century BCE	Spring and autumn period, 770 BCE

people lived in a peripatetic group society; the era of Hwanung represents a more sedentary lifestyle that included farming, or a settled clan society; and Hwanung and Ungnyeo's marriage represents an alliance between several villages, or a joint village society. Table 4.1 shows the formative stages of the Korean race (Yoon 2015).

The myth of Dangun, which describes the formation of early societies in Korea and Northeast Asia, is found not only in *Hwandan gogi*, but also in texts such as *Samguk yusa* (Memorabilia of the Three Kingdoms, Ilyon 1206–1289), *Jewang ungi* (Songs of emperors and kings, Yi Seung-Hyu 1287–1301), *Sejong sillok* (Annals of Sejong, 1452), and *Eungje siju* (Annotation of Eungje si [Writings for the Ming Emperor], Gwon Ram, 1416–1465). Each rendition reveals slight narrative differences. The foundation myth of Dangun is responsible for the development of the Three Gods doctrine, the wellspring of Korean folk religion: the gods Hwanung (heaven) and Ungnyeo (earth) had a son, Wanggeom (Dangun), who came down and served the people. This idea was formational in Asian shamanism and in the Dongyi tribes' traditional religion, totemism.

According to the record in *Samguk yusa*, distinctions can be made between (1) the era of Hwanin and Hwanung, (2) the era when Hwanung established the city of Sinsi in the Taebaek Mountains, and the bear and tiger lived together, and (3) the era when Dangun established the state of Gojoseon. The era of Hwanin and Hwanung spanned a 1000 years, from about 6000–5000 BCE, when Primitive Pottery culture was widely disseminated across the Korean Peninsula. At this stage, groups of clans formed joint village societies, similar to early Liao River cultures such as Xiaohexi, Xinglongwa, Chahai, and Fuhe. These occurred simultaneously with the era of Hwanguk in *Hwandan gogi*. Hwanung's founding of Baedalguk in the Taebaek Mountains, with Sinsi as its capital, coincided with the period in which fishing and hunting clans who worshipped tiger and bear totems were merging into small tribal alliances as a step toward Neolithic farming. This occurred in 4000–3000 BCE and mirrors the period of the Liao River Valley's Zhaobaogou and Hongshan cultures.

Dangun Wanggeom's establishment of Gojoseon (also called Dangun Joseon) marks the formation of the first centralized government in Korean history, which occurred through the merging of small tribal states during the transition from the

Neolithic era to the Bronze Age in the 2000s BCE. This period, represented by Liao River Valley cultures Xiaoheyan and Lower Xiajiadian, appertains to China's golden age, or period of peace. The territory of Gojoseon is estimated to have covered at least the area of the eastern Liao River in the region of Baekdu Mountain (Chi. Changbai), where the Korean Peninsula abuts the Northeast Asian continent.

After the Neolithic era, an increase in population led to the emergence of tribal states, and as these began to undergo militarization around 1500 BCE, the era of megalithic culture began, which is represented by large stone structures such as dolmens and menhirs. This period coincides with the early Bronze Age on the Korean Peninsula. Dangun Wanggeom merged nine Tungus tribes to form the Joseon kingdom (now called Gojoseon, or "Old Joseon") with its capital in Asadal. Gojoseon territory included the area north of the Han River, Heilong River's southern Manchuria region, and the eastern Liao River region (Nahm 1988).

4.3 The Establishment of Gojoseon

In *Gojoseon yeongu* (A study of Gojoseon), Yoon (2015) posits that Gojoseon was a powerful state encompassing the entirety of the Korean Peninsula and Manchuria. The Luan River and the territory downstream, the Jieshi Mountains, served as a western border, west of Beijing; the Argan River marked the northern border; the eastern border was bounded by the Amur River (perhaps reaching Maritime Province, Russia); and the southern border was formed by the southern coast of the Korean Peninsula.

The record of the Dangun myth in *Samguk yusa* (Ilyon 1285) can be found in Sect. 2, "Wanggeom Joseon" of Book 1, *Kii* (Wonders), as follows:

> *Wei shu* (The book of Wei) states, "Two thousand years ago, Dangun Wanggeom founded a nation in Asadal. (It was called Muyeob Mountain, or Baegak, in Baekju. It is said that it was located to the east of Kaesong.) He named it Joseon, and it happened during the same period as the reign of Emperor Yao." *Gogi* (Ancient record of Korea) declares, "In the old days, Hwanung, the bastard of Hwanin, longed to live in the human world under the heavens. When his father learned of his son's desire and looked down at Taebaek, one of three mountain regions, he deemed it a worthy place in which his son could benefit the human race. He gave three heavenly seals to Hwanung and let him rule the land. Hwanung led three thousand of his heavenly cohort down to Sindansu, a holy sandalwood tree, near the top of Taebaek Mountain and called the place Sinsi (City of God). He became Hwanung cheonwang (Heavenly Emperor Hwanung). He remained in the world to govern human life, grain, disease, punishment, good and evil, and over 360 human affairs, reigning and edifying with his ministers *Pungbaek* (wind), *Usa* (rain), and *Unsa* (cloud). At that time, there was a bear and a tiger living in the same cave, and they petitioned Hwanung, the divine king, to transform into humans. In reply, Hwanung gave them a handful of psychedelic mugwort and 20 bulbs of garlic and said, "If you eat this and do not see sunlight for a hundred days, you will become human." The bear adhered to the diet, and after only twenty-one days turned into a woman, but the tiger could not tolerate the fast and left the cave before achieving the desired change. Since Ungnyeo (Bear Woman) had no partner, she went to the holy sandalwood tree and begged to be granted children. Hwanung took pity on her and transformed into a human in order to marry her, and soon she gave birth to a son they named

Dangun Wanggeom. Dangun ascended the throne in the year Gyeongin in Pyongyang, 50 years after the Tang Emperor (Emperor Yao) came to power in China, and named the nation Joseon. Later, he moved the capital to Asadal on Baegak Mountain, and the place was called Gungholsan or Geummidal, and he ruled the country for 1,500 years. In the year Gimyo (1122 BCE), King Ho founded the Zhou dynasty in China and sealed Gija to Joseon, upon which Dangun moved his capital to Jangdangyeong. Later he returned to Asadal, abdicated the throne, and hid, becoming a mountain god. He was 1,908 years old."

Pei Ju zhuan (Biography of Pei Ju), written during the Tang Dynasty (618–906 CE), states, "Goryeo [Goguryeo] was originally Gojuk-guk (now Haeju), but the Zhou Dynasty enthroned Gija there and called it Joseon, and the Han Chinese had three commanderies in the land: Xuantu, Lelang, and Daifang." The same information is related in *Tongdian* [Comprehensive institutions (766–801)]. *Hanshu* (Book of Han, 82 CE), however, lists four commanderies: Zhenfan, Lintun, Lelang, and Xuantu. Why does one record mention only three commanderies, one of which has a different name?

The existence of the Four Commanderies of Han (206 BCE–220 CE, China) and the importance and location of the states Gija Joseon and Wiman Joseon form the nexus of debates over ancient Korean history. After liberation from Japanese rule (1945), professional Korean historians identified the position of the Lelang Commandery (108 BCE–313 CE) as Pyongyang, asserting that it succeeded Gojoseon and established Gija Joseon, and that later, Wiman Joseon destroyed Gija Joseon and ruled the Gojoseon region. However, lay historians found that the Four Commanderies of Han were located in the Liao River territory, and that Gija Joseon and Wiman Joseon did not replace the state of Gojoseon. The root of the problem behind this debate lies in the deficiency of historical sources, without which it is difficult to verify the ancient names and locations of the kingdoms in question, particularly as place names were recorded differently depending on the era. Yoon (2015) has attempted to clarify this confusion by exhaustively examining all pertinent literary sources and historical research currently available.

Gojoseon became a powerful state by creating a confederation of the joint village societies that were scattered across Manchuria and the Korean Peninsula. It expanded its territory to the west by advancing across the Luan River and moving its capital to Asadal, in the Luan River region of the Baiyue Mountains. Around 1100 BCE the Western Zhou dynasty exiled the Gija clan to the territory of Gojoseon's western frontier and had them settle along the Luan River, putting them in charge of defending the border. Gojoseon retreated and relocated its capital to Jangdangyeong (Zangtangjing), along the eastern reaches of what is now the Daling River. In 195 BCE Wiman was exiled from Western Han to Gija Joseon, and before long, he usurped the government from Gija's 40-year-old grandson, Jun, and founded Wiman Joseon. In 108 BCE Western Han's Emperor Wu overthrew Wiman Joseon, and after setting up the Lelang, Lintun, and Zhenfan commanderies in that region, followed up on his victory by attacking the border of Gojoseon. In 107 BCE he installed the Xuantu Commandery along the west bank of the Liao River. Accordingly, the establishment of Gija Joseon, Wiman Joseon, and the Four Commanderies of Han all occurred in the western border region of Gojoseon, along the western reaches of the Liao River, while the Korean Peninsula and the northeastern area of the Liao River were under the rule of Gojoseon, the successor of which was the Several States Period, followed by the four kingdoms Goguryeo, Baekje, Silla, and Gaya.

Several statelets existed during the time of Gojoseon, including Buyeo, Gojok, Goguryeo, Ye, Maek, Chu, Jin, Beon, Nangnang, Imdun, Hyeondo, Suksin, Cheonggu, Yang'i, Yangju, Bal, Yu, Okjeo, Gija Joseon, Biryu, Haengin, Haedu, Gaema, Guda, Jona, Juna, Jin, and peninsular Han (Yoon 2015). Among these, Jin is considered to have been under the direct control of Dangun's descendant, King Bu (r. 232–220 BCE), thus retaining a higher status than that of the other states. Jin covered the area from the Liaodong region to northwest of the Korean Peninsula and shared a border with the peninsular state of Han. Due to Han's location in the southern region of the Korean Peninsula, it received no harm during the battles between late Gojoseon and Wiman Joseon or Gojoseon and Western Han (China). Thus, the Han Korean culture was more fully preserved compared to that of Gojoseon culture and society.

Towards the end of Gojoseon, the power of Wiman Joseon increased in the Liao region at Gojoseon's western border, advancing as far as today's Daling River Basin. When the succeeding Han Commanderies were established following the demise of Wiman Joseon, the Gojoseon statelets in western Liao were transferred to the eastern stretch of the Liao River. Jin incurred heavy damage and could no longer maintain its capital in the eastern region of the Daling River, transferring it further east and south to the region of today's Pyongyang, which had served as a capital during the era of joint village societies. King Bu and his clans emigrated south, where the Han Koreans had not been ravaged by war. The people of Han accepted the Jin clan and honored them as their rulers. King Bu became known as Great King Jin and was made the highest leader of the Han (Yoon 2015). From around the third century BCE the ruling power of Gojoseon began to weaken. The Several States period followed in the wake of Gojoseon's demise.

4.3.1 Gojoseon Industry and Lifestyle

Farming was the key industry of Gojoseon economy. Since farming had existed from the period of Lower Neolithic tribal societies, by now many different grains were being cultivated, including rice, barley, foxtail millet, broomcorn millet, soybeans, adzuki beans, sorghum, barnyard grass, and more, along with hemp, jute, and other textile fibers (Yoon 2015). Cultivated lands were divided and irrigated, bronze was used to make farm implements like plows and spades, and cows and horses were being used for farm work. Each village clan engaged in what were by then well-established communal traditions, the most basic of which was shared labor. Grains were the main crop, and by then rice may have already become a staple crop. This deduction would push the start date of rice farming back a thousand years or more from the previously held theory, which pointed to the Three Kingdoms period (57 BCE–668 CE) as the probable time of incipient rice cultivation.

As Gojoseon waned, tools began to be forged in iron, which came to be preferred over bronze, and were often paired with wooden handles. The development of such tools allowed for more rapid soil preparation, and the volume of crop yield increased significantly. Along with agriculture came animal husbandry and weaving, and rudimentary looms were used to make cloth from hemp, wool, and silk. Hunting and fishing continued to play an important role in daily life (Yoon 2015).

The houses in farming villages included some structures built above ground, but most were dugouts halfway underground, mainly rectangular in shape. Lots varied in size from 80 m^2 for a larger footprint to 10 m^2 for a smaller shelter, but most averaged about 20 m^2. Roofs were made of straw or other grasses, often thickly smeared with mud. Early Gojoseon remains show evidence of fire pits in the homes, which would have been used for warmth, while by late Gojoseon the beginnings of *ondol* (floor heating) can be seen. In order to block moisture, floors were tamped down and heated with fire, and then fine clay, or clamshells mixed with clay, were added to the floor. Wooden planks or mats made of reeds or straw were laid on top of the clay. Partitions were installed in the houses, cupboards and cellars were made, and grains were stored in large earthen jars. The ruling class of Gojoseon lived in much larger and better-equipped structures above ground.

For eating and drinking, Gojoseon people used *byeon* (bamboo dishes), *jo* (dishes with lids), and *du* (wooden footed dishes), and various forms of clay pottery continued to be used. The staple foods of Gojoseon consisted of rice, barley, foxtail millet, broomcorn millet, pulses, adzuki beans, sorghum, and barnyard grass. For side dishes, they mostly ate wild greens and wild and domesticated animals. People cooked whole grains, but they also used stone mortars and pestles to grind grains into flour for cooking. Ground rice was steamed in earthenware steamers and formed into rice cakes (*tteok*), which were widely consumed during the Gojoseon period. The practice of making jjigae (stew) in earthenware pots, which began in the Primitive Pottery era, expanded across the land until it became a universal method of cooking. During this time the manufacture of salt increased, and salt preservation and fermentation techniques for vegetables, fish, shellfish, and meat had become routine, as had the production of alcohol and vinegar. A number of different types of pottery vessels have been excavated at Gojoseon archeological sites, including earthenware pots (*ttukbaegi*), footed and non-footed small bowls, rice bowls, and plates. Specialized food wares suggest classification of food types and purposes: distinct vessels were created for main dishes, side dishes, alcohol, and sweet treats, as well as for banquets and ceremonies (Yoon 2015).

4.4 History of the Dongyi Tribes

The legendary nations of the Chinese Heroic Age begin with Emperor Yao and continue with Emperor Shun, followed by the Xia (2000–1520 BCE) and Shang (1520–1030 BCE) dynasties. The legend of the Three Sovereigns and Five Emperors tells the story of the formation of China's mythologized kingdoms and the battles fought between clans. Recent Korean historians claim that the Dongyi tribes established and ruled the land during China's Shang dynasty. Most legends, including China's, were utilized by future governments to legitimize current royal authority or leadership. Filtering the contents of legends for unadulterated facts has proved ineffectual. Only when tied to archeological evidence can the gaps in prehistoric legends be filled and the work of restoring the history of the Dongyi tribes between 8000 and 2000 BCE succeed.

The term "Dongyi" is the designation given in ancient Chinese records to the tribes that lived in Northeast Asia, including the Korean Peninsula. Records such as *Hou Han shu* (Book of the Later Han, 25–220 CE [dates refer to the given dynasty]), *Sanguo zhi* (*Records of the Three Kingdoms*, 8–265 CE), *Jin shu* (Book of Jin, 265–418 CE), *Liang shu* (Book of Liang, 502–557 CE), *Sui shu* (Book of Sui, 581–618 CE), and *Xin Tang shu* (New Book of Tang, 618–907 CE) comprise part of China's official recorded history and contain biographies of a succession of important people belonging to the Dongyi tribes (Shin 2018). The 85th volume of *Hou Han shu*, 75th biography, which concerns the Dongyi, includes the tribes Buyeoguk, Eumnu, Goguryeo, Guryeo, Dongokjeo, Ye, and Han (Korean).

Figure 4.3 shows the territory of the Dongyi tribes during the Gojoseon period. The Dongyi tribes are associated with megalithic culture, represented here by dolmen and a loquat bronze sword.

The character for *dong* in Dongyi means east, and according to *Shouwen jiezi* (An explanation of written characters, 100 CE), the character for *yi* in Dongyi derives from the combination of the characters for big, arrow, and people, or "big-arrow tribe(s)." The traditional Korean dictionary definition of "Dongyi" as "barbarians from the east" reflects the vilification of the tribes by later generations of Chinese, who used an epithet to denigrate the Dongyi peoples. However, the term should be interpreted by its original meaning, "the tribes from the East that use arrows," or the Eastern Archer tribes. The people of Goguryeo wore bird feathers in their hats to symbolize their use of arrows to hunt birds, unlike other tribes in the region, who hunted mainly with knives or spears.

In later Chinese literature, the use of "Dongyi" often refers to the ancient tribes of Gojoseon, but during the Han dynasty (206 BCE-220 CE), Gojoseon people were referred to as Ye, Maek, or Han Korean, collapsing the difference between the Yemaek and Dongyi tribes. After the construction of the Great Wall, the Dongyi tribes inside (west of) the wall merged with the Han Chinese, while the Dongyi outside (east of) the wall came to be called Ye or Maek, until the term "Dongyi" gradually disappeared from the record.

Yoon (2015) suggests that the principal group forming the Han Korean tribe consisted of the indigenous Dongyi who lived on the Korean Peninsula and in Manchuria. While it is plausible that immigrants from different regions may have arrived from time to time, Yoon asserts that there is little evidence they conquered or suppressed the native tribes in that area.

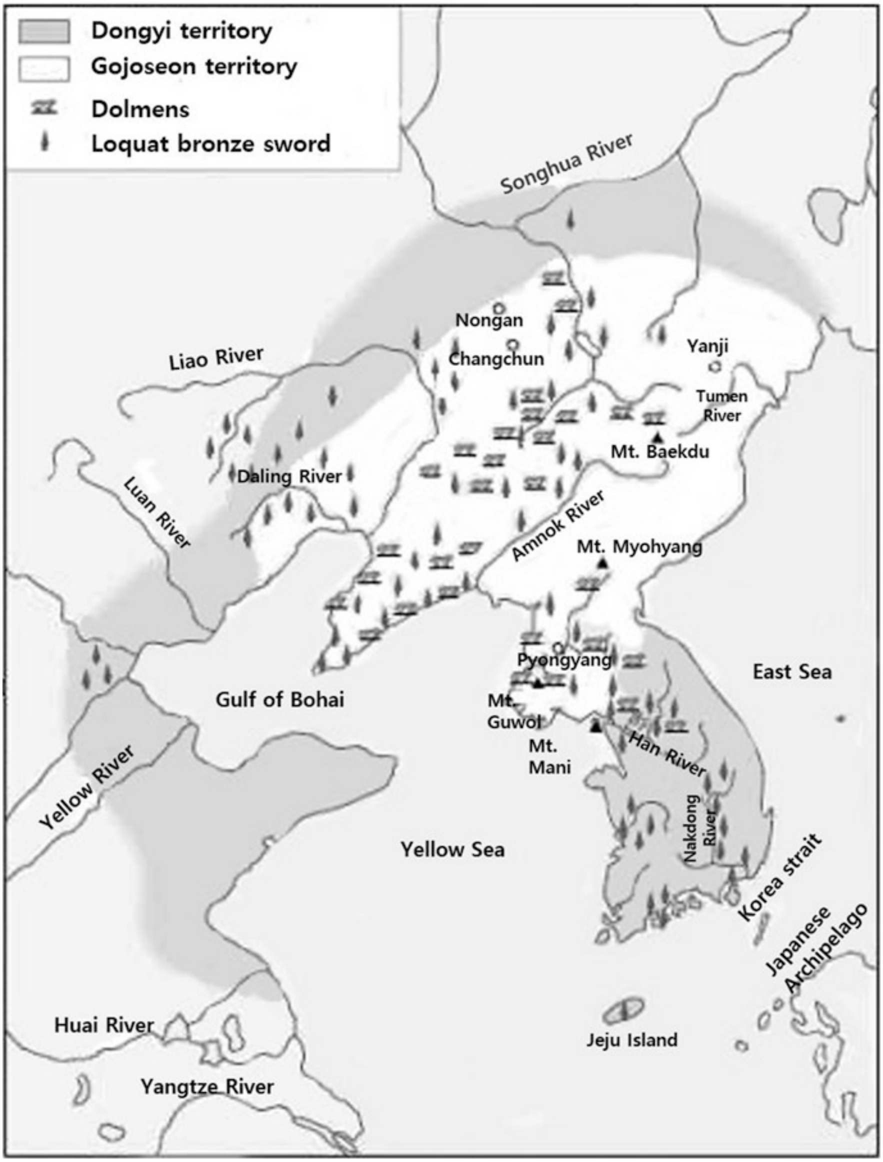


Fig. 4.3 The territory of Dongyi tribes during the Gojoseon period

4.5 Food Culture of the Dongyi Tribes

As discussed in Chap. 1, scholars postulate that the first inhabitants of Northeast Asia subsisted on a largely carnivorous diet, based on their practice of hunting large animals, while their descendants in the late Paleolithic era shifted to an omnivorous diet due to a gradual increase in plant consumption. This was facilitated by the cyclical use of caves and shelters that provided a concentration of edible plants nearby—plants that had grown from seeds discarded or excreted by previous dwellers after the consumption of wild fruit and plants. Typical examples of plants increasingly used as food included tree fruits such as acorns, wild fruits like wild berries and grapes, grain seeds, plant roots, and tree shoots. Analysis of charred remains at Upper Paleolithic archeological sites reveals traces of a number of plants, including rice (*Gramineae*) and beans (*Leguminosae, Papilionoidiae*). As the plant food supply expanded, people gradually moved from mountainous regions to plains. Evidence indicates that hunting also changed over time, from chasing after large prey to hunting small game on flat land with bows and arrows (Lee 1998).

At the beginning of the Holocene epoch, the Paleolithic people living on the Korean Peninsula and along the Korea Strait expanded their use of marine products by inventing pottery. With earthenware vessels, they were able to facilitate further use of quick-rotting seafood by cooking it over a fire for immediate consumption or boiling and drying it for storage. They also developed a method of fermentation that consisted of salting the food with seawater and placing it in a crock. The numerous shell middens on the coasts of Korea and Japan attest to the use of these fermentation techniques, which represent a unique characteristic of food culture in this period.

As discussed above, jjigae, which is a representative element of Korean food culture today, is a dish made by boiling seafood and vegetables with salted water in an earthenware vessel. It is thought to be a legacy of the era of Primitive Pottery culture on the Korean Peninsula (Lee 1999). The use of earthenware for the storage of collected grass seeds (grains), vegetables, meat, and seafood inevitably leads to natural fermentation, so alcoholic grain fermentation (*gokju*), pickled vegetables (kimchi), salt-fermented fish, and meat sauce were probably made before farming began in this region.

Professor Lee Sung-Woo (1990) concludes that "In the history of humankind, the first group of people to use soybeans as food, even among the Dongyi tribes, was the Yemaek tribe," and refers to this development as "the beginning of nation formation in Northeast Asia (4000–2000 BCE)." He believes that nomads from northern regions who began settling farms in southern Manchuria and the Korean Peninsula around the Baekdu Mountains during the Neolithic Era were the first to cultivate soybeans, and that by the early Bronze Age (1500 BCE), soybean consumption had spread throughout the entire region of Northeast Asia.

4.5.1 The Origin of Fermented Soybean Foods

The technique for fermenting soybeans to make sauce developed almost simultaneously with the use of soybeans as food. The basis for this assertion rests on remains discovered at shell mounds that date to about 6000 BCE—the Primitive Pottery era—that point to the use of alcohol fermentation techniques. By about 3000 BCE the making of grain wine using *nuruk* (cereal alcohol fermentation starter) had become universal. It follows that when soybeans began to be cooked for food in pots, the use of *meju* (soybean fermentation starter) to ferment beans in crockery would also be possible. Just as boiling saltwater in a pot with seafood, vegetables, and grains in preparing jjigae led to the discovery of salt, techniques for preserving foods in salt were also developed and would come to be used in making fermented soybean sauces. It is estimated that the manufacture of fermented sauces using beans would have begun in Korea and the southern Manchuria region in the 1000s BCE by the Dongyi tribes. This inference supports written records stating that soybeans, which were introduced to China in the seventh century BCE, were handily made into soybean fermented food (*chi*) by the time of the Han dynasty, 220 BCE.

The earliest written record of alcoholic drinks is found in the aforementioned phrase from *Shijing* in about 1000 BCE, "There are a thousand wines in Liao." Through archeological research, it is now known that by 2000 BCE, during the time of Emperor Yao, a great variety of grain wines were already being made. By now the people of Korea and southern Manchuria had begun using soybeans for food, and all the conditions for the birth of soybean fermentation techniques were present.

Neolithic peoples would have been used to consuming very strong-smelling, nearly rotten meat because they lacked proper storage methods for the meat they hunted. They likely would have desired strong seasoning to improve the insipid flavor of the grains and plant foods they grew as they began to settle on the land and farm. If leftover cooked soybeans were placed in a crock, mold and bacteria would grow on them and the protein would decompose. The natural state of the decomposed amino acids and ammonia would emit a smell and taste similar to that of the strong flavor of preserved meat. Today, foods like Korea's *cheonggukjang* (thick, fermented soybean paste) and Japan's *natto* (fermented soybeans) are made using a similar process. The first mention of fermented soybeans in Chinese literature refers to chi (Kor. meju), which is soybeans mixed with mold and bacteria to form, as mentioned above, a natural soybean fermentation starter.

The oldest archeological evidence of fermented soybean product was excavated in 1972 at the Mawangdui tombs site in the eastern part of Changsha County, Hunan Province, China, where traces of soybeans and fermented soybean paste have been found. The most intact of the three tombs there belonged to Xin Zhui (213–163 BCE), also known as Lady of Dai, wife of Marquis Li Cang (Prime Minster 193–186 BCE) from the Western Han period. Buried in the tomb with her were a variety of foods and grains she would have enjoyed during her lifetime, held in 48 bamboo containers and 51 ceramic dishes. Each receptacle bore a label naming the food items held within; 312 labels were inscribed on wood blocks, 49 on wood tablets. Figure 4.4 shows the carbonized soybean paste and soybean seeds excavated from the tomb (Hunan shengbo wu guan 1978; Lee 2004).

In China's ancient record *Shangshu* (*Book of Documents*, oral legends recorded during the Zhou dynasty) the only seasonings mentioned are salt and sour green plum, and in both *Chu ci* (Songs of Chu, 220 CE), in which food is discussed at length, and *Li ji* (The book of rites, 450 BCE-100 CE), the question "What is chi?" arises. According to Huang (2000), there is no mention of chi in Chinese literature before the Qin dynasty (221–209 BCE), but by the time of Western Han (206 BCE–

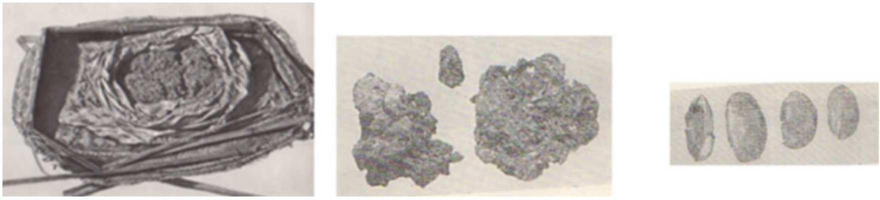


Fig. 4.4 Carbonized soybean paste and soybean seeds found in Mawangdui Tomb

9 CE) chi had become a staple food. One of the food containers found in Lady of Dai's tomb is labeled "chi" (Lee 2004). *Shiji*'s "Huo zhi lie zhuan" (Biography of important people and customs, 90s BCE) contains a phrase which means "a thousand jars of nuruk and salted chi." *Jijiupian*, a Chinese primer from 40 BCE, mentions a type of food containing turnip sprouts, salted chi, sour pickles, vinegar, and layered, fermented meat. In Eastern Han's *Shuowen Jiezi* (Character dictionary, 100 CE) chi is described as being made by fermenting soybeans in a dark place and mixing them with salt, similar to today's recipe for cheonggukjang. Also, *Qian hanshu* (History of the Former Han Dynasty, 221 BCE–9 CE) states that of the seven wealthiest people in the land, two gained their riches in the chi trade. *Shijing* records that when Liu Chang, King of Huainan, was banished in 173 BCE for instigating a rebellion against the Han emperor, he and his attendants were supplied with firewood, rice, salt, chi, and cooking utensils (Huang 2000).

However, Zhang Hua's *Bowuzhi* (Records of diverse matters, 290 CE) states that "There is chi in other countries," and in *Bencao Gangmu* (Compendium of *Materia Medica*) by Li Shizhen (1518–1593) too, chi is mentioned as a foreign product. A passage in *Xuezhai zhanbi* (a Northern Song (960–1126 CE) book of textual criticism) reads, "The word 'chi' does not appear in the *Jiujing* (Nine classics); only a dialect version of the word appears." In the article on Goguryeo found in *Sanguozhi* (Record of the Three Kingdoms), Book of Wei, Biography of the Dongyi tribes (8–265 CE), the people of Goguryeo (37 BCE–668 CE) are described as excelling in fermentation techniques. Additionally, there is a quotation from *Xin Tang shu* (New book of Tang) in *Haedong Yeoksa* (A history of Korea), compiled during the time of Kings Jeongjo (r. 1776–1800) and Sunjo (r. 1800–1834) of the Joseon dynasty, stating that emissaries were carrying chi (Kor. *si*) from the capital of Bohai (Kor. Balhae), a specialty food of that region (Lee 1992). In Chinese literature, the word *jiang* (Kor. *jang*), which today means "fermented sauce," referred instead to *yukjang*, a dish of fermented, layered meat. The first time the term "soybean sauce" (*doujiang*) appeared in Chinese literature was toward the end of Eastern Han, in a tract written by Wang Chong called *Lunheng* (Disquisitions, 80 CE). In light of these facts, the dominant Korean theory today is that China's "jiang" was not soybean sauce, and that soybean fermentation techniques were introduced to China from outside its borders (Lee and Kwon 2005).

The evidence culled from these records and archeological sites provides a basis for the conclusion that the technique for fermenting soybeans began with the Dongyi tribes in southern Manchuria and the Korean Peninsula. At first, they used soybeans as food out of necessity, but as pottery and fermentation techniques developed, they eventually mastered the fermentation of soybeans, including the making of chi. Ancient fermented soybean products are similar to the materials Koreans use today when making traditional jang, including meju (soybean fermentation starter) and cheonggukjang (quick-fermented soybean paste). Dishes like these, then, were being produced during the Bronze Age (1500 BCE). Fermented soybeans that started off in the form of meju gradually developed into *ganjang* (soybean sauce), *doenjang* (fermented soybean paste), and other savory sauces, which became widely disseminated in Northeast Asia by the time of the Han dynasty (200 BCE), if not earlier (Lee and Kim 1998).

4.5.2 The Origin of Soybean Sprout Cultivation

Traditional soybean products, aside from fermented variations, include soybean sprouts, soy milk, and *dubu* (soybean curd; Jap. tofu), but unfortunately, when and where these foodstuffs were first made has not been discovered. Traces of these products are first mentioned in literary texts from the Han dynasty period. After the Han dynasty, soybean sprouts appear in Chinese medical books as *dadou huangjuan*, or "yellow sprouts of soybeans." Soybean sprouts used as medicine would be sprouted only 1–2 cm in height and then dried and ground into a powder. In contrast, Koreans preferred to sprout their soybeans longer, for direct consumption. *Shennong Ben Cao Jing* (The Divine Farmer's *Materia Medica*, oral traditions compiled and recorded c. 250 CE) is an ancient text of medicinal herbs that were reportedly used during the Zhou (1030–221 BCE) and Qin (221–207 BCE) dynasties. The "Cures for 52 ailments" section contains written characters for *shu* (soybeans), *niemi* (rice malt), and *shumi* (glutinous foxtail millet), but not dadou huangjuan (Huang 2000). It may be the case that soybean sprouts were not used as medicine until after the Han dynasty.

The first text to mention soybean sprouts as food is the Southern Song (1127–1279) cookbook *Shanjia qinggong* (Pure food of the mountain people), which contains a detailed description of how to sprout them. *Dongjing meng Hua lu* (The Eastern capital: a dream of splendor, 1149) mentions that *yadou* (bean sprouts) were frequently sold as a staple food in the Northern Song (960–1126) capital market. *Ben Cao Tu Jing* (Illustrated canon of herbology, 1061) casts mung bean sprouts as the most delicious kind of sprouts. The Yuan dynasty (1260–1368) text *Jiujia biyong* (Mongolian home-style cooking) is the first work to contain the term *douya* (bean sprouts), but in its recipe for these beans, douya is referred to as mung bean sprouts. Toward the end of the Han dynasty, mung beans had been introduced from India or Southeast Asia to China, as mentioned in the texts *Qimin yaoshu* (Essential techniques for the welfare of the people, 544) and *Shi liao ben cao* (Compendium of dietary therapy, 670). Even today, mung bean sprouts are a favorite in the southern region of China, while soybean sprouts are more popular in the north.

The regional preference for each of these two foods seems to coincide with the locales in which each crop was first cultivated.

The technique of sprouting grains appears to have been familiar to people by the Primitive Pottery era. When grains are harvested and placed in a moist environment, they sprout of their own accord, creating an enzyme that breaks down the grain's starch into a simple sugar. The grains can be dried (or roasted) and then ground to produce malt powder, which has a sweet taste. The history of malt, then, can be said to be nearly as old as the history of fermentation. In ancient Chinese texts such as *Chu ci* and *Li ji* the word *nie* (malt) appears. The fact that taffy, a product made from malt, appears in *Shijing*, the oldest collection of Chinese poetry, indicates that the technique for making malt was likely in use well before the advent of literary Chinese.

People living in Northeast Asia began to cultivate soybeans around 2000 BCE, and during cold winters, when it was difficult to grow green vegetables, soybean sprouts may have been consumed as an acceptable substitute. When soybeans germinate, the trypsin inhibitors are deactivated, and the oligosaccharides break down, which reduces intestinal gas; in addition, vitamins such as ascorbic acid, riboflavin, and niacin increase dramatically. For this reason, soybean sprouts would have been nutritionally valuable to people living in the cold north, while in warmer climes where food was relatively more abundant, as in China's southern region, there may not have been as great an interest in sprouting. Huang (2000) points out that to the Han Chinese, who lived in warmer regions, bean sprouts were considered to be the food of poor people and thus were less likely to be featured in Chinese literature. The term *daedu hwang* (soybean sprout), quoted from a Chinese medical text, appears in the Goryeo work *Hyangyak gugeupbang* (Native first aid prescriptions, 1236). Today soybean sprouts are one of the vegetable dishes Koreans enjoy eating throughout the year, and North Koreans living in China's northeastern Jilin Province are more likely to eat soybean sprouts than the Chinese. Generally speaking, soybean sprouts are not frequently consumed in China or Japan.

4.5.3 The Origin of Tofu

The origin of tofu (Kor. dubu) is unclear (Huang 2000). During China's Song (960–1279), Ming (1368–1644), and Qing (1644–1911) dynasties, and until recently too, tofu was believed to have been made for the first time during the Han dynasty by the King of Huainan, Liu An (179–122 BCE). The basis for this is the Song dynasty legend of Mt. Bagong tofu. In it, Liu An is a Daoist ascetic who, exhausted from an extended meditation and fast, nevertheless scales a mountain and encounters the eight Daoist immortals. Liu asks them the secret to everlasting life, and they instruct him to eat tofu. They teach him how to grind soybeans into soymilk and then coagulate it—a process similar to that of making tofu. The writings of Zhu Xi (1130–1200) of the Song dynasty contain a line about the King of Huainan earning money with his skill in tofu-making. Similar content regarding Liu An being the first to make tofu can be found in Ming dynasty texts such as *Cao mu zi* (a philosophical work, 1378), *Wuyuan* (The origin of things, fifteenth century), and *Ben Cao Gang Mu* (Compendium of *Materia Medica*, sixteenth century).

However, upon close examination of *Huainanzi* (Master Huainan, c. 139 BCE), scholar Yuan (1981) reveals that there is no mention of tofu in the text, nor any ancient words that might refer to tofu, such as *li qi* or *lai qi*. Further, Yuan asserts there is no record of tofu-making before the Song dynasty (960–1279), whether in Tang (618–906) or any earlier documents. In classic food texts from the Tang dynasty, including *Qimin yaoshu* (Essential techniques for the welfare of the people, 544), there is no reference to tofu. The oldest record of tofu, according to Yuan, is found in *Ben cao yan yi* (Extension of the pharmacopoeia) from the end of the eleventh century. Yuan asserts that tofu did not exist during the Tang dynasty, and that it was first made in the eleventh century, after which it enjoyed widespread use for the remainder of the Song dynasty.

Meanwhile, Shinoda Osamu concludes that tofu was made toward the end of the Tang dynasty, based on a line in the Chinese text *Qing shi lu* (Veritable records of the Qing dynasty, 960): "When Shiji became Qingyang's Chief Executive, he emphasized leading a simple life and promoted eating tofu over meat" (Lee 1992, Choi 2009). Also, the text *Wu lei xiang gan zhi* (Compendium of interactions between various substances, 980), written at the beginning of Song, contains the phrase, "If you fry tofu in oil it becomes a delicious treat." Yang Wan-Li's (1127–1206) *Cheng Zhai zhi* (Writings of Cheng Zhai [sobriquet of Yang Wan-Li]) contains a section called "Doulu zi rou zhuan—doufu," (Tale of the softness of Doulu—tofu), which Huang (2000) describes below:

> "Doulu" was a well-known family name during the Tang and Five Dynasties periods, and "rou" means "fu," or soft, so Doulu zi rou has come to mean doufu [tofu]. Its hometown is Waihuang, in northeast Henan. Its name means "bean soup made of finely ground, boiled soybeans," and it has the same smell as white *da geng* or *xuan jiu*. The texture is similar to butter or fermented milk. It first appeared toward the end of the Han dynasty, then after disappearing for many years, resurfaced during Northern Wei (530–550).

Thus, the historical home of tofu is thought to have been in an area called Waihuang, in the northeastern reaches of the Yellow River Valley, where Dongyi tribes lived (present-day Henan Province). The texture of tofu was described as similar to that of certain dairy products. Lee (1984) adds that the ancestors of the Dongyi tribes, as nomads, would have been familiar with dairy products like cheese and yogurt. Huang (2000) also surmises that the motive for making soymilk derived from the northern nomads' familiarity with drinking milk. Dairy products receded from use when tribes settling in northern Manchuria and the Korean Peninsula began privileging crops over domesticated animals, but milk remained in their collective memory. In time they also came to make soybean curd. Lee persuasively argues, based on the appearance of curds and cheese (called *rufu*) in *Tang su* (Book of Tang), a book covering the Sui dynasty (581–618) and the beginning of Tang (618–906), that northern nomads who used soybeans would have made soybean curd, which is similar to fermented dairy products, especially in its runnier form. If millstones were in regular use during the Han dynasty, then they would have been part of the tribal food culture in northern regions as well, and therefore it is not unlikely that people ground soybeans into powder or soaked them to make soymilk.

The more primitive form of millstones—mortars and pestles—have in fact been discovered at Middle and Upper Neolithic sites across the Korean Peninsula, including those at Jitap-ri in Bongsan-gun, Hwanghae Province; Amsa-dong in Seoul; Seopohang in Gyeongheung, North Hamgyong Province; Amnam-dong in Busan; and Jungdo in Chuncheon, Gangwon Province. Artifacts confirm that mortars were in continual use throughout the Gimhae culture period (1–250 CE) (Kim 1973). As the Lelang commandery began (108 BCE–313 CE), mortars and pestles were further developed by connecting them to a pivot or axle, which resulted in the creation of a rotating millstone able to pulverize grains and legumes into a fine powder (Lee 1965). On the basis of this knowledge, Chang (1993) concludes that the era in which tofu was first made in Korea could be located toward the end of the Three Kingdoms period (57 BCE–668 CE) or the beginning of the Unified Silla period (668–918).

Literature of the Joseon dynasty offers clues that help date the societal use of tofu. According to the 66th volume (1434) of *Sejong sillok* (Veritable records of King Sejong), the Xuande Emperor (1425–1435) of Ming dynasty China sent a personal letter to King Sejong with a Joseon envoy who had brought elaborate birthday gifts from Korea for a member of the Chinese royal family. In the letter, the Xuande Emperor lauds the Joseon women gifted to the imperial family for their culinary expertise, especially in tofu-making, and requests that King Sejong send more women like them (Chang 1993). This passage implies that Koreans would have been making tofu for their own royal tables at least by the late Goryeo dynasty (918–1392), which predates the making of tofu in China.

Further, *Munjong sillok* (Annals of Munjong, 1450) contains a record of a petition sent to King Munjong by military official Jeong Hyo-Gang regarding the making of bean curd: “Because our salt pans are plowed with oxen, the beasts’ waste mixes with the salt as it bakes in the sun, making it unsanitary; using salted water from these pans to make tofu for sacrificial rites or royal offerings would be improper, so I humbly request the use of *sansu* [acidic water].” References in other contemporary texts that this issue was repeatedly taken up in the royal court indicate the significance of salt and tofu manufacture as commercial food products during this period. Concerning the brine water made with salt (*gansu*) and other coagulants, a passage in Li Shizhen’s Ming dynasty text *Ben cao gang mu* (Compendium of *Materia Medica*, 1596), which discusses tofu in volume 25, states that “Other than salt water, coagulants include leaves of *shan fan* (Asian sweetleaf), *suan jiang* (Chinese lantern), and even vinegar.” Taking these references together, it appears that in China’s Ming and Korea’s Goryeo dynasties, saltwater was the main coagulant employed in making tofu (Chang 1993). Once tofu reached widespread production, sources indicate that the manufacturing process in China and Korea was the same, but the birthplace of soybeans and the era in which soybean products were first used appear to differ significantly.

If the Dongyi, who used soybeans as a staple food, did indeed make tofu, then incipient use of tofu would have predated the Han dynasty. By the Han dynasty tofu may have been introduced to China. The basis for the latter inference lies in the

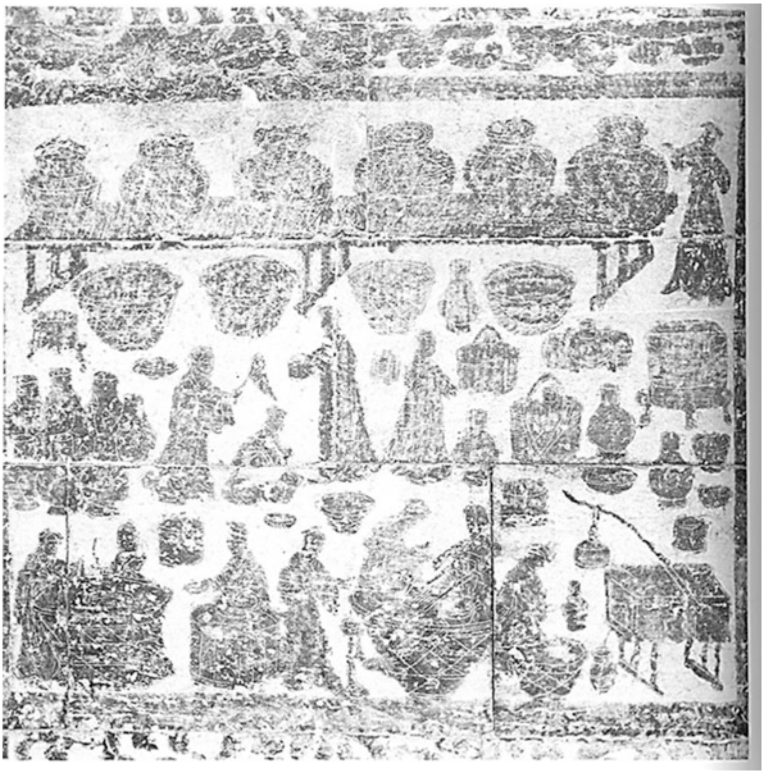


Fig. 4.5 A stone painting in the Dahuting tombs of the eastern Han Dynasty that May Depict Tofu-making

1980s discovery of a stone painting in the Dahuting tombs of the Eastern Han dynasty that appears to depict the tofu-making process (Fig. 4.5). However, later Chinese scholars have interpreted this rock art as depicting the process of making alcohol, not tofu. The question of which product is being made in the image continues to be debated (Choi 2009).

The legend of Mt. Bagong tofu seems to suggest that King Liu An of Huainan (177–122 BCE) learned how to make tofu from northern tribes. Although the method for making soybean curd became known around 200 BCE in China, tofu was generally only eaten by vegetarian Buddhist monks for a 1000 years, quite possibly because of a southern Chinese bias against the foods of northern "barbarians." A similar phenomenon occurred in the West: for the first 200 years after their introduction, soybeans were used strictly as a feed crop; it was not until the late twentieth century that they were recognized as a functional food for people.

4.5.4 Development of Soybean Foods

In his book *Seongho saseol* (Seongho's miscellany), Seongho Lee Ik (1681–1763), a proponent of the *Silhak* school of Confucianism, which pursued reform from the perspective of practical science and realism, describes the nutritional benefits of soybeans as follows (Lee 1984).

> The soybean is one of the five staple grains, yet people do not value it. It is said that grain saves people, and indeed, the life-saving power of soybeans is prodigious. Few elders live well these days because many are poor; all the best food made of "good" grain is given to the rich, while soybeans are passed on to the poor [but soybeans can be used to great advantage for health].
>
> The price of soybeans is equal to that of cheap unhulled rice. One *mal* [18 L] of unhulled rice yields four *doe* [1.8 L] of polished rice. Thus, four *doe* of polished rice may be exchanged for one *mal* of soybeans. The additional three-fifths of grain volume acquired has a significant impact on poor people's diets.
>
> Grinding soaked soybeans with a stone mill will produce soymilk, which can be used to make dubu (soybean curd). The byproduct of this process is an abundance of edible residue (*biji*). Boiling biji for soup makes a delicious meal. Additionally, sprouting soybeans for food increases the amount of nutrients available in the diet. Poor people can fill their stomachs by mixing ground beans with bean sprouts to make porridge.
>
> My life in the country has opened my eyes to these things, so I write them down for the benefit of those who teach and govern the people.

Seongho saseol is considered to be the first Korean record describing the nutritional benefits of soybeans and soybean-based foods. Soybean curd is made into a number of different products in Korea, China, and Japan, some of which are listed and named in Table 4.2.

4.5.5 The Origin of Bulgogi

As the nomadic Maek tribes people of the northeast region of the Amnok River settled on the Korean Peninsula and discovered soybeans fermenting into sauces in their earthenware, it is no stretch to imagine that their meat-heavy food culture combined with soy sauce culture would eventually bear fruit in dishes like bulgogi. Bulgogi consists of beef marinated in a soy-based sauce and then grilled; it has become popular around the world today as a uniquely Korean dish. In China, this dish was called *maekjeok* (Chi. *modi*), or meat cooked by the Maek tribe. *Soushen ji* (Anecdotes of seeking the supernatural), written during China's Jin dynasty (265–420 CE), includes the following passage: "Although modi is the food of barbarians, the fact that Chinese people have enjoyed it for so long, and that the feasts of every noble or rich house must have it, are signs that they might have to invade [the Maeks to obtain more]!" (Lee 1984). The phrase translated as "for so long" is written in the original text as "from the beginning of creation," indicating

Table 4.2 Comparison of bean curd uses and names in Korea, China, and Japan

Product name in English	Product name per Country	Processing method
Soy milk	China- Dou jiang Korea- Duyu Japan- Tonyu	Soybeans are soaked in water, ground in a mortar, and filtered
Soymilk skin	China- Doufupi Korea- Dubupi Japan- Yuba	The protein sheet that forms on the surface of soybean milk Is removed and dried
Soybean curd	China- Doufu Korea- Dubu Japan- tofu	Coagulant (Gansu [brine], acid, or calcium salt) is added to soybean milk, and the precipitate is taken and pressed to make curd
Deep-fried bean curd	China- Doufupao Korea- Twigin dubu Japan- Aburaage	Small blocks of soybean curd are deep-fried
Frozen bean curd	China- Dongdoufu Japan- Kori tofu	Bean curd is frozen, then thawed To form sponge-like texture
Fermented bean curd	China-Doufuru (sufu)	Bean curd is salted and fermented

that Korean bulgogi must have been transmitted to China long before the Jin dynasty. Today yakiniku, Japanese grilled meat based on Korean bulgogi, is so well loved that it can be found in most restaurants in Japan. Bulgogi was created by the meeting of two ancient cultures, the northern meat culture and the peninsular soy sauce culture, which together created a masterful dish that harks back to the origin of Korean foodways. Figure 4.6 presents a flow chart showing the development of Korean food culture as communities in Northeast Asia began engaging in agriculture and state formation (Lee 2001).

Southern Korean Peninsular fishing and grains-and-vegetables culture

↓

Advent of northern horseback-riding nomads

↓

Settled agricultural society and the need for a steady supply of protein to supplement meat

↓

Soybean cultivation and development of soybean dishes (around 2000 BCE)

↓

Primitive Pottery culture's fermentation methods lead to fermentation of soybeans—beginning of soybean sauce culture

↓

Development of various methods of cooking with fermented soybean sauces, including bulgogi—the combination of meat culture and soy sauce culture

Fig. 4.6 Prehistoric Korean food culture formation

References

Barnes, Gina L. 1993. *China, Korea and Japan: The Rise of Civilization in East Asia*. London: Thames and Hudson.

Chang, Chi-Hyun. 1993. *Hanguk jeollae daeduiyongeumsik ui jorigagongsajeok yeongu* [History of Korean soybean food processing technology]. Seoul: Suhaksa.

Choi, Duk-Kyung. 2009. *Reexamination of the origin of soybean and the distribution of soybean sauce, soybean malt, and Sundubu: from the documentary and excavated data from the Ancient China, Yeoksaminsokhak no.30*, 363–427. Hankuk Yeoksaminsokhakhoi.

Huang, Hsing-Tsung. 2000. *Science and Civilisation in China, Volume 6, Biology and Biological Technology, Part V: Fermentations and Food Science* (trans: Joseph Needham). Cambridge: Cambridge University Press.

Hunan sheng bo wu guan. 1978. *A local study of animals and plants unearthed from the Han Tomb No. 1 at Wangdui, Masha, Changma, vol. 2, 7*. Beijing: Wen wu chu ban she. (in Chinese).

Ilyon. 1285. *Samguk yusa* [Memorabilia of the Three Kingdoms]. Modern Korean edition: Ilyon. 2013. *Samguk yusa* (trans: Lee Min-Su). Seoul: Eulyumunhwasa.

Kim, Jimin. 2011. Representing the Invisible: The American Perceptions of Colonial Korea (1910–1945). PhD dissertation, Columbia University.

Kim, Won-Ryong. 1973. *Hanguk gogohakgaeseol* [Korean archeology]. Seoul: Ilgisa.

Lee, Cherl-Ho. 1998. Hanbandowa Dongbugasia ui guseokgisidae siksaenghwal hwangyeong [The foodways of Paleolithic peoples in Northeast Asia and on the Korean Peninsula]. *Minjokmunhwa yeongu* [Korean Cultural Studies] 31: 418–458.

———. 1999. Dongbugasia wonsitogimunhwa sidae ui teukjanggwa sikpumsajeok jungyoseong [The Primitive Pottery age of Northeast Asia and its importance in Korean food history.]. *Minjokmunhwa yeongu* [Korea Cultural Studies] 32: 325–357.

———. 2001. *Fermentation Technology in Korea*. Seoul: Korea University Press.

Lee, Cherl-Ho, and Jun-Cheol Kim. 1998. Hanguk jeontong jangnyu ui munheonjeok gochal [Literature review on traditional Korean fermented soybean products]. *Jangyu* 61: 3–18.

Lee, Cherl-Ho, and Kwon Tai-Wan. 2005. Kong ui iyongyeoksa [History of soybean utilization]. In *Kong* [Soybean], ed. The Committee for the Establishment of a Korean Soybean Museum, 3–44. Seoul: Korea University Press.

Lee, Chun-Nyoung. 1965. Hanguk nongeopgisulsa [History of Korean agricultural technology]. In *Hanguk munhwasadaegye III* [Encyclopedia of Korean Culture], ed. Research Institute of Korean Culture, 17–54. Seoul: Korea University.

Lee, Moonsil. 2004. Dietary Conditions and Differential Access to Food Resources among the Various Classes during the Han Period. Master's thesis, University of Pittsburgh.

Lee, Sung-Woo. 1984. *Hanguk sikpummunhwasa* [Cultural history of Korean food]. Paju: Kyomunsa.

———. 1990. Godae Dongasiasok ui dujange gwanhan balsanggwa gyoryue gwanhan yeongu [A study on the origin and interchange of *dujiang* (soybean sauce) in ancient East Asia]. *Hanguk singmunhwahakhoeji* [Korean Journal of Dietary Culture] 5 (3): 313–316.

———1992. *Dongasiasok ui godae Hanguk siksaenghwalsa yeongu* [A study on the history of ancient Korean food life in East Asia]. Seoul: Hyangmunsa.

Lim, Seung-Guk. 1986. *Hwandan gogi* [Ancient record of bright heaven and earth]. Seoul: Heongsinsegyesa.

Nahm, Andrew C. 1988. *Korea: A History of the Korean People, Tradition and Transformation*. Elizabeth, NJ: Holly International Corp.

Shin, Yong-Ha. 2018. *Gojoseon munmyeong ui sahoesa* [History of Gojoseon society]. Seoul: Jisiksanupsa.

Yoon, Nae-Hyun. 2015. *Gojoseon yeongu I and II* [Gojoseon research]. Seoul: Mankwondang.

Yuan¸ Han-Ching. 1981. The problem of the origin of *doufu*. *Materials on the History of Science and Technology in China* 2: 84–86. (in Chinese).

Chapter 5
Food Culture in the Early Historical Era: Vegetarianism, Rice Cakes, and Traditional Sweets

Abstract This chapter overviews the early history of Korea from the fall of Gojoesun to the Three Kingdoms periods. The dozens of confederacies that formed in the wake of Gojoseon's destruction, also known as the Several States period, were eventually consolidated into the kingdoms of Buyeo, Goguryeo, Baekje, and Silla. The Three Kingdoms period that followed witnessed the introduction of Buddhism on the peninsula, which had a considerable impact on Korean food culture. The Buddhist tenet forbidding the taking of life caused a steep rise in vegetarian food culture in Korea. Buddhist foodways engendered a culture of grain confections, such as *tteok* (rice cake) and *hangwa* (sweets made from grains and fruits) techniques, both of which developed dramatically over time. The varieties of *hangwa* and *tteok*, and their processing techniques, were reviewed in this chapter.

Ancient historical records of the Korean people begin with *Sinji* (Divine record), a compilation of oral stories about the mythological era of Dangun (c. 2333? BCE). The songs of Dangun history-keepers were first recorded in the *idu* script, which used Chinese characters to express the sounds of the spoken Korean language. The editors of *Sinji* rewrote these in the form of 5-syllable poems. Ensuing histories include the 100-volume *Yugi* (Long record), which was completed during the reign of King Daemusin of Goguryeo (r. 18–44 CE) and encompassed the ancient Joseon kingdom, Gojoseon, through early Goguryeo (37 BCE–668 CE). In the mid-Baekje dynasty (18 BCE–660 CE) Go Heung wrote *Seogi* (Scribe), a history of the kingdom to that point, and toward the end of Goguryeo Yi Mun-Jin completed a history called *Sinjip* (New compilation). During the golden age of the Silla dynasty under King Jinheung (r. 540–576), Geochilbu produced *Silla gosa* (Silla history). Unfortunately, these and other texts of similar dates have been lost (Shin 2006). Goryeo dynasty (918–1392) historians published several works, such as *Samhan gogi* (Ancient records of the Three Han Kingdoms), *Haedong gogi* (Ancient records of Korea), and *Samguksa* (Three Kingdoms history), authors unknown, as well as *Samguk sagi* (History of the Three Kingdoms) by Kim Bu-Sik (1145) and *Samguk yusa* (Memorabilia of the Three Kingdoms) by Ilyon (1285). Only the last two of these Goryeo histories are extant. Although these books are generally accepted as valuable records of Korea's early history, *Samguk sagi* has also been assessed as tainted by its overall

C.-H. Lee, *Korean Food and Foodways*,
https://doi.org/10.1007/978-981-19-0023-5_5

sycophantic position toward China, and *Samguk yusa* has been criticized for its Buddhist-centric bias. Sporadic supplemental information can be found in Chinese literature regarding the tribal groups that defended the border after the fall of Gojoseon.

The dozens of confederacies that formed in the wake of Gojoseon's destruction, also known as the Several States period, were eventually consolidated into the kingdoms of Buyeo, Goguryeo, Baekje, and Silla. The Three Kingdoms (Goguryeo, Baekje, and Silla) period that followed witnessed the introduction of Buddhism on the peninsula, which had a considerable impact on Korean food culture. The diet of residents of Gojoseon and the Several States period, which was rooted in native Daoism and Northeast Asian shamanism, consisted of a balance of meat and vegetables. The Buddhist tenet forbidding the taking of life, however, caused a steep rise in vegetarian food culture in Korea. Techniques for making meat-based dishes waned, while methods for making rice cakes and sweets that relied on grains, vegetables, and fruits proliferated. It appears that the invention and consumption of rice cakes and sweets at this time may have flourished to fill the gaps left by meat's removal from the table.

5.1 Overview of Korea's Early Historical Period

The early history of Korea has been disputed in modern times. At least two decades after the Japanese Occupation ended in 1945, the excavation and analysis of new archeological evidence of Korea's past began to shake off colonial assertions about its history. Conventional knowledge of Korea's ancient history is based on the content of *Samguk sagi* (1145) and *Samguk yusa* (1281–1289). During the period of Japanese occupation (1910–1945), however, Japanese historians did not recognize *Samguk sagi* or *Samguk yusa* as records of historical value. They twisted the story found in the biography of the Dongyi tribes in the "Book of Wei" of the ancient Chinese text *Sanguozhi* (Records of the Three Kingdoms, by Chen Shou, third century) to validate their colonization of Korea. The "Mimana" theory they advanced purported that Japan established a governing body that ruled part of the Gaya confederacy in southern Korea during the Samhan (Three Hans, or Proto-Three Kingdoms) period (first century BCE). After Korean liberation from Japanese rule in 1945, Korean historian circles, led by Lee Byong-do, denied the Japanese interpretation of this legend as found in *Nihon shoki* (The Chronicles of Japan, 720 CE). Yet Lee Byong-do and his followers seemed unable to break free entirely from the colonial viewpoint, as they also did not recognize the initial part of *Samguk sagi* as a viable record of Gojoseon and Buyeo. Decades of archeological work, beginning in 1960s Korea, revealed cultural artifacts from ancient sites on the peninsula and in southern Manchuria that attested to the veracity of early (Gojoseon) records, including *Samguk sagi*, by the 1990s. The colonial assertion of Japanese rule on Korean land during the Samhan period was debunked. The newly discovered archeological evidence allowed the ancient history of Korea as found in *Samguk sagi* to become widely accepted (Lee 1999).

5.1.1 Several States Period

As time progressed from the Bronze Age to the Iron Age, improved tools allowed farms to scale up production, and through the development and increased manufacture of weapons, the merging of smaller states accelerated. In Manchuria and the Korean Peninsula, numerous statelets were established and destroyed. Similar to the breaking up of the Zhou dynasty into feudal states during the Spring and Autumn period (770–403 BCE) in China, the political confusion that arose towards the end of Gojoseon led the Korean Peninsula into a period of regionally-controlled statelets, or confederacies (200s BCE–100s CE). In current Korean historical circles this time is known as the Proto-Three Kingdoms (or Several States period), while archeologists call it the Gimhae period (Nahm 1988).

As Gojoseon's power waned in the third century BCE, the many small states that made up the Gojoseon kingdom became independent and formed their own confederacies. Included in these are East Buyeo (today's Liaodong and North Pyong'an Province), Eupnu (Russia's Maritime Province), East Okjeo (Hamgyeong Province), Nangnang (South Pyong'an Province), Dongye (Gangwon Province), Daebang (Hwanghae Province), and Samhan, or the Three Hans, comprising Mahan (Gyeonggi and Chungcheong Provinces), Jinhan (Gyeongsang Province), and Byeonhan (South Jeolla Province).

Figure 5.1 maps the statelets that emerged as Gojoseon dissolved. As shown in the figure, early Goguryeo was forced out of Liaodong by Jin and Han China and retreated to Jilin in the northeast. Buyeo was pushed from the upper reaches of the Luan River toward Heilong River (Lee and Choi 1989).

Representative archeological sites from this period include Majang-ri, Gapyeong-gun; Daesam-ri, Yangpyeong-gun; and Pungnap Toseong in Songpa-gu, Seoul, all of which are located in the Han River region of Gyeonggi Province. In the Nakdong River territory, southeast Korea, sites include Daho-ri in Changwon; Dalseong in Daegu; Songcheon-ri in Goseong; Yangdong-ri, Jinaedong, and Buwondong in Gimhae; Guseodong and Nopodong in Busan; Joyangdong and Hwangseongdong in Gyeongju; Jeopo in Hapcheon; and Seongsan in Masan.

During this period the use of bronzeware diminished and iron tools became universally available. Most of the excavated artifacts from this period are made of iron, clearly distinguishing this era from the previous one, in which bronzeware and ironware were used together. Ironware was useful not only for agriculture, where the tools greatly increased the productivity of farms, but also for trade, as iron ore and tools were exported as far as Nangnang and Wei in the north. Ironware artifacts such as axes and other farm implements have been found at Majang-ri and Daesim-ri archeological sites. There are also indications that stone tools continued to be used

Fig. 5.1 Map of Buyeo and the several states period after Gojoseon

during this period, including stone axes, stone arrowheads, and half-moon stone blades, along with some bone tools.

The most representative pottery from this period is Gimhae-style "gray stoneware" (*wajil togi*), a relatively soft pottery with a tap print. This stoneware enhanced traditional patternless pottery with a hint of Chinese-style grayware: the base clay was more carefully selected, and the objects were no longer fired in an open-air kiln, but rather in a cave-like kiln, which would be flat or elongated and sealed to reach higher temperatures. Firing the clay in these kilns resulted in pottery with a reddish-brown or greyish-blue tint, and designs on the surface tended to be latticed or checked.

During this period rice farms multiplied, especially in the Samhan area (southern peninsula). Charcoal remains of rice excavated from the Gimhae shell mound, and the discovery of several ancient reservoir sites in the more developed delta region, particularly downstream of the Nakdong River, are indications of a broad increase in rice farming. The appearance of earthenware steamers (*siru*) during this time attests to the increasing number of farms and the theory that grain consumption had already become a part of daily life by that time. Most people continued to live in pit dwellings, but during the early years of the Iron Age, houses above the ground begin to appear. At the beginning of the Several States period, human remains were typically placed in wood coffins or cremated and placed in jars, but later in the period, large rectangular burial pits become more common (Kim 1986).

Politically, the Several States timeframe saw no unified system, as during the ensuing Three Kingdoms period. The many statelets, comprising a village society, were governed by local chiefs and were politically and economically independent (Yoon 2015). Through the process of vying for power, towns and villages soon combined into small states, which eventually led to the emergence of the larger states Goguryeo, Baekje, Silla, and Gaya. Jumong, also known as King Dongmyeong, established the northern kingdom of Buyeo, then emigrated south and established Goguryeo. His son Onjo moved further south and established the kingdom of Baekje. The legendary Park Hyeokgeose established Silla thirteen years after his miraculous birth in Saro Yukchon, a region of six villages in the southeastern peninsula. Table 5.1 shows the chronology of early Korean history (Lee and Kwon 2003).

5.1.2 Buyeo

Buyeo, the second kingdom in the history of Korea, was established in about the third century BCE, a little before the destruction of Gojoseon, and it lasted 700 years. In 238 BCE Dongmyeong, the founder of Buyeo, moved south from the state of Takri in the north, and crossed a river into northern Manchuria to establish his kingdom. According to the Chinese classic *Sanguozhi*, "Book of Wei," "Dongyi biography," the people of Buyeo were thought to be descendants of migrants who had come from another region long ago. A twentieth-century theory proposed that the area where the Songhua and Nen Rivers meet (in northern China near Harbin), where artifacts from the Zhaoyuan Baijinbao and Daan Hanshu cultures have been excavated, originally pertained to Takri (the forerunner of Buyeo), which was ruled by Dongmyeong, though evidence was lacking. New theories began to emerge after the 1980s with the discovery of the Hongshan culture, including the view that the region of Jillin was the center of early Buyeo, and that the Nong-an area was the center of late Buyeo (Encyclopedia of Korean Culture 1991).

The name "Buyeo" has been applied to various locales. There is the Buyeo founded by King Dongmyeong of the Buyeo people, who was succeeded by Haemosu, the founder of North Buyeo; during the time of King Dongmyeong, Haeburu lost North Buyeo and migrated to the eastern part of Maritime Province to establish East Buyeo; Jumong escaped from East Buyeo and established the beginnings of Goguryeo by building Jolbon Buyeo; and King Seong of Baekje changed the name of his kingdom in 538 CE to South Buyeo.

Although China and Japan have their own views of the nearly thousand-year history of the kingdom of Buyeo peoples, according to the "Biography of usurers" in *Shiji* (*Records of the Grand Historian*), the Kingdom of Buyeo is described as a large empire on equal or better footing with the Han dynasty (China), even receiving

Table 5.1 Chronology of early Korean history

700,000–12,000 YBP	**Paleolithic Age** Lower Paleolithic remains (700,000–300,000 YBP), 6 sites Middle Paleolithic remains (300,000–40,000 YBP), 12 sites Upper Paleolithic remains (40,000–12,000 YBP), 7 sites Stone and bone tools, mountain caves, mobile hunting
8000–5000 BCE	**Primitive Pottery Era** Initial Mumun (patternless) pottery, bows and arrows, carved bone tools and fishing instruments, shell mounds, hunting and fishing, dugout huts, early Jeulmun pottery
5000–2000 BCE	**Neolithic Age** Agriculture begins, ground stone and bone tools, patternless pottery, appearance of tribal nations (myths), legendary nations (Hwanguk, 7197–3987 BCE; Baedalguk, 3897–2333 BCE)
ca. 2333 BCE	Foundation of Gojoseon by Dangun (Dangun Joseon)
ca. 2333–108 BCE	**Gojoseon Period,** Bronze Age
ca. 1122 BCE	Immigration of Gija from Zhou (=statelet Gija Joseon), black pottery
ca. 800–400 BCE	Megalithic culture, dolmens, menhirs, farming tools, Iron Age
ca. 238 BCE	Emergence of Buyeo in the north, Several States Period
ca. 194 BCE	Emergence of Samhan in the south (Jinhan, Mahan, Byeonhan)
ca. 75 BCE	Foundation of Goguryeo
57 BCE	Foundation of Silla
18 BCE	Foundation of Baekje
18 BCE–668 CE	**Three Kingdoms Period**
372–527	Acceptance of Buddhism in the three kingdoms, Establishment of Confucian schools
660–668	Fall of Baekje (660) and Goguryo (668) to Silla
668–918	**Unified Silla Period**
918–1392	**Goryeo (Korea) Period, founded by Wang Geon**
1231	First Mongol invasion
1392–1910	**Joseon Dynasty, founded by Yi Seong-Gye**

tributes from Han. Buyeo, in fact, ruled a vast area that encompassed the northern regions of Hebei and Liaoning Provinces, Inner Mongolia, eastern Mongolia, and eastern Siberia (Fig. 5.1). *Samguk sagi* and *Sanguozhi*, “Book of Wei” and “Dongyi Biography,” contain passages suggesting that in Buyeo’s prime, the population reached 80,000 households and stretched for 2000 *ri* (10 ri = 4 km) in every direction. In contrast, the population of Goguryeo by that time comprised only about 30,000 households. Whereas weapons like slender bronze daggers have been found on the Korean Peninsula that date from this time, more advanced iron weapons have been found further north, in Buyeo, indicating that it was also a military power in the region.

Enough is known about daily life in Buyeo to highlight a number of their experiences. Animal husbandry had developed into such an integral part of life that domesticated animal names were chosen as official government titles. The four highest government positions added the suffix "-*ga*" to four animal names to create their titles: horse (*Maga*), cattle (*Uga*), pigs (*Jeoga*), and dogs (*Guda*), presumably all with positive connotations worthy of an elite ministry official. Storehouses for grains increased in importance as people established farms and ranches. They lived among mountains and hills or on broad plains with lakes, especially in the region of the Dongyi. The earth was fertile, and while grains grew well, fruits did not. Staple foods consisted mainly of millet and soybeans. There was hemp for weaving, and the cut of cloth for everyday clothing was similar to that of Goguryeo, only wider. The men were generally tall with large frames; on record, they are extolled as being brave, prudent, dignified people of integrity who did not plunder in times of battle. Punishments in Buyeo, however, were severe and swift: a murderer would be put to death and his family made slaves. People scorned what they deemed to be obscene mannerisms and would kill any woman who they felt behaved in an "unseemly" way, leaving her body to rot on top of a mountain.

The land in northern Buyeo was occupied by the Dumangnu people, who were of the same lineage as the Buyeo tribe. The "Dumangnu biography" in the "Book of Wei" reads, "The land of Dumangnu, one thousand ri north of the lake country, is the old North Buyeo, in East Silwi." In the *Book of Jin*, the land of Dumangnu is also referred to as old North Buyeo. Silwi is understood to be located near Lake Baikal, Siberia. In 726 CE, Dumangnu was destroyed by Balhae and Heuksumalgal. Until the land was divided into two states, Buyeo was a nation comprised of the Yemaek tribe of the Dongyi who lived in northern Manchuria. The later Korean kingdoms of Goguryeo and Baekje considered themselves to be the successors of Buyeo.

5.1.3 Three Kingdoms Period

The Three Kingdoms period began in the first century BCE when many states were consolidated to form the four powers Goguryeo, Silla, Baekje, and the Gaya confederacy, which together reached from the southern tip of the Korean Peninsula to Manchuria in the north. The period ended when these kingdoms were conquered and unified by Silla in the seventh century. Some historians assert that the Three Kingdoms period developed once Buyeo was destroyed; others argue for a start date after the destruction of Gaya, around the time when Silla conquered Baekje (660) and made an alliance with Tang China, although the latter theory would suggest that the Three Kingdoms period lasted for only about 100 years (Encyclopedia of Korean Culture 1991).

5.1.4 Goguryeo

The story of the progenitor of Goguryeo, Go Jumong (58–19 BCE), is recorded in *Samguk yusa*, "Goguryeo annals" in *Samguk sagi*, and "Dongmyeongwang pyeon" (King Dongmyeong) in *Dongguk Yi Sangguk jip* (Collected works of Minister Yi Gyu-Bo). In these stories, the son of a heavenly prince, Haemosu, lies with Yuhwa in a hut on the banks of the Amnok (Yalu) River, after which the king of East Buyeo welcomes her to the palace as one of his concubines and treats her well. Not long after, Yuhwa gives birth to a son, Jumong. In order to avoid the battles being fought in North Buyeo, Jumong travels south to the region of Jolbon, near the Biryusu River, where Chief Songyang rules. Jumong marries the chief's second daughter, Soseono.

During this period Gojoseon is conquered and replaced by the (Chinese) Four Commanderies of Han: Lelang, Zhenfan, Lintun, and Xuantu, among which only Lelang and Xuantu remain before long. In 75 BCE Xuantu retreats in the direction of Liaodong, to the west of central Amnok River. Afterward, small states of Guryeo people are established throughout the country, several of which form confederacies. From the confederacy where Jumong lived, called Songyang, Jumong brings together five small Guryeo states from the region Daena and calls the newly formed state Goguryeo (37 BCE).

Each autumn Goguryeo held a commemoration of the alliance of the smaller states of Daena in order to facilitate harmony and integration. All the nobles and adults gathered in one place for festivities that included drinking, singing, and dancing. Also, important matters of state were discussed and decided during the celebration. King Yurimyeong, who succeeded King Jumong, moved the capital to Gungnae, along the banks of the Amnok River. King Daemusin (the third king of Goguryeo) conquered Lelang to the south, and the sixth ruler, King Taejo, who was strongly in favor of foreign conquest, crossed Gaema Plateau to the east and conquered East and North Okjeo, followed by an attack to the west on the Xuantu and Liaodong commanderies. King Taejo elevated Goguryeo from a confederation of five small states to a large kingdom (Northeast Asian History Foundation 2007).

In addition to foxtail millet and soybeans, staple foods of Goguryeo included wheat, barley, sorghum, broomcorn millet, and other grains. These grains have been found in the form of bits of char at archeological sites across the Goguryeo region. Foxtail millet, barley, and other grains would also be ground into flour and set into an earthenware steamer to cook. Sherds of steaming vessels have also been found at Goguryeo sites. A wall mural at Anak site #3 depicts women who appear to be maids building a fire, placing grain-filled steamers over the fire, and using a ladle to stir the contents of the steamer, seemingly engrossed in their cooking (Lee 1965).

People obtained meat from domesticated animals such as cattle, pigs, chickens, and dogs, while also hunting for wild animals such as boar, deer, and pheasant. The charcoal-grilled, cured beef of Goguryeo was famous in China. Also, as evidenced in China's "Dongyi biography," the people of Okjeo (present-day Hamgyong

Province, in northern North Korea) paid tribute to China with offerings of fish and salt, which indicates that the method of preserving seafood in salt was well established by then.

The kitchens of noble households during Goguryeo were separate from the main building in the compound. Female servants would cook in the kitchen, then place the food and dishes on a small portable table (*soban*) and bring it to the men in their quarters. This custom can be seen in a wall mural of the Goguryeo tomb Muyong chong, in which individual dining tables are set out for the lord of the house and for his guests.

5.1.5 Baekje

Baekje became a consolidated kingdom in 18 BCE in the south-central area of the Korean Peninsula, an iron-based culture that arose from the admixture of local inhabitants of the land with northern immigrants who had moved south after the destruction of Gojoseon. Baekje's foundation myth as described in *Samguk sagi* (Kim 1145), particularly the passage treating King Onjo's accession, provides insight into the process of state formation on the Korean Peninsula:

> The first ancestor of Baekje was King Onjo. His father was Chumo, also known as Jumong. Jumong escaped an uprising in Bukbuyeo [North Buyeo] by emigrating to Jolbon Buyeo. The King of Buyeo was without a male child and only had three daughters. Upon seeing Jumong, the king perceived he was no ordinary man, so he arranged for his second daughter to marry him. Shortly thereafter, the king of Buyeo died. Jumong succeeded him to the throne, and two sons were born to him. The elder was called Biryu, the younger Onjo. (It is also possible that Jumong went instead to Jolbon and married a woman from Wolgun, who bore him two sons.) Now, Jumong had had a son when he lived in Bukbuyeo, who came down and became the crown prince. When that happened, Biryu and Onjo feared the new crown prince would not tolerate their presence, and so with Ogan, Mareo, and eight other ministers, they moved south, and a large number of commoners accompanied them. They reached Hansan and climbed to the summit of Mt. Buaak to look for good land on which to live. Biryu wanted to settle near the beach, but the ten ministers admonished him, saying, "Consider this: the Han River forms a northern border to all the land south; to the east, mountains rise high; to the south, marshland hedges the way; and to the west, the sea guards. The benefits of such a natural stronghold would be hard to find elsewhere. Why should you not make your capital in this place?" However, Biryu did not listen and settled in Michuhol instead, and the people were divided. Onjo made his capital south of the river in Wiryeseong, with the ten ministers assisting him, and called the country Sipje. This happened in the third year of Hongjia, during the reign of Emperor Cheng of the Early Han (18 BCE). Biryu, however, could not live comfortably in Michu, where the earth was saturated with salty water. He looked upon Wirye, with its stable capital and peaceful, secure populace, repented of his choice and died. His ministers and people all emigrated to Wirye. Many more people came to this country later and were happy and obedient, so the name of the kingdom was changed to Baekje [meaning "many cross over"]. Since Baekje, like Goguryeo, claimed its heritage through Buyeo, the king and his descendants took the surname Buyeo (*Samguk sagi* 23, "Baekje" 1, King Onjo's accession).

The capital of Wirye was located in present-day Seoul. At the time of Onjo in *Samguk sagi*, the kingdom had already expanded from Chuncheon in the east all the way to the West Sea, north to Yesong River, and south to Anseong. The record reports that Baekje combined forces with Mahan, thus expanding into part of South Chungcheong Province. At the beginning of the third century CE, King Goi (r. 234–286) sought to centralize Baekje's power in the Han River region. On the backbone of its heightened productivity and the absorption of nearby statelets, which greatly increased its economic power, Baekje's political might waxed stronger until, toward the end of the third century, it conquered Mokji, the leading state of Mahan, and swept the entire central region of the Korean Peninsula. King Goi established a framework for an official ranking system, organizing a centralized government with a king at its head. In the middle of the fourth century, King Geunchogo subjugated the remaining land of Mahan in South Jeolla Province, all the way to the west sea. In the north, he fought against Goguryeo for an area called Daebang goji and emerged as head of all the feudal lords of the south-central Korean Peninsula. In 371 (26th year of his rule) King Geunchogo led an army of 30,000 men and advanced on Goguryeo's Pyongyang fortress, killing King Gogugwon of Goguryeo in battle. On the basis of its increasing political power, Baekje began to engage in maritime trade with China and Japan, thereby assuming a more sophisticated and international character (Encyclopedia of Korean culture 1991).

5.1.6 Silla

Silla emerged from one of the Jinhan statelets, Saro-guk, and was established in 57 BCE by native and migrant groups joining together. The following paragraph comes from the King Hyeokgeose section of the "Silla annals" of *Samguk yusa* (Ilyon 1285):

> Suddenly there was a lightning-flash, and an auspicious rainbow stretched down from heaven and touched the earth in the south by the well called Najong in the direction of Mt. Yang, where a white horse was seen kneeling and bowing to something. In great wonderment people ran down to the well. When they came near, the white horse neighed loudly and flew up to heaven on the rising veil of the rainbow, leaving behind a large red egg. When the people cracked the egg they found within it a baby boy whose noble face shone like the sun. When he was given a bath in the East Stream he looked even more bright and handsome. The people danced for joy, and the birds and beasts sang and danced round the boy. Heaven and earth shook, and the sun and moon shone brightly. They named him King Hyokkeose [Hyeokgeose], meaning bright ruler (Ilyon, *Samguk Yusa: Legends and History of the Three Kingdoms of Ancient Korea*, trans. Ha Tae-Hung and Grafton Mintz [Rockville, MD: Silk Pagoda, 2008], 34–35.)

Afterward, the Seoktalhae clan entered the kingdom from the eastern seaboard, and the Park, Seok, and Kim families took possession of the throne by turns. During the reign of Naemul Maripgan (an honorary title) (356–402) Silla occupied nearly all the Jinhan territory in the eastern region of the Nakdong River. A centralized state was developed, and from that time forward the Kim family succession to the throne was established. In the sixth century, King Beopheung brought Buddhism into the country, and in the seventh century, King Jinheung expanded Silla's territory to the Han River Valley and made an alliance with the Sui dynasty, which had unified China, as well as with the succeeding Tang dynasty. In 660 Silla conquered Baekje, and in 668 Goguryeo. Soon the Tang king wanted to rule the Korean Peninsula, but the ensuing Silla-Tang war ended with Silla driving out the invading army. Silla expanded to Wonsan Bay, south of the Daedong River (in present-day North Korea, due east of Pyongyang), and unified the three previously distinct Korean kingdoms.

5.1.7 Gaya

Between the second and third centuries, the early Gaya confederacy formed in the area of Gimhae (near Busan) from five city-states: Dae Gaya, Seongsan Gaya, Ara Gaya, Goryeong Gaya, So Gaya, and Geumgwang Gaya, the last being the center of power. Geumgwang Gaya was greatly damaged, however, by attacks from Goguryeo. Later in the Gaya confederacy, during the 5th–sixth centuries, Dae Gaya became the seat of power, having successfully evaded most of the fallout from skirmishes with Goguryeo.

Gaya was based along the southeast shore of the Korean Peninsula, a region that is markedly important in the history of ancient civilization as the starting place of Primitive Pottery culture. Archeological evidence from the Gimhae shell mound points to Gaya having been a local power on the Korean Peninsula. Gaya made fine-quality iron in the area of Gimhae, the production of which elevated it politically and as a trading hub with Wae (southern Japan) and other states. Gaya excavation sites reveal a high level of expertise in iron workmanship. The kingdom was threatened on both sides by Baekje and Silla, however, and was finally conquered in 562. Below is a map of the four kingdoms on the Korean Peninsula in the fifth century (Fig. 5.2).

5.2 The Three Kingdoms' Buddhist Traditions and Vegetarianism

The introduction of Buddhism to the Three Kingdoms after the fourth century created a major shift in food culture. The Buddhist tenet forbidding the taking of life fostered a trend toward restricting or prohibiting meat and instigated the rise of vegetarianism on the peninsula. This dietary shift seems to have instigated a proliferation of pickled vegetables, sauces, and rice wine, and as more of the populace shunned animal products, soybeans were increasingly used to make flavorful sauces and other food items. By the seventh century, such foods were so prevalent in the diet of the wealthy that they were deemed appropriate for royalty. A *Samguk sagi* record from the eighth year of King Sinmun of Silla during the Three Kingdoms

Fig. 5.2 Map of the four kingdoms on the Korean Peninsula, fifth century

period (683) states that wedding gifts for the royal family included rice, rice wine, oil, honey, soy sauce, doenjang (fermented bean paste), beef jerky, and jeotgal (salt-fermented seafood)—all of which are traditional food items still enjoyed today. Written records of the manufacture and use of soybean products, such as *dubu* (tofu) and bean sprouts, do not appear until much later: a discussion of bean sprouts is found in *Hyangyak gugeupbang* (Native medical prescriptions, 1213–1260), and the Chinese word for tofu, *doufu*, appears in Song China's *Qingyi lu* (Record of pure marvels), from the tenth century. Nevertheless, scholars infer that by this time on the Korean Peninsula such dishes were already a fixture in the daily diet.

The Three Kingdoms period also marks an era of rapid development in grain manufacturing techniques. A broad spectrum of sweets (*hangwa*) was prepared for Buddhist ceremonies, such as *yakgwa* (honey cookies), *sanja* (rice puffs), *dasik* (molded tea cakes), *jeongwa* (candied fruits), *sukgwa* (fruit-shaped confections), and rice cakes (*tteok*)—including *sirutteok* (steamed), *injeolmi* (powder-coated), *jeolpyeon* (patterned), *songpyeon* (filled half-moons), and *danja* (filled and coated). Unlike fruits and meats, these treats could be provided year-round. Grain brewing techniques also developed considerably, with *nuruk* (cereal alcohol fermentation starter) being used to make high-quality, clear rice wine (*cheongju*). The famous Nangnang brewing method flourished at this time, along with many others, and Silla's renowned cheongju was exported to Tang China. This period marks the golden age of vegetarianism in Northeast Asia, and techniques for making sauces, brewing with nuruk, and processing unique foods were introduced from Korea to Japan and neighboring countries.

Qimin Yaoshu (Essential techniques for the peasantry), a Chinese text written by Jia Sixie of Northern Wei in 530–550 CE, describes the food techniques seen across the border in Goguryeo. These two states comprised the area previously occupied by the Dongyi tribes. The brewing and sauce-making methods depicted in *Qimin Yaoshu* mirror the traditional techniques employed in Korea (Yoon et al. 1993).

5.2.1 *The Transmission of Korean Fermentation Techniques to Japan*

A number of records mention the transmission of various food-processing methods, including fermentation, from Korea to Japan between the third and fifth centuries CE. According to the earliest surviving Japanese narrative, *Kojiki* (*An Account of Ancient Matters*), Inbeon, a man from Baekje, went to Japan during the reign of Emperor Ōjin (a legendary emperor of the third century CE) and taught the people how to brew wine using nuruk. Later, Inbeon was enshrined by Japanese locals as a god of rice wine (Lee 1984a). At Matsuo Taisha, an ancient shrine near Kyoto, there remains an ancestral tablet for the Jin (Jap. Hata) clan, which immigrated from Silla, bringing rice wine techniques and other skills. Each year Japan's rice wine manufacturers hold a memorial ceremony in front of the altar to the Jin clan to pray for success in the coming year's brewing (Lee 2001).

Techniques for fermenting soybeans were introduced to Japan by Goguryeo. According to Arai Hakuseki's book *Tōga* (1903), "The fermented sauce from Goryeo called *maljang* came to Japan and was changed by the local dialect into 'miso'" (Lee 1984b). The transmission of Korea's Buddhism-influenced food culture to Japan had a lasting impact: The ensuing vegetable-based foodways were passed down over the generations in Japan, largely undisturbed by external forces until the beginning of the twentieth century. Figure 5.3 depicts the development of Korean vegetarian food culture and its transfer to neighboring countries.

5.3 Origin of Rice Cakes (*Tteok*) and their Varieties

As mentioned above, the transmission of Buddhism during the Three Kingdoms led to a 1000-year period of vegetarian culture on the Korean Peninsula, as monks and others eschewed meat consumption in order to follow the Buddhist precept that prohibits the taking of life. Buddhist foodways engendered a culture of grain confections, such as *tteok* (rice cake) and *hangwa* (sweets made from grains and fruits), and *namul* (blanched and seasoned vegetables), techniques for both of which developed dramatically over time (Lee and Kwon 2003).

Buddhism comes to the Three Kingdoms

↓ Goguryeo 372 CE

Baekje 384 CE

Silla 527 CE

Meat consumption dwindles

↓

Development of grain-processing techniques; entrenchment of vegetarian culture

↓ In *Samguk sagi*, 8th year of King Sinmun (683 CE), ceremonial items gifted to royal in-laws include rice, rice wine, oil, honey, fermented soy sauce, fermented soybean paste (doenjang), jerky, and fermented fish sauce (jeotgal).

Manufacture of various fermented foods: sauces, pickled products, seafood condiments, alcohol

↓

Export of food manufacturing techniques, including fermentation, to neighboring countries, influence on Japanese food culture

Fig. 5.3 Transmission of Buddhism during the three kingdoms period and resultant changes in food culture

The origin of *tteok* is unclear, but the following basic tools must have been developed in order for it to have come into existence: harvesting and threshing tools for grain (the main ingredient), grinding tools to pulverize the grain, and an adequate vessel (*siru*) for steaming the grain. As mentioned in Chap. 3, remnants of stone mortars and other grinding stones from the Neolithic era have been discovered at archeological sites on the Korean Peninsula, and earthenware steamers have been found at later Neolithic and early Bronze Age sites. The making of *tteok* is thought to have begun in the latter period, with the advent of steamers (Lee and Maeng 1987a).

Grains that were universally consumed by the time earthenware steamers appeared included rice, broomcorn millet, foxtail millet, soybeans, adzuki beans, barley, and wheat. Pulverizing or grinding whole grains made them more palatable, and cooking ground grains may have further enhanced their flavor. The steaming of ground, mixed grains was likely the incipient recipe for *tteok* when farming was young and earthenware steamers began to be crafted in Korea. Before long, the development of farming implements led to the propagation of rice farming and the eventual transformation of rice into *tteok* (rice cake) as a specialty food item. *Tteok* soon claimed an important place on Korean tables, especially those that restricted meat and seafood, and a wide array of rice cakes began to appear at harvest festivals and Buddhist banquets (Lee and Kwon 2003).

The generic term for *tteok* is *byeong-i*, and while in China "byeong" refers to *tteok* made from wheat flour, in Korea this term refers to rice cakes. Generally speaking, byeong-i may be divided into two broad categories depending on how it is made: siru *tteok* (steamed) and *mulpyeon*, which refers to all other kinds of *tteok*; beyond that basic division, garnishes, powdered coatings, and fillings are used to give *tteok* flavor and shape. Siru *tteok* is made from rice flour and set into a steamer to cook, while *mulpyeon* is not steamed but rather worked into a dough by adding water to the rice flour and shaping (Kang 1983, Hwang 1986). The various types of *tteok* can be further divided according to production method: *tteok* made from rice flour and steamed is called *jeungbyeong*; *tteok* made by pounding steamed rice is called *dobyeong*; shapes made from dough that are boiled or steamed are called *danjabyeong*; *tteok* shaped from dough and then fried is called *yujeonbyeong*; and dough that is fermented and then steamed is called *ibyeong*. *Tteok* may also be classified by its base material, that is, glutinous rice or nonglutinous rice (see Table 5.2) (Lee and Maeng 1987a; Lee et al. 2015).

Since the standard base material for Korean *tteok* is rice, its flavor and texture differ from bread or cakes made of wheat flour. For thousands of years, *tteok* has been the preferred treat for everyday occasions as well as an integral part of Korean food culture at ancestral rites, weddings, and national ceremonies. Since *tteok* does not use butter or sugar like flour-based pastries or cakes, it is considered to be a traditional health food.

Table 5.2 Korean *Tteok* varieties and characteristics

Jeungbyeong (steamed *tteok*): Rice flour steamed in an earthenware steamer. Two broad categories:
(1) *Seolgi tteok*: Rice flour is mixed with water, shaped into a single mass rather than layered, and then steamed. Varieties include *baekseolgi* (white *tteok*), *kongsiru tteok* (whole soybean), *musiru tteok* (radish), *japgwabyeong* (mixed fruit *tteok*), *bamseolgi tteok* (chestnut), *gamseolgi tteok* (persimmon), *haengbyeong* (apricot *tteok*), *dobyeong* (peach *tteok*), *danggwibyeong* (“female ginseng” *tteok*), *gukhwabyeong* (chrysanthemum *tteok*), *ssuksiru tteok* (mugwort), *sangjabyeong* (acorn *tteok*), *sansambyeong* (pounded bellflower root coated in rice powder *tteok*).
(2) *Kyeo tteok*: Rice flour is not mixed with water, but is layered and then steamed. Varieties include the following:
(a) *Mesiru tteok*: Steamed nonglutinous rice powder.
1. *Mesiru kyeo tteok*: Nonglutinous rice flour is layered, coated with a ground powder of choice, and steamed. Examples include *bulgeunpat gomul siru tteok* (red bean powdered), *geopipat* gomul siru *tteok* (thin-skinned red bean powdered), *mulhobak tteok* (pumpkin), *sangchu tteok* (lettuce), and *neuti tteok* (zelkova leaf).
2. *Mesiru pyeon*: Nonglutinous rice flour is not coated, but thinly layered. Examples include *baek pyeon* (white), *ggul pyeon* (honey), *seunggeomcho pyeon* (Korean angelica), and *seogi pyeon* (rock tripe).
(b) *Chalsiru tteok*: Steamed glutinous rice flour.
1. *Chalsiru tteok*: Glutinous rice flour is layered thinly and coated with powder, then steamed. Types include *chalsiru tteok* (glutinous steamed rice flour) and *duteop tteok* (honeyed red bean *tteok*).
2. *Chalsiru pyeon*: Glutinous rice flour is mixed with sesame seeds or mung beans, then steamed like *mesiru pyeon*. Types include *ggae chalpyeon* (sesame *tteok*), *nokdu chalpyeon* (mung bean *tteok*), and *ggul chal* (honey *tteok*).
Dobyeong (pounded *tteok*): After steaming, grains are pounded until they become sticky.
(1) Chapssal *dobyeong* (glutinous rice *dobyeong*): Glutinous rice is steamed and then pounded.
– *Injeolmi*: Glutinous rice is steamed, pounded on a rice-cake board and made into shapes, then coated in a powder of choice. Varieties include ssuk injeolmi (mugwort), *daechu* injeolmi (jujube), and *cheongjeongmi* injeolmi (glutinous millet).

(continued)

Table 5.2 (continued)

(2) Mepssal *dobyeong* (nonglutinous rice *dobyeong*): Nonglutinous rice is steamed and then pounded.

(a) *Jeolpyeon*: Nonglutinous rice is cooked and pounded, then cut in a rectangular or circular shape and stamped with a patterned *tteok* mold. Types include huin *jeolpyeon* (white), ssuk *jeolpyeon* (mugwort [green]), and *songgi jeolpyeon* (inner pine bark).

(b) Huin *tteok*: Nonglutinous rice is steamed, placed on a *tteok* board, and pounded into a long bar shape.

(c) *Gaepi tteok*: Nonglutinous rice is steamed, pounded flat, then shaped into thin, round pieces, filled, and folded into half-moon shapes. These are often placed in a small bowl to be scooped out with a spoon. Types include huin gaepi *tteok* (white), ssuk gaepi *tteok* (mugwort), and songgi gaepi *tteok* (inner pine bark).

Danjabyeong (dough *tteok*): Dough is made out of rice flour, formed into a shape, and boiled or steamed.

(1) Mepssal danjabyeong (nonglutinous rice dough *tteok*): Dough is made from nonglutinous rice, formed into a shape, and boiled or steamed.

– S*ongpyeon* (pine *tteok*): Nonglutinous rice is made into dough, filled, and formed into a dumpling shape, after which the *tteok* is steamed and garnished with pine needles. Examples include huin *songpyeon* (white pine *tteok*), ssuk *songpyeon* (mugwort pine *tteok*), and songgi *songpyeon* (inner pine bark *tteok*).

(2) Chapssal danjabyeong (glutinous rice dough *tteok*): Glutinous rice is made into dough, placed into boiling water, and then coated with powder.

(a) *Gyeongdan* (glutinous rice balls coated with powder): Hot water is added to glutinous rice flour, and after stirring and kneading, balls are formed and placed into boiling water. After cooking, they are coated with a powder of choice. Examples include Kong gyeongdan (soybean powder), pat gyeongdan (red bean powder), ggae gyeongdan (sesame powder), *susu* gyeongdan (sorghum powder), and *gamja* gyeongdan (potato powder).

(b) *Danja* (filled glutinous rice balls coated with powder): Glutinous rice is made into dough and formed into a flat dumpling shape, then cooked in boiling water. Next it is pounded until air bubbles form, then filled, reshaped, and coated in a powder of choice. Types include pat danja (red bean), bam danja (chestnut), seogi danja (rock tripe), seunggeomcho danja (Korean angelica), *yuja* danja (citron), *boksunga* danja (peach), *ssukguri* danja (mugwort), and *geonsi* danja (persimmon).

Yujeonbyeong (pan-fried *tteok*): Shapes are made out of thick, glutinous rice flour batter and pan-fried.

(1) *Hwajeon* (flower pancake): Flowers or leaves are placed onto glutinous rice flour pancakes and fried in oil. Examples include *jindallae kkot* jeon (azalea blossom pancake), *jangmi* kkot jeon (rose blossom pancake), and gukhwa kkot jeon (chrysanthemum blossom pancake).

(2) *Juak* (fried, filled *tteok*): Filling is added to glutinous rice dough, then shaped and fried. Examples include bam juak (chestnut), daechu juak (jujube), *chiji* juak (jasmine), and *memil* juak (buckwheat).

(3) *Bukkumi* (half-moon fried, filled pancake): Glutinous rice batter is pan-fried in oil, then filled and folded into a half-moon shape.

Ibyeong (fermented *tteok*): Rice wine is added to rice flour and made into dough, then left to ferment and rise, after which it is steamed. *Jeung pyeon* is an example of this kind of *tteok*, which is made with unfiltered rice wine.

5.3.1 *Jeungbyeong* (Steamed *Tteok*)

Siru *tteok* (rice flour steamed in an earthenware vessel) is the original form of *tteok*: rice is soaked in water, dried, and then ground into flour, after which it is placed in an earthenware vessel and steamed until ready. The two basic types are made of either glutinous or nonglutinous rice flour. The recipe determines whether the resulting *tteok* will be *seolgi tteok*—rice flour and water shaped into a single mass, often rectangular in shape—or kyeo *tteok*—no water added, but also shaped into a single mass.

The book *Joseon sangsik* (The Joseon table, Choi 1948) states, "Sticky cakes in the three East Asian nations differs in the following ways: the main ingredient of Chinese cake is wheat flour, the standard cooking method, baking; in Japan it is glutinous rice flour and pounding; in Korea, nonglutinous rice flour and steaming. Each country has their unique way of making sticky cakes. Joseon *tteok* made in an earthenware vessel is our original way of making steamed rice cake, and every other kind of *tteok* made in Korea is an adaptation or decorative twist on this original type" (Choi 1948).

Seolgi Tteok

To make *seolgi tteok*, water is added to rice flour and made into a single mass without layering. First the rice is ground into flour, then water is added little by little, squeezing the mixture by hand until it holds together. If too much water is added to nonglutinous rice, it becomes sticky like glutinous rice and must be pressed through a fine sieve.

Baekseolgi (white) is the basic form of *seolgi tteok*. Water or honeyed water is mixed with nonglutinous rice flour and sieved to evenly integrate the air, after which the cake is steamed. *Baekseolgi* is one of the most universally prepared types of *tteok*. It appears at almost every festive occasion, regardless of region or season. Its whiteness symbolizes purity, so it is usually found at celebrations of a baby's first 21 days, first 100 days, and first year landmarks. Also a symbol of the sacred, *baekseolgi* often makes an appearance among ceremonial offerings at Buddhist temples as part of their Yong-wang (Dragon King) and Sansin (Mountain Spirit) rituals. Many other folk rites and rituals also include *baekseolgi*. In 1934 Choi, Nam-Sun (a well-known literary figure) wrote, "The color white, as a symbol of the sun, represents purity and uplifting sublimity and is therefore revered as a holy hue by nations who worship the sun." In *Gyuhap chongseo* (Women's encyclopedia, Lady Yi 1809; translated into modern Korean by Jeong, Yang-Won 1975), a section on *baekseolgi* reads, "It is not good to knead the dough because the light will go out of it. To prepare for steaming, wash the rice wash until it turns white, grind it, and strain through a cloth sieve twice in order to achieve the finest flour (gently tap the sieve to achieve this)."

Mesiru Kyeo Tteok

Mesiru kyeo tteok is made by layering *tteok* with a powder of choice (such as adzuki beans) and then steaming. The name of this kind of *tteok* changes depending on the kind of powder mixed with the rice flour or placed between rice layers. According to the book *Dongguk sesigi* (Korean seasonal customs), written in 1849 by Hong Seok-Mo (translated by Lee, Seok-Ho 1972), "Nonglutinous rice is spread out in an earthenware steamer, and cooked adzuki beans are sprinkled between the rice layers, with the rice layers somewhat thicker. Depending on the size of the steamer, more layers may be added before steaming. This is called *jeungbyeong*. It is used as an offering to the gods at the start of a new year, at *sagmangjeon* [a ritual performed on the first and fifteenth of a month during a period of mourning], or any time one requests a favor of a god."

Followers of indigenous faiths blamed evil spirits for the onset of disease, claiming that the mouth was the portal through which malevolent spirits entered a body. The solution for preventing or expelling disease, then, required one to eat something the spirit hates. The color red was seen as representing fire, and because yang (an aspect of which is the fiery sun) dispels bad energy, people believed that evil spirits hated anything emitting a reddish hue. Gosa *tteok* contains red bean powder, and so it was considered to have the effect of chasing away evil spirits, or preventing them from invading the body in the first place (Cho 1976).

Mesiru Pyeon

Mesiru pyeon (or *mepyeon*) is a *tteok* that is thinly layered, with no filling between the layers, then steamed. Its name changes based on the ingredients mixed into the rice flour. In the 1670 cookbook *Gyugon siuibang* (or *Eumsik jimibang*; A mother's cookbook for her daughter-in-law), by Lady Jang of Andong (Hwang, Hae-Sung, ed. 1985), a passage reads, "Take 18 L of white rice, mix it together with 3.6 L of glutinous rice, and then pulverize the mixture. Thoroughly rinse one mal of rock tripe with water, mince it finely, mix it with the rice flour, and place the mixture into an earthenware steamer [siru]. Garnish it by spreading a thin layer of finely minced pine nuts on top, and steam."

Chalsiru Kyeo Tteok

This *tteok* is made of thin layers of glutinous rice flour that are dusted on top with a powder of choice. Since glutinous rice is sticky, the steam may not cook it through, so this *tteok* can also be layered alternately with nonglutinous rice.

Chalsiru Pyeon

Also known as *chalpyeon*, *chalsiru pyeon* is similar to *mesiru pyeon* in that glutinous rice flour is mixed with a powder such as sesame or mung bean, and then steamed. No water is added to the rice flour, and a little bit of salt is used. It is garnished in the same manner as *mesiru pyeon*.

5.3.2 Dobyeong (Pounded *Tteok*)

Dobyeong is made by cooking floured or granular grains in a steamer, then pounding the mass vigorously to make *tteok*. Glutinous *dobyeong* is called injeolmi, while *jeolpyeon*, huin *tteok*, and gaepi *tteok* are the names of *dobyeong* made with nonglutinous rice. A phrase in the biography of Baekgyeol (a zither player born c. 414 CE in the Silla dynasty) in *Samguk sagi* reads, “As the end of the year draws nigh, the sound of neighbors pounding tteok can be heard.” This *tteok* was likely huin *tteok*, which they referred to as *ja*. Grains would be cooked and pounded before the end of the year in order to prepare sufficient amounts of *dobyeong* to ring in the new year at temple ceremonies.

Injeolmi

Dongguk sesigi contains the following passage: “Steam glutinous rice flour, pound it to make tteok, and dip it in pan-fried black bean powder or sesame salt. This is called *inbyeong*” (Hong 1849). A similar type of *tteok*, injeol byeong, is sticky and must be pulled by hand and cut with a knife.

Injeolmi is made by steaming glutinous rice, millet, or another glutinous grain, and pounding it on an *anban* (a wide, wooden board used for pounding *tteok*), which produces sticky *tteok*. Or glutinous rice can be made into *jiebap* (a type of steamed rice used in the making of rice wine) and then pounded. Alternatively, the rice can be ground into flour before steaming and pounding. *Gyuhap chongseo* (Women’s encyclopedia) states, “Make the uncooked rice pearly white by pounding with a *sseulgi* [archaic word for a pestle that removes rice hulls], then wash several times until clean.” It continues, “Remove any grains of nonglutinous rice and add hot water. Change the water every day for 4–5 days, then drain, steam thoroughly, and pound. Pound for a long time for best results” (Lady Yi 1809, translated into modern Korean by Chung Yang-Won 1975).

Injeolmi is not always white; often mugwort or jujubes are added. Additional flavors may take the form of a powder coating suitable to the given type of injeolmi; for white injeolmi, for example, these include roasted yellow soybean powder, cooked green bean powder, red adzuki bean powder, black adzuki bean powder, or roasted black sesame powder. When coated in hulled, cooked adzuki beans, the *tteok* is known as pat injeolmi. Soybean injeolmi is coated in roasted soybean powder, and sesame injeolmi is coated in hulled, pulverized sesame seeds.

Gyugon siuibang (A mother's cookbook for her daughter-in-law) suggests a sweetener: "Put a pinch of taffy (*yeot*) into some injeolmi and roast it over a fire until the taffy melts. Eat one piece every morning." In the winter season, when injeolmi with added taffy would harden, cutting and roasting it over a fire resulted in a sweet injeolmi with a distinctive flavor.

Jeolpyeon

Jeolpyeon is the most basic form of *mulpyeon* (*tteok* made from dough). It is made of nonglutinous rice flour that is cooked, pounded, and sliced. *Gosirae tteok* (soaked nonglutinous rice made into a fine flour that is mixed with boiling water to prevent lumps, then steamed) is placed on a pounding board and pounded firmly with a *tteok* mallet until it forms a ball, at which point it is shaped by hand, imprinted with a wooden rice-cake pattern stamp, and oiled. Among the broad array of pattern stamps for *tteok* in Korea, many are thought to be related to religion or emotional longing. There are also geometric patterns, character patterns (Korean or Chinese), lined patterns, latticed patterns, flower patterns, animal patterns, and various composite patterns. Symbolic or abstract patterns may be mixed with descriptive patterns (Shin et al. 1972).

Striped *jeolpyeon* represents long life or long marriage, and as such is often placed on the table as part of a large spread prepared for a wedding feast or 60th birthday celebration. The size and shape of *jeolpyeon* varies from region to region: some favor wooden stamps, others prefer using dye to create an attractive design. Flavors include mugwort *jeolpyeon* and pine bark *jeolpyeon*. (Pine bark *jeolpyeon* is made by removing the outer layer of bark on a small section of a pine tree, then stripping off a piece of the inner white bark. The inner bark is shredded, soaked in cold water that is frequently refreshed, then simmered and squeezed out. At this point, the pine bark is added to the *tteok*.) Both *Gyeongdo japji* (Customs of the capital, Yu Deuk-Dong late 1700s, translated into modern Korean by Lee, Seok-Ho 1972) and *Dongguk sesigi* contain the following passage: "To prepare for Dano [a festival on the fifth day of the fifth lunar month], mugwort leaves are picked, mashed, added to nonglutinous rice flour, and kneaded into a green dough. The image of a cart wheel is imprinted on the tteok." This reveals that mugwort *jeolpyeon* comprised part of the Dano festival offerings.

Jeolpyeon included *tteok* that was dyed and shaped into a half-moon, dragon, bird, flower, leaf, or cocoon. Names for this kind of *tteok* were based on its shape, such as "dragon tteok," but they were all a form of *jeolpyeon*. Even the round bars of rice cake eaten on Lunar New Year's Day can be called *jeolpyeon*. Regional names vary: In Jeolla Province it is called *bandal tteok* (half-moon *tteok*) or *banchakgon tteok* (fine half-moon *tteok*); In Baekjon village, Gangwon Province, it is known as jeol *tteok*; and in Hamgyong Province is it made into large half-moon pieces and called *dal tteok* (moon *tteok*) (Hwang 1986).

Huin *Tteok*

Huin *tteok*, or white *tteok*, is made a bit wetter than the dough for gyeongdan (sweet rice balls), steamed, and then placed on a *tteok*-pounding board wrapped in cloth to be massaged and kneaded. Next it is spread out on a *tteok* board and pounded with a mallet. Both *Gyeongdo japji* and *Dongguk sesigi* reveal that "Nonglutinous rice is steamed and placed on a board to be pounded multiple times into a long shape. This is huin tteok. The long roll is sliced thinly, about the width of a coin, and added to clear broth soup along with some beef or pheasant. Boil it and season with pepper, and you have *tteokguk* (rice cake soup). This soup can be used in ancestral rites or for entertaining guests, and it is called for on every New Year's celebration table." *Yeolyang sesigi* (A record of seasonal customs in Seoul, Kim Man-Sun 1819, translated into modern Korean by Lee, Seok-Ho 1972) states the following: "Make flour from high-quality rice and sift it with a sieve. Add enough water to make dough, set it to cook in a steamer, then place it on a board and pound it with a tteok mallet. Once bubbles form, pinch off pieces of the dough and rub them until they are round and long. Because pieces are torn off by hand, this tteok is sometimes referred to as *gwonmo* (fistfuls), but is more commonly known as *bibin* tteok (rubbed tteok), *golmu* tteok (thimble tteok), or huin tteok (white tteok)."

According to the poem "*Cheomse* byeong" (New Year's *tteok*), huin *tteok* is eaten at Lunar New Year celebrations, when everyone gains another year of life, and for this, white rice cake must be pounded for an extended period of time. The whiteness and cleanness of the *tteok* was likened to the fruit of immortality eaten by Daoist immortals (Jung 1973). When good, clean huin *tteok* was boiled in *tteokguk* (rice cake soup), the rice cake would not become overly sticky or fall apart. Since *tteok* was made of rice, it was considered to be the staff of life, and eating huin *tteok* in the first month of the year came to symbolize the resurrection of the previous year's fading and dying spirit.

Sudan is bead-shaped *tteok* (literally, "water ball" *tteok*) and is often called *baekdan* (white ball *tteok*) or *bundan* (powdered ball *tteok*), while a particularly refined version is known as *jeokbundan* (fine powdered ball *tteok*). *Dongguk sesigi* relates that "Just as with huin tteok, nonglutinous rice flour is steamed and pounded at length and then rolled into long logs, but then it is thinly sliced and shaped into round balls about the size of small marbles. These are eaten after being placed into honeyed water and chilled with ice. They are also found in ceremonial offerings. Sudan is a traditional food item consumed during the Dano and Yudu water festivals" (Hong 1849). Another rice cake of this type is called *geondan* ("dry ball" *tteok*), which is not placed into water, but still adheres to the "cold filling" type of *tteok*. Sudan and geondan both belong to the category of huin *tteok* (Lee 1978).

Gaepi *Tteok*

Gaepi *tteok* is made in the same way as *jeolpyeon*, by cooking nonglutinous rice, then pounding and rolling it, placing a filling inside, and placing it into a small bowl. As the *tteok* is folded over the filling, air enters and causes the crescent shape to balloon, leading to its alternate name, *baram tteok* (wind *tteok*). Once the *tteok* is filled and shaped, it is basted with sesame oil. In the pounding stage, the dough should be pounded until air bubbles form in order to achieve the chewy exterior texture characteristic of gaepi *tteok*. The filling used for gaepi *tteok* in all regions is adzuki bean paste. When ssuk (mugwort) is added, it becomes ssuk gaepi *tteok*, and when songgi (inner pine bark) is added, it is called songgi gaepi *tteok*.

5.3.3 Danjabyeong (Dough Tteok)

***Songpyeon* (Filled Half-Moons)**

The exterior of *songpyeon* is made of rice-flour dough, and once a filling is placed inside and the *tteok* shaped, it is steamed with pine needles. New grain is used to make holiday *tteok* for the fall festival Chuseok, and early-ripening rice is used for ancestral memorial service tables and gravesites. This is called *oryeo songpyeon* (early rice). *Dongguk sesigi* reads, “Make huin tteok from the earliest rice, make the filling by soaking beans, then layer pine needles in the steamer, place the tteok on top, and steam. When fully cooked, remove the tteok, rinse it with water, and coat with sesame oil. This is called songpyeon” (Hong 1849). *Gyuhap chongseo* (Women’s encyclopedia) suggests further, “Grind rice into fine flour and make dough using more water than that used for huin tteok. After steaming, pound the tteok a considerable amount, then rather than coat it in powder like thick sudan tteok, rub the dough until thin enough for the filling to show through, and fill.”

The names of different *songpyeon* indicate the color of the dough—huin *songpyeon* is white, mugwort *songpyeon* is green, and inner pine bark *songpyeon* is brown—or the type of filling: mashed, thin-skinned red bean, mashed mung bean, young soybean, chestnut, jujube, or sesame paste. While the names and colors of *songpyeon* differ according to type, its size and shape vary by region. In the north *songpyeon* is larger; in Seoul, it looks like a small clam; in Gangwon Province the pieces are slender as a finger; in the Wonsan region the clam-like shape is pinched tightly in back; in Hwanghae Province, *songpyeon* is as large as the palm of a hand. *Gyuhap chongseo* states, “If the tteok is too small and round it looks plain; adjust the size to make it bigger” (Cultural Heritage Administration 1984). As mentioned, *songpyeon* is layered over pine needles and placed in a steamer with a cloth laid over it. The pine needles must be cooked and laid out to dry in order to be clean. To eat right away, let the steam rise, then, with the pine needles still in place, rinse with cold water, drip dry, and add sesame oil.

Gyeongdan (Sweet Rice Balls)

The basic ingredient of gyeongdan is sweet glutinous rice flour, which is mixed with mugwort or *danggui* (Korean angelica). Glutinous rice flour, or glutinous sorghum flour, is kneaded with boiling hot water, then shaped into balls and boiled in water. Once the balls float, they are removed from the water and dried, then dipped in a coating powder. Numerous coarsely ground coatings may be used for gyeongdan, among which roasted soybean powder, adzuki bean powder, and sesame powder are frequently seen. For shaping, the dough is rolled into small balls and covered with a damp dishcloth to rest a few minutes, which increases stickiness. Although gyeongdan can be made large or small, it is important to make them round as a ball and of uniform size. Gyeongdan are usually served on a wooden dish, laid out in three rows according to color. When boiled they turn out soft and delicious.

***Danja* (Filled and Coated)**

When making danja, a secondary ingredient is mixed into glutinous rice flour and kneaded with water, after which the dough is shaped in the palm of one's hand, making round pieces with flat bottoms. The dough is then boiled, drained, and pounded with a bat until it bubbles and becomes sticky. After the dough is rolled into a long cylindrical shape, small pieces are torn off by hand and flattened in the palm, and filling is placed in the center. The *tteok* is folded around the filling and dipped in coating powder. Danja is frequently seen at festivals and banquets, and constitutes an essential part of the food offerings at children's birthday celebrations.

Unlike injeolmi, danja consists of small pieces and is made by steaming glutinous rice flour. Traditionally, danja would not be displayed alone, but would be accompanied by various colorful rice cakes. The recipe for danja depends on which secondary ingredients are in season, with mugwort danja in spring, chestnut or citron danja in fall, and jujube, mushroom, or pine nut danja in winter. Danja tends to be about the size of a finger, and chestnut or adzuki beans can be used as filling. The ingredients mixed into the rice flour must harmonize with the flavors in the powdered coating. Mugwort danja goes well with adzuki bean powder, while chestnut mixed with dried jujube is compatible with chestnut powder.

5.3.4 Yujeonbyeong (Pan-Fried Rice Cake)

Rice cakes pan-fried in oil include hwajeon, juak, and bukkumi. Glutinous rice flour is mixed with hot water, and the resulting dough is formed into a number of different shapes. Hwajeon is pan-fried with flowers, bukkumi is made the same way but with filling, and juak is deep-fried in boiling oil.

Hwajeon (Flower Pancake)

"Hwajeon" means "flower pancake." Glutinous dough is placed in a pan to sizzle, and flowers or leaves are decoratively placed on top. Once the dough becomes golden and hot, it is dipped into honeyed water and removed. As recorded in *Buin pilji* (Necessities for every wife, 1915) and *Gyuhap chongseo* (Women's encyclopedia), "If made with cold water, the dough loses its color and soaks up too much oil; make the dough in the steam of salted, boiling water and squeeze the flour together just until it holds" (Cultural Heritage Administration 1984). While the use of glutinous rice dough for hwajeon seems to be consistent throughout Korea, the ingredients placed on top differ by region. Decorative flowers include azaleas, roses, pear blossom, peach blossom, cockscomb, or chrysanthemum, depending on the season. When no flowers are in season, dried jujube peels, mugwort leaves, dropwort, or crown daisy leaves may be used. Hwajeon is often served in conjunction with colorfully dyed *tteok*.

Jeongjoji (Pots and cutting boards), volume 8 of *Imwonsimyukji* (Encyclopedia of rural life, Seo Yu-Gu 1827), confirms that "Glutinous rice pan-fried with flowers is called hwajeon," while "wheat flour fried in round balls is called jeonbyeong. Alternatively, glutinous rice flour, sorghum flour, or Job's tears [adlay millet] flour may be shaped into rounds and filled with adzuki beans, then folded over and pan fried" (Jung 1973). *Gyeongdo japji* (Customs of the capital) and *Dongguk sesigi* (Korean seasonal customs) state that "On the third day of the third lunar month, after picking azaleas I made dough from glutinous rice flour and shaped it into round rice cakes, placed them in oil to fry lightly, and called them hwajeon." *Gyugon siuibang* (A mother's cookbook for her daughter-in-law) reads, "Add a little hulled buckwheat flour to the glutinous rice flour, then add several azalea, rose, or Korean yellow rose blossoms. Loosely roll the dough, then drop it piece by piece into boiling oil and panfry the pieces until they steam. Remove and drizzle honey over them." This method of making hwajeon continues to this day, except that now the *tteok* pancakes are each adorned with a single petal and then fried, which looks lovely, but is not as fragrant as the full-flower garnishes of the past.

Juak (Filled and Deep-Fried)

Juak is not pan-fried like hwajeon, but deep-fried. Jujube, sesame, or minced citron is mixed into sifted glutinous flour and then molded by hand into half-moon shapes and deep-fried in oil. *Gyuhap chongseo* reads, "Using cold water to make the dough for juak results in soft, tender tteok; if made with hot water, the resulting dough will be flaccid and taste thin." Hwajeon typically has no filling, but juak often has a bit of filling, such as sesame seeds or minced jujubes mixed with honey or cinnamon. When glutinous rice is deep-fried, it has a tendency to fall apart; care must be taken to place the pieces of dough in the oil separately so they do not stick together, and then remove them as soon as they float to the top. They are then basted with honey, sprinkled with powdered pine nut or cinnamon, and arranged decoratively on a platter to serve.

Juak began as *gakseo* in the Chinese state of Chu (1030 BCE–223 BCE). The character for "gak" means horns, which likely refers to the peaked corners of the *tteok*. Although not the same as juak made in Chu, Korean juak was made by placing diced meat and vegetables into rounded leaf shapes that were closed and then pinched at the ends. As time passed, people began to fill this *tteok* with adzuki beans instead, causing it to be dubbed *jogak*, which later morphed into *joak*, which today is pronounced juak (*Aeongakbi* [Proper usage of the Korean language], Jung Yak-Yong 1819, translated into modern Korean by Kim Jong-Kwon 1976). According to *Jeongjoji*, "Today people consider juak to be the most important type of rice cake, a necessity on any table when receiving guests or performing ancestral rites" (Jung 1973). Juak is often made rounder and larger for events such as weddings or 60th year birthday (*hoegap*) celebrations.

Larger, rounded shapes are characteristic of juak from Gaesong (in present-day North Korea), and are often topped with a pine nut or a slice of jujube when served. In Seoul, juak is made into smaller, flatter, dumpling-like shapes.

Bukkumi (Half-Moon Fried, Filled Pancakes)

Bukkumi is shaped and pan-fried in a similar manner to hwajeon at first, but after frying, a filling is added. The top is decorated with flowers or leaves. Bukkumi's base is most often made of glutinous rice or millet, but sometimes wheat or mung beans are used, all of which must first be soaked, then dried and ground. After frying the dough like a pancake, a filling is placed inside and the edges are sealed in a half-moon shape. Fillings tend to consist of mung bean powder or hulled adzuki bean powder. In the past, in addition to mashed chestnut, summer fillings included julienned cucumber or zucchini that was lightly salted, then squeezed of excess liquid after several minutes and stir-fried, or meat that was also julienned and stir-fried.

Joseon sangsik (The Joseon table) asserts that "the origin of *binja tteok* [mung bean cake] comes from the Chinese term *bingja*" (Choi 1948). The manner of making binja *tteok* is explained in *Gyugon siuibang* and *Gyuhap chongseo*, not as the *bindaetteok* [mung bean] pancakes commonly used as a savory side dish today, but rather as true yujeonbyeong (pan-fried *tteok*). *Gyugon siuibang* describes it thus: "Make flour of hulled mung beans by coarsely grinding them. Pour oil into a fry pan, and when it boils, spoon the flour in a little at a time. Place a filling of honey mixed with hulled adzuki beans inside, then drizzle with more of the mung bean flour and fry until it turns a golden citron hue." In addition, *Gyuhap chongseo* reads, "Grind the mung beans coarsely, then pour enough oil into a frying pan to submerge the cakes, stirring the mung bean flour into the oil. Place a filling of honeyed chestnuts on top, cover this with more mung bean flour, and pat it down. As you turn and press it with a spoon, shape it like a flower pancake. As it cooks, place pine nuts and sliced jujubes on top."

5.3.5 Ibyeong (Fermented Tteok)

Ibyeong dough is made by mixing rice wine with rice flour, then letting it rest to ferment and rise before steaming. The representative type is called *jeung pyeon* (or *jeungbyeong*), but other names include *gijeung* byeong, *giju tteok*, *giji tteok*, *sul tteok*, and *beonggeoji tteok*. The method of steaming, the garnishes, and the taste of sweet and sour wine make this *tteok* unique. Because of the use of alcohol, the rice cakes do not spoil as quickly, so the main season for this type of *tteok* is summer. Malt can be used instead of unfiltered rice wine, and garnishes that enhance the look or taste of the *tteok* include black sesame seeds, pine nuts, dyed noodles, adzuki beans, or cinnamon.

The ibyeong recipe in *Dongguk sesigi* reads, “First make rice flour into dough, then pull it apart piece by piece, add rice wine, and steam. The dough will rise and take on the appearance of teardrops. Cooked soybeans can be mixed with honey and added to this tteok as filling. Top the tteok with jujube rind. This is called jeung pyeon.” *Aeongakbi* (Proper usage of the Korean language) states, “When making jeungbyeong, jujube rind is used as a decorative garnish. [Incidentally], long ago the fruit was sliced so thinly it imparted to the *tteok* the appearance of having a character carved into it, which is why *gomyeong* (“go” = *tteok*, “myeong” = to carve) became the word for rice cake garnish.” Even today, the chestnuts, jujubes, or pine nuts decorating prepared foods, as well as the strands of egg or *gochu* (chili pepper) threads gracing the top of a dish, are called gomyeong.

The key element to making good *jeung pyeon* is the way the rice wine is made. Nonglutinous rice flour is used to dilute rice porridge, which is then chilled. Nuruk (cereal alcohol fermentation starter) powder is mixed with water and stirred well; when it settles, the water on top is poured into the porridge and left in a warm room to ferment. This ferment is added to rice flour to make dough, which is shaped and then covered with a hemp cloth. Once the desired rise is achieved, the pieces of *tteok* are laid out evenly and steamed. Garnishes include cucumber blossom, cockscomb blossom, pumpkin blossom, jujube blossom, pine nut, rock tripe, chestnut shavings, and black sesame seeds.

Gyugon siuibang (A mother’s cookbook for her daughter-in-law) states, “Rice flour is sifted through a fine sieve and refined further using a cloth sieve. If making one *mal* (18 L) of *jeung pyeon giju* (when rice wine is poured into *jeung pyeon* so that it rises), first wash one *doe* (1.8 L) of rice and make watery cooked rice, then cool. Shave a clean block of nuruk and add the shavings to water. Once it rises, pour off the excess water and strain through a sieve until about one bowl of milky water accumulates. Mix this with the rice and add one spoonful of good rice wine. When bubbles begin to form, take 3 *hop* (540 mL) of rice, make watery cooked rice, cool, then add it to the rice wine mixture and wait until bubbles arise again. When bubbles appear on the second day, dampen a large, thick cloth with water and place the mixture in it. Add rice flour until the mixture swells to the thickness of soybean porridge, and then take about half a crock’s amount and place it in a crock until it swells about seven-tenths of its size again, at which point it is ready to be placed in a steamer and steamed in the manner of *sanghwa* tteok."

Gyuhap chongseo (Women's encyclopedia) describes *jeung pyeon* in the following way: "Start with quality rice and polish it like jade by rinsing several times until the water runs clear. Let it sit overnight, then dry thoroughly, grind, and sift through a cloth sieve. Bring water to a rolling boil, then add the same amount of boiling water to the rice flour as when making songpyeon. Pound the dough a few times. Mix a small amount of rice wine with cold water—just enough to draw out the taste of the wine—then knead it thoroughly into the dough, adding a little sesame oil as you knead, until no lumps remain. Taste the dough: if the sour taste of wine comes through, then stretch the dough to check if it slowly returns to shape. If so, wrap it tightly in oiled paper and a wrapping cloth and place it in a warm room with a slight breeze.

When bubbles form, it is ready to be cooked. Stir-fry a mix of honeyed adzuki beans, dried ginger, and ground black pepper to make a filling. To prepare the tteok for cooking, open the bundle and tie the wrapping cloth to the rim of a steamer. Drizzle the adzuki bean filling in rows over the dough; if you spoon it, it will dribble into lumps. Then seal the dough over the filling, forming distinct pieces. Garnish with thinly sliced jujubes, dried persimmons, and half of a pine nut, then cover with a cloth and steam as when making sanghwa tteok. When the jujube rinds darken, the tteok is fully cooked. If a greener appearance is desired, add some angelica root powder to the dough. If your *makgeollii* (unfiltered rice wine) is not good, make your own ferment about 2 days ahead: mix cooked rice with good nuruk and ferment until it reaches the almost sweet but slightly bitter stage, filter it, and use the liquid for jeung pyeon."

5.4 Origin of Traditional Korean Sweets (*Hangwa*) and their Varieties

In food studies, *hangwa* are classified as confections (*gwajeongryu*). These treats are not as universal or as varied as *tteok*, but they have a similar history: they developed as agriculture progressed and the production of grains increased, especially among vegetarian Buddhist monks, during the Silla and Goryeo dynasties. Originally, *hangwa* were made by mixing honey with grains or fruit. When certain fruits or other natural ingredients were out of season, *hangwa* were made by shaping cooked grains to mimic the appearance of the fruit, with small twigs from fruit trees fashioned to look like fruit stems. Such specialized forms of *hangwa* became popular at weddings and banquets. Some were included with other food items as offerings at ancestral rites. Many became visually stunning delicacies favored by the upper class (Lee 1985). To distinguish this kind of Korean confection from sweets from other countries, they were called "hangwa," "han" referring to Korea, and "gwa" meaning fruit. Another name for *hangwa* is "*jogwa*," where "jo" means made or shaped, as opposed to "*saenggwa*," where "saeng" indicates fresh fruit. In sum, *hangwa* encompasses all kinds of manufactured sweets that substitute for fresh fruit (Yoon 1974).

The oldest written record of *hangwa* is found in *Samguk yusa* (Memorabilia of the Three Kingdoms), in "Biography of Kim Yu-Shin," a Silla general. In 613 a Goguryeo spy named Baek Seok falsely befriended Kim Yu-Shin and almost succeeded in kidnapping him, but the three guardian deities of the state appeared to Kim as women who offered him delicious rice sweets (*migwa*) and told him that Baek Seok was a spy, thereby thwarting a national crisis. In "Biography of Garakguk" there is a record of a queen who brings the ingredients for sweets to be made in preparation for her royal wedding, as well as a record of treats used as an offering at King Suro's rites table (Kim 2015).

References to specific types of *hangwa* in histories or other ancient writings in Korea are few, and, to complicate things, in given eras and regions they are referred to by different names. Nevertheless, most *hangwa* may be classified by production method and ingredients. Production methods have remained largely the same over time, and only small changes have occurred in terms of shape or ingredients. Table 5.3 divides the different types of *hangwa* according to the preparation method (Lee and Maeng 1987b).

5.4.1 Yumilgwa (Oil and Honey Confections)

All varieties of yumilgwa begin with the same ingredients mixed into dough, which is then molded into different shapes. These are referred to as yakgwa, dasikgwa, *mandugwa*, maejakgwa, bakgye, and more. As mentioned above, the techniques for making yumilgwa as found in historical texts remain the same today, with only minor variations in ingredients or shape. Typically, sesame oil and honey are added to wheat flour and kneaded firmly, then the dough is placed in a special mold or made into attractive shapes before frying in oil.

Jeongjoji (Pots and cutting boards) reads, "Wheat flour is kneaded with honey and oil until dough forms and then fried in oil. Rice cake made in this manner is called *hangu* [fried strands] and *geoyeo* [similar to yakgwa]. . . .When performing rites for their ancestors, the Easterners [a neo-Confucian school during the Joseon dynasty] add these to their ritual offerings" (Lee 1981b). This passage reveals that yumilgwa had become a valued component of ancestral offerings by the nineteenth century. Originally, yumilgwa made up part of the humble fare offered with prayers to the Buddha, but with the rise of the golden age of Buddhism during the Goryeo dynasty (918–1392), the avoidance of fish and meat allowed yumilgwa to increase in importance and frequency in offerings. Once fish and meat were approved for ceremonial rites again, some suggested that yumilgwa should be excluded; as of yet, however, the confection remains an essential part of ritual offerings (Yoon 1974).

Table 5.3 Classification of *Hangwa* by preparation method

Gangjeong **and** ***Sanja***: Dried, glutinous rice dough is fried until puffed and then dipped in a powdered coating. Varieties include the following: • Gangjeong: Thin layers of dried glutinous rice dough are fried until puffy, after which various coatings may be applied (soybeans, angelica, white or black sesame seeds, *maehwa* [puffed grains], pine nuts, pine flower, or cinnamon) and different shapes may be made (finger shapes, ball shapes, or pounded shapes). • Sanja: Dried glutinous rice dough is fried in oil, then *maehwa* (puffed grains) are attached with honey to the exterior. Slightly flattened, rectangular shapes are typical. Some are tinted with natural dyes. Types of sanja include *maehwa* sanja, puffed rice sanja, and buckwheat sanja. *Yeonsagwa* is another type, which includes *baemaehwa* (pear blossom), *hongmaehwa* (pink plum), and baekja (white, or pine nut). *Binsagwa* is another type (made with the small pieces leftover from making yeonsagwa), which includes *Baksan* (light sanja) and *yohwa* (water pepper flower). Yeonsagwa may be naturally dyed in "rainbow" colors (usually pink, green, and yellow).
Yumilgwa (oil and honey confections): Honey is kneaded into dough and shaped, then deep-fried and dipped in honey again. Varieties include *yakgwa* (fried honey cakes), *yeonyakgwa* (soft yakgwa), *dasikgwa* (patterned tea cakes), *maejakgwa* (fried ribbon cookies), small, medium, and large *bakgye* (rectangular honey cakes), and cinnamon ginger confections.
Dasik (patterned tea cakes): Honey is kneaded into grain flour with medicinal herbs, ground flowers, starch, or other raw edibles, and the dough is pressed into a dasik pattern mold. Varieties include starch, pine pollen, chestnut, sesame, black sesame, soybean, ginger, longan, arrowroot, acorn, potato, bracken, angelica, and rice.
Jeongwa (candied fruit): The roots, stems, or fruits of low-moisture plants are boiled for long periods of time in sugar water. Varieties include lotus root, green plum, apricot kernel, lilyturf, ginseng, citron, hawthorn, quince, pine, raisin, balloon flower root, *deodeok* root (bellflower family), winter melon, bog bilberry, apricot, peach, cherry, bamboo shoot, and scilla.
Suksilgwa (sweetened stewed fruit): Fruit that is ripened on the tree and then boiled in honey. • *Cho* varieties: After letting the fruit ripen on the tree, the shape of the fruit is maintained as when boiling in honey, but it is pan-fried instead. Examples include chestnut and jujube. • *Nan* varieties: After letting the fruit ripen on the tree, the fruit is mashed, boiled in honey, and then reshaped. Examples include chestnut balls, jujube balls, and ginger balls.
Gwapyeon (Fruit jellies): Honey and sour-tasting fruit are boiled together, starch is added, and the mixture is left to set until completely cool, after which it is sliced. Varieties include cherry, apricot, quince, pine nut, raspberry, wild grape, and ginger.
Yeotgangjeong (Crunchy nut candy): Whole, not ground, nuts and/or grains are boiled with taffy and mixed well. Varieties include sesame, black soybean, walnut, pine nut, and peanut.

Yakgwa is the most basic form of yumilgwa and is sometimes used as a collective term for the many different types of yumilgwa. *Joseon sangsik* (The Joseon table) records that "Yakgwa is the best of all sweets made during the Joseon dynasty. It is crafted with the utmost effort, and surely there is no confection in the world that compares to it." Yakgwa literally means "medicinal fruit," and as the text states further, "Wheat is the main ingredient of yakgwa, which means this treat has the excellent quality of being available spring, summer, fall, and winter; among the secondary ingredients, honey is the basis for a broad swath of medicines, and oil contains insecticidal and detoxifying properties." In Korea honey is considered to be medicinal, and thus honeyed wine is called *yakju* (medicinal wine), honeyed rice is called *yakbap* (medicinal rice), and honeyed fruit (or fruit-shaped honey cake) is called yakgwa (medicinal confection) (Jung 1973).

In *Gyuhap chongseo* (Women's encyclopedia), yakgwa is also referred to as *gwajul*, and *Aeongakbi* (Proper usage of the Korean language) reads, "Mix wheat noodle dough with honey and form it into fruit shapes such as chestnut, jujube, pear, or persimmon to make *jogwa* (molded confections)." In another text, "Sundry honey cakes" in *Daesangji* (cited in Jung 1973), yakgwa is simply called *hangwa*, and in this case, it is cut into squares.

During the Joseon dynasty yakgwa was frequently shaped somewhat like a small pancake: "For roughly-shaped yakgwa, form the wheat dough into flat, round pieces and then fry" (Choi 1948). *Ganbon gyuhap chongseo* (Women's encyclopedia, woodblock version, 1869) suggests "pressing the batter into a mold" to shape it, or "If you wish to make squares, prepare the dough accordingly." Further, *Joseon yori jebeop* (Korean cooking, Bang Sin-Young 1917) reads, "Shape by pressing the dough into a candy mold or pound with a wheat baton to the thickness of about three spoonfuls of wheat, then slice evenly to fry."

Recipes for yakgwa appear not only in *Gyuhap chongseo*, *Aeongakbi*, and *Joseon yori jebeop*, but also in *Ijo gungjung yori tonggo* (Recipes from the palace, Han et al. 1957) and many other cookbooks. In each cookbook, there are slight differences in the proportions of ingredients and preparation methods. Table 5.4 lists the ingredients for making yakgwa as recorded in various records (Lee and Maeng 1987b).

The yakgwa recipe in *Gyugon siuibang* calls for kneading wheat flour, honey, oil, and water, then shaping the dough, frying it, and soaking it in malt syrup. *Jubangmun* does not use oil, but rather adds honey, alcohol, and hot water to wheat flour for its yakgwa dough. Another method in this volume takes the roasted soybean flour that is used for molded confections, adds only honey to make the dough, and soaks it in malt syrup without frying (Hwang 1976). In *Gyugon siuibang*, *Jubangmun*, and *Siuijeonso*, dough is made by adding *suyucheong*, a mixture of sesame oil and honey, to boiling water. In later cookbooks, water is no longer used in yakgwa recipes (Lee 1981a). After *Gyuhap chongseo* (1815), yakgwa is made by mixing cinnamon, ginger, and citron juice with malt syrup in order to enhance the flavor, then soaking it in honeyed malt syrup. After draining the yakgwa, it is finished with a sprinkle of pine nut flour. *Joseon yori jebeop* was the first to introduce sugar syrup by boiling sugar in water for yakgwa, and since then sugar syrup has frequently replaced malt syrup in yakgwa recipes (Bang 1954).

5.4.2 Gangjeong and Sanja (Dyed, Puffed Rice Confections)

As gangjeong and sanja are mentioned in the 1611 text *Domundaejak* (Dreaming of good food at the butcher shop, a food critique by Heo Gyun), these confections must have been part of the *hangwa* panoply before the 1600s. *Gyuhap chongseo* and *Gyugon siuibang* also refer to gangjeong. *Dongguk sesigi* reads, "Gangjeong, in its variety of colorful hues, is used as a household offering during New Year's or spring festivities to represent a veritable parade of fruit, and it has become an indispensable New Year's gift for guests." *Seongho saseol* (Seongho Yi Ik miscellany, Yi Ik

Table 5.4 Yakgwa ingredients, per historical record

Record	Year	Wheat	Honey	Sesame oil	Alcohol	Other
Gyugon siuibang (A mother's cook-book for her daughter-in-law)	circa 1670	✓	✓	✓	✓	Boiling water
Yorok (vital record [of medicinal foods])	1680	✓	✓	✓	cheongju (refined rice wine)	
Jubangmun (how to make and cook with rice wine)	Late 1700s	✓	*chongmil* (another word for honey)	—	cheongju (refined rice wine)	Hot water
Jubangmun #2		Roasted soybean flour	✓	—		
Gyuhap chongseo (Women's encyclopedia)	1815	✓	✓	✓	*soju* (distilled spirits)	Cinnamon, pepper, dried ginger, ginger juice, pine nut flour
Siuijeonseo (compilation of correct cooking methods)	Late 1800s	✓	✓	✓	yakju (medicinal/herbal wine), soju	Boiling water, pine nut flour, cinnamon
Joseon yori jebeop (Korean cooking)	1917	✓	Sugar	✓	—	Cinnamon
Buin pilji (necessities for every wife)	1915	✓	✓	✓	soju	Cinnamon, dried ginger, pine nut flour

[1681–1763]) states, "The term *wonil cheon-gyeon* (New Year's offering), used in the Dongnae sacred rites, refers to gangjeong, and the phrase *hyein isik* as found in *Zhouli* (Rites of Zhou) means fermented offering, which is also a variety of gangjeong." Finally, *Yeolyang sesigi* (A record of seasonal customs in Seoul) affirms that "Household ritual offerings to ancestors are never complete without gangjeong" (Jung 1973).

According to Kim Jung-Man's research, there are over 23 different names for gangjeong and sanja, each of which carries its own nuance (Kim and Yang 1982). This plethora of names stems from the oral transmission of the terms over a lengthy period of time. Confusion may ensue when the same kind of *hangwa* is referred to by different names, or when different *hangwa* are referred to by the same name. For example, in the 1976 edition of *Hanguk-eo daesajeon* (Korean language encyclopedia, Jung et al. 1976), the first definition of gangjeong reads as follows: "Dough is made by kneading together fermented, dried glutinous rice flour with rice wine, then slicing it into pieces that are 1 cm wide and 2 cm long. The dough is then dried and fried in oil. Rice syrup or honey is applied, after which the pieces are rolled in sesame seeds, ground peanuts, ground pine nuts, or pine pollen. This is a type of yumilgwa." Definition two reads, "A Korean traditional treat made from sesame seeds or soybeans mixed with rice syrup, also known as yeot (taffy) gangjeong, a different product of the same name." Gangjeong and sanja are also sometimes referred to as *yugwa*. "Yugwa" is defined as an abbreviation of "yumilgwa" in *Hangugeo daesajeon* (Unabridged Korean language dictionary) and *Urimal keun sajeon* (The big dictionary of Korean language), thus creating confusion around the classification of yakgwa, gangjeong, and sanja. The appellations above may overlap with each other because some are homophones of different *hanja* (Chinese characters used in the Korean language). This bewildering lack of standard classification makes it difficult to correctly disseminate information about Korea's confectionary culture abroad.

Sanja is usually found coated in *maehwa* (puffed rice), while gangjeong coatings include *maehwa*, white sesame seeds, black sesame seeds, and others. Sanja and gangjeong differ only in appearance—the basic recipe is the same. *Gyugon siuibang* (A mother's cookbook for her daughter-in-law) contains a descriptive recipe: glutinous rice flour is mixed with rice wine and soybean milk to make dough, after which it is steamed, pounded until bubbles arise, rolled, dried, and then fried in oil until it puffs up. Finally, the pieces are drizzled with honey water and dipped in white sesame seeds, colorful puffed rice, or powdered angelica coating. *Aeongakbi* (Proper usage of the Korean language) reads, "Mix strong wine with glutinous rice flour to make *tteok* dough; slice it thinly and wait for it to dry. If it floats in the frying oil, the pieces will turn out big and round. *Dongguk sesigi* provides the following recipe: "Knead rice wine into glutinous rice flour, cut it into large and small pieces, and dry these in the sun. When frying in oil, let the pieces puff up like a cocoon so that the interior is hollow. To make many-colored gangjeong, coat the exterior with white sesame seeds, black sesame seeds, white bean powder, or green bean powder mixed with syrup; for pine gangjeong, use ground pine nuts; for maehwa gangjeong, pop glutinous rice grains over a fire and attach them to the confection in the shape of a flower." *Yeolyang sesigi* (A record of seasonal customs in Seoul) reads, "Make gangjeong dough by mixing glutinous rice flour with pure wine unadulterated by water. Slice it thinly, like tteok, and place the pieces into boiling oil. The shape will look like a silkworm cocoon. Remove from oil, then drench in syrup and attach roasted sesame seeds or roasted soybean powder."

Gyuhap chongseo (Women's encyclopedia) offers this recipe: "Make glutinous rice flour, being sure not to contaminate it with nonglutinous rice when grinding, then strain it through a fine sieve several times. For a slightly sweet taste, knead in some honey mixed with rice wine, as when making bukkumi. Steam the batter, stirring occasionally, until it is cooked through, then add three or four spoonfuls of honey. Pound until bubbles arise, cover it with white powder, and slice. Lay out the paper in a warm room with floor heating (*ondol*) and spread the gangjeong pieces on it, adjusting the shapes as you go, turning frequently until completely dry. As each piece dries, place it in a bowl and continue to dry overnight. Next, take the wine used to make the dough and douse the pieces with it until they become soaked, then place them in another bowl, cover with a cloth, and let them rest awhile. If any pieces stick together, pull them apart to avoid spoilage and reshape as needed. Let them air out a little, and then when half-dried, fry them in oil. Use two bowls to fry the gangjeong in an oil bath over low heat, pressing the pieces down with a spoon and stirring for a long time. When the oil starts to bubble, increase the heat. Spoon more oil over the gangjeong, as needed, until it reaches a full pop. If the rice is not good, or if only one bowl of oil is used, it will not pop well. Pour cinnamon honey boiled in ginger juice over the fully popped ganjeong. Rather than cover each piece individually, let them bunch together. Take a fine sieve and sprinkle green soybean powder over the honeyed gangjeong until completely covered. The taste is extraordinary."

The *Gyuhap chongseo* recipe above is by far the most detailed, and the others, although simple, demonstrate the common technique of adding rice wine to make dough, steaming it like *tteok*, and pounding until bubbles form before cooking it in oil. These techniques have been passed down through time and remain the same today.

As seen in Table 5.5, the main ingredient in the gangjeong and sanja recipes above is glutinous rice; rice wine and soybean oil are mixed in to make dough; and the heating medium is oil. *Gyuhap chongseo* also has a recipe for replacing the glutinous rice flour with a mix of buckwheat flour and wheat flour. This implies that less expensive grain flours could be substituted for pricier glutinous rice flour.

In these texts, the degree to which the glutinous rice soaks in wine is expressed variously, with phrases such as "until it decomposes," "until it spoils," "until it sours," and "until it gives off a sour smell." The authors suggest steeping the rice 2–14 days, not only to achieve maximum absorption, but also to begin the process of lacto-fermentation.

Table 5.5 Gangjeong ingredients, per historical record

Record	Year	Glutinous rice	Rice wine	Oil
Seongho saseol	1681–1763	✓	✓	✓
Aeongakbi	1819	✓	✓	✓
Yeolyang sesigi	1819	✓	✓	✓
Dongguk sesigi	1849	✓	✓	✓
Gyuhap chongseo	1881	✓ (buckwheat)	Honeyed rice wine	✓
Urinara eumsik mandeuneun beop (how to cook Korean food)	1954	✓	✓	✓

5.4.3 Dasik (Patterned Tea Cakes)

According to *Seongho saseol* (Seongho Yi Ik miscellany), dasik might originate with the large and small dragon medallion molds used at national festivals during the Song dynasty (960–1279), which, in turn, derived from the boiled tea leaves made for religious rites (Yoon 1974). In Korea too, dasik once referred to ceremonial tea used in ancestral rites. Now the substance has changed (tea cakes rather than tea), and only the name remains (the "da" in "dasik" is the character for "tea").

The explanation in *Gyugon siuibang* (A mother's cookbook for her daughter-in-law) of how to make dasik is unique. First, wheat flour is roasted, then honey, oil, and refined rice wine are added to make dough. When the dough is ready to ferment, it is placed onto a tile spread with sand, and another tile is placed as a lid on top. In *Sallim gyeongje* (Farm management, Hong Man-Seon c. 1715), the fermentation method is different: "Lay paper across the fry pan and place the dough on top. When it turns light yellow, remove it." In a section called "Jogwasik" (molded confections) in *Taesangji* (Encyclopedia of traditional Korean customs, Seong Dae-Jung 1766) jeon (fried) dasik is said to be pressed into a mold for shaping and then pan-fried in oil. This differs from today's method, in that the rice cake was fried after molding. Beginning with *Jeungbo sallim gyeongje* (Revised farm management, Yu Jung-Im 1766), the recipe for dasik is the same as that used today. Grain flour, herbs, pollen, starch, or other flour that can be consumed raw is mixed with honey until well incorporated, then the dough is pressed into any of a variety of shapes in a mold board. *Aeongakbi* reads, "Sometimes dasik is referred to as *indan*, and the dough is made by mixing chestnuts, sesame seeds, and pine pollen with honey, then pressing pieces of the dough into a mold to make shapes like flowers, leaves, fish, or butterflies. Long ago, rice or wheat flour was used in making dasik."

Ingredients frequently employed in making dasik include dried chestnuts, pine pollen, soybeans, angelica, and mixed fruit (a combination of chestnut, jujube, persimmon, walnuts, etc.). Dried ginger pulp, arrowroot, or other starch dasik are made using ginger starch, kudzu root starch, or mung bean starch, and starch dasik in particular is usually dyed with five-flavor berry (schisandra) juice. *Gyuhap chongseo* mentions dried, peeled chestnut dasik, longan dasik, black sesame dasik, and starch dasik, and prefers honey and sugar as coagulants. Distinctively, the dasik recipes in *Eumsik beop* (How to cook, 1843) are made with animal ingredients such as herring, croaker, or flatfish. Coagulants used in this type of dasik include sesame oil and water, and black pepper is added to enhance the flavor. Table 5.6 lists the types of dasik that appear in each historical text.

5.4.4 Jeongwa (Candied Fruit)

Traditionally, every New Year's Day festival includes jeongwa (or *jeonggwa*) as part of its celebratory food. The stem, root, or fruit of a plant with low-water content

Table 5.6 Types of Dasik, per historical record

Record	Type of Dasik (Tea Cake)
Gyuhap chongseo	*Hwangnyul* (dried and peeled chestnut), *yongannyuk* (longan), *heugimja* (black sesame), *nongmal* (starch)
Siuijeonseo	*Heugimja* (black sesame), *songhwa* (pine pollen), *hwangnyul* (dried and peeled chestnut), *galbun* (arrowroot), *nongmal* (starch)
Eumsik beop	*Gangbun* (dried ginger starch), *hwangnyul* (dried and peeled chestnut), *heugimja* (black sesame), *jineom*, *nongmal* (starch), *jat* (pine nut)
Sul mandeuneun beop	*Japgwa* (mixed fruit), *saengsil* (pine nut) *songhwa* (pine pollen), *danggui* (Chinese angelica), *yongannyuk* (longan)
Buin pilji	*Ganchi* (herring), *poyuk* (halibut), *gwangeo* (flatfish)

is boiled down with starch syrup or honey until it becomes a chewy, sweet confection, as follows: Stems or roots are thinly sliced and blanched in boiling water, then drained. The plant is coated in dissolved sugar and cooked at length over low heat. When completely cooled and congealed, the sweets are placed in rows on a dish. At most festivals, more than one kind of jeongwa can be found on a feast table, where the confection is presented on flat dishes. For ritual offerings, however, dishes with legs are used to elevate the jeongwa.

The jeongwa recipe in *Aeongakbi* calls for honey, the sweetener most commonly used to make jeongwa. *Gyuhap chongseo* provides detailed directions on how to make jeongwa, including a standard recipe for cooking with honey, as well as one in which the ingredients are marinated in honey. In the 1843 book *Eumsik beop* (How to cook), sugar is used in place of honey for the first time on record, in a recipe for cooked potato jeongwa (Cho et al. 1984). Thirty-four new recipes for jeongwa were introduced in nineteenth-century cookbooks, among which lotus root jeongwa appears to have been a favorite. Types of jeongwa as they appear in historical records are listed in Table 5.7.

5.4.5 Suksilgwa (Sweetened Stewed Fruit)

Suksilgwa is made by cooking roots or ripe fruit, especially chestnut and jujube, in honey. Types of suksilgwa containing the word “cho,” as in chestnut cho or jujube cho, are the most well-known. “Cho” indicates a method in which the fruit is reduced by roasting. Chestnuts are washed with the hull intact and cooked for 40 min, while jujubes cook until well done, for about 2 h. When thoroughly soft, the chestnuts are peeled, but the jujubes are left intact for the next step. Both are mixed with honey, then boiled down for 30 min, taking care not to burn while simmering. Finally, cinnamon powder is stirred into the confection. Chestnuts must be watched carefully to ensure their color does not change, and jujubes must not scorch, but should be cooked until glossy. These two confections—chestnut and jujube suksilgwa—are always placed together, like twins, and tend to be presented on a festival platter with

Table 5.7 Types of Jeongwa, per historical record

Record	Type of Jeongwa (Candied Fruit)
Gyugon siuibang	*Sun* (watershield)
Gyuhap chongseo	*Gamja* (potato), *mogwageoreun* (quince), *mogwajjok* (quince pieces), *sun* (watershield), *seongdonggwa* (wax gourd), *sansajjok* (hawthorn berry), *saenggang* (ginger), *ikhindonggwa* (ripe winter melon), *waegamja* (citrus), *yuriryu* (hawthorn berry juice), *yeongeun* (lotus root), *yuja* (citron), *cheonmundong* (Korean asparagus)
Siuijeonseo	*Gamja* (potato), *mogwageoreun* (quince), *haengin* (apricot kernel), *deuljjuk* (bog bilberry), *cheongmae* (green plum), *sansajjok* (hawthorn berry), *saenggang* (ginger), *insam* (ginseng), *yeongeun* (lotus root), *yuja* (citron), *bae* (pear), *dorat* (balloon flower root)
Gyugon Yoram (Yonsei University copy)	*Mogwa* (quince), *sansa* (hawthorn), *saenggang* (ginger), *yeongeun* (lotus root), *hyangnin* (apricot kernel)
Eumsik beop	*Cheongmae* (green plum)
Buin pilji	*Sansajjok* (hawthorn berry), *mogwa* (quince), *donghwa* (winter melon), *yeongeun* (lotus root), *saenggang* (ginger)

colorful jeongwa or other types of suksilgwa, such as chestnut balls (yuran), jujube balls (joran), or ginger balls (saengnan).

Yulran and joran are types of suksilgwa made by first removing the seeds or pit of a fruit and then cooking the flesh until soft. Next, the fruit is pounded in a mortar and pestle, strained through a coarse sieve, and mashed. After cinnamon powder and honey are added, the mash is boiled until all the water evaporates and the fruit congeals. When cool, the confection is shaped to resemble chestnuts or jujubes, after which it is basted with or dipped in syrup and then ground pine nuts. Yulran (chestnut ball) is made by kneading honey together with dried chestnut powder, then shaping it to look like a chestnut. The chestnuts are cooked all day and night until they turn into paste, which is then kneaded with cinnamon powder. Yulran is easier to make when all the water has been cooked out of the chestnuts, and their appearance is also better. While kneading and adding honey a little at a time, care must be taken that the dough does not become too thick.

For joran (jujube ball), jujubes are lightly steamed and then peeled. The skins are finely minced. These are mixed with cinnamon powder and boiled, then shaped to look like a jujube again. A single pine nut is inserted into the end of each piece. Saengnan (ginger ball) is variously called "gangsaengnan," "saenggangnan," or "gangnan," and these refined confections often graced the royal table. Now saengnan is appears more broadly, usually at joyous, grand celebrations such as weddings, 60th birthdays, and 60th wedding anniversaries. Although ginger is not a fruit, its aromatic flavor suits this elegant confection, particularly when paired with chestnut balls and jujube balls. In summer the quality of ginger is somewhat lower because it is dried, but fresh new ginger harvested in the fall is perfect for making saengnan. To make saengnan, ginger is soaked in water, rubbed to clean off any mud, and then peeled and cut into thin slices. Next, the slices are ground up, strained through a sieve, and placed in a pot into which honey is added before cooking. Once the concoction boils down almost completely, and only a little moisture remains, more honey is added to the resultant ginger starch, and once this congeals, it rests and cools. Small chunks are plucked from the congealed mass, formed into 3-pronged ginger shapes, and dipped into ground pine nuts.

5.4.6 Gwapyeon (Fruit Jellies)

For *gwapyeon*, sour fruit such as wild cherry, quince, or apricot are honeyed and left to congeal like jam, then sliced into squares. Starch is sometimes used to help the *gwapyeon* congeal sufficiently. Wild cherries, Korean blackberries, apricots, cherries, and mandarins must be boiled, strained, and then mixed with starch until almost a paste, at which point honey or sugar is added and the mixture is boiled for a while, then poured out onto a flat dish and left to harden. Once firm, it is sliced into squares. For schisandra berry (five-flavor berries) *gwapyeon*, the berries are washed and soaked in water for a day to infuse the water with a reddish hue. After the water is strained, starch and sugar are added and mixed well. The mixture is set over a low fire and stirred slowly with a wooden spoon until congealed, after which it is poured into a deep, square dish to let cool and solidify.

5.4.7 Yeotgangjeong (Crunchy Nut Candy)

Yeotgangjeong consists of roasted pine nuts, walnuts, peanuts, or other nuts with toasted seeds such as black sesame or perilla, or lightly roasted green or black (freeze-dried) soybeans, mixed with a sweetener. The healthy fats, protein, and minerals in the nuts and seeds infuse yeotgangjeong with nutrients. Nuts and grains are not ground, but left whole to be mixed with syrup made of rice, corn, or another starch. Once left to set, the candy is usually cut into rectangular bars and served. Although starch syrup is the adhesive that holds everything together, there are more nuts and seeds than syrup in yeotgangjeong.

References

Bang, Sin-Young. 1917. *Joseon yori jebeop* [Korean cooking]. Seoul: Sinmunsa.

———. 1954. *Joseon yori jebeop* [Korean cooking]. Seoul: Jangchung Publishing.

Cho, Chang-Suk. 1976. Hanguk ui byeongiryu go [Korean cookies and cakes]. *Geonguk daehakgyo haksulji* [Konkuk University Journal] 20: 337.

Choi, Nam-sun. 1934. *Gosatong* [A collection of ancient stories]. Seoul: Samjungdang.

———. 1948. *Joseon sangsik* [The Joseon table]. Seoul: Hyeonamsa.

Cho, Sin-Ho, Gang Yu-Jeong, and Hyo-Ji Lee. 1984. Yeongeun jeonggwa ui jaeryo mit joribangbeope gwanhan yeongu [A Study on the Ingredients Preparation Method of Lotus

Root Jung Kwa (sic)]. *Hanguk yeongyang singnyanghakhoeji*. [Journal of the Korean Society of Food Science and Nutrition] 13 (1): 42–50.
Han, Hui-Sun, et al. 1957. *Ijo gungjung yori tonggo [Recipes from the palace]*. Seoul: Hakchongsa.
Hangukhak jungang yeonguwon [Academy of Korean Studies], ed. 1991. *Hanguk minjok munhwa daebaekgwasajeon [Encyclopedia of Korean culture]*. Seoul: Hangukhak jungang yeonguwon.
Hong, Seok-Mo. 1849. *Dongguk sesigi* [Korean seasonal customs]. Modern Korean edition: Hong Seok-Mo. 1972. *Dongguk sesigi* (trans: Lee Seok-Ho). Seoul: Daeyang Books.
Hwang, Hae-Sung. 1976. *Hanguk yori baekgwasajeon* [Encyclopedia of Korean cuisine]. Seoul: Samjungdang.
———. 1986. *Jeontong ui mat, tteok, hangwa, uemnyo* [The taste of Korean rice-cakes, cookies, and beverages]. Seoul: Jubusaenghwalsa.
Ilyon. 1285. *Samguk yusa [Memorabilia of the Three Kingdoms]. Modern Korean edition (trans: Lee Min-Su 2013)*. Seoul: Eulyumunhwasa.
Jung, In-Seung, Yang Ju-Dong, and Lee Sung-Nyeong. 1976. *Hanguk daesajeon* [Unabridged Korean dictionary]. Seoul: Committee for Korean Dictionary Publication.
Jung, Sun-Ja. 1973. Urinara byeonggwaryue gwanhan sogo [A review of Korean cookies]. Master's Thesis Collection, Danguk University.
Jung, Yak-Yong. 1819. *Aeongakbi* [Proper usage of the Korean language]. Modern Korean edition: Jung Yak-Yong. 1976. *Aeongakbi* (trans: Kim Jong-Kwon). Seoul: Iljisa.
Kang, In-Hee. 1983. *Hanguk siksaenghwalsa* [Korean food history]. Seoul: Samyoungsa.
Kim, Bu-Sik. 1145. *Samguk sagi* [History of the Three Kingdoms]. Modern Korean edition: Kim Bu-Sik. 1145. *Samguk sagi* (trans: Kim Jong-Kwon). Seoul: Daeyang Publishing.
Kim, Jung-Man, and Yang Hee-Cheon. 1982. Busugaee gwanhan yeongu [Studies on Busugae]. *Food Science* 15 (2): 33.
Kim, Kyu-Heun. 2015. *Hanguk ui jeontong gwaja* [Traditional Korean sweets]. Seoul: MID.
Kim, Man-Sun. 1819. *Yeolyang sesigi* (A record of seasonal customs in Seoul). Modern Korean edition: Kim Man-Sun. 1972. *Yeolyang sesigi* (trans: Lee Seok-Ho). Seoul: Daeyang Publishing.
Kim, Won-Ryong. 1986. *Hanguk gogohak gaeseol* [Establishing Korean archeology]. Seoul: Ilgisa.
Lady Jang of Andong. 1670. *Gyugon siuibang/Eumsik jimibang* [A mother's cookbook for her daughter-in-law]. Modern Korean edition: Lady Jang of Andong. *Gyugon siuibang* (ed: Hwang Hae-Sung). Seoul: Hanguk-inseo Publishing.
Lady Yi, Bingheogak. 1809. *Gyuhap chongseo* [Women's encyclopedia]. Modern Korean edition: Lady Yi Bingheogak. 1975. *Gyuhap chongseo* (trans: Chung Yang-Won). Seoul: Bojinje.
Lee, Byeong-Do and Choi Tae-Young. 1989. *Hanguk sanggosa ibmun* [Introduction to Korea's ancient history]. Seoul: Goryeowon.
Lee, Cherl-Ho. 2001. *Fermentation Technology in Korea*. Seoul: Korea University Press.
Lee, Cherl-Ho and Kwon Tai-Wan. 2003. *Hanguk sikpumhak ibmun* [Introduction to Korean food science] Seoul: Korea University Press.
Lee, Cherl-Ho and Maeng Young-Sun. 1987a. Hanguk tteoke gwanhan munheonjeok gochal [A Literature Review on Korean Rice-cakes. *Hanguk singmunhwahakheoji* [Journal of the Korean Society of Food Culture] 2(2):117–132.
Lee, Cherl-Ho, and Maeng Young-Sun. 1987b. Hangwaryu ui munheonjeok gochal [A Literature Review on Traditional Korean Cookies, *Hankwa* (sic)]. *Hanguk singmunhwahakheoji*. [Journal of the Korean Society of Food Culture] 2 (1): 55–69.
Lee, Cherl-Ho, Rhee Sook-Jong, and Kim Mi-Ryung. 2015. *Ssal ui hyeongmyeong* [The rice revolution] Seoul: Sikanyeon.
Lee, Chun-Nyoung. 1965. Hanguk nongeop gisulsa [History of agricultural technology in Korea]. In *Hanguk munhwasa daegye III* [Encyclopedia of Korean Culture]. Seoul: Korea University Research Institute of Korean Studies.
Lee, Hyo-Gee. 1981a. *Siuijeonseo* ui jeongnihakjeok gochal [A Study on the Book Siuejunsuh (sic)]. *Daehan gajeonghakhoeji* [Journal of the Korean Home Economics Association] 19 (3):47.

Lee, Hyo-Gee. 1985. *Joseonwangjo Gungjung Yeonhoieumsikui Bunseokjeokyeongu* [An analytical study on the Royal cusine in Joseon Kingdom]. Suhaksa.

Lee, Jong-Wook. 1999. *Hanguk godaesa ui saeroun chegye* [A new system of ancient Korean history] Seoul: Johapgongdongche Sonamu.

Lee, Sung-Woo. 1978. *Goryeoijeon Hanguk siksaengwhalsa* [The history of Korean dietary life before Goryeo]. Seoul: Hyangmunsa.

Lee, Sung-Woo. 1981b. *Hanguk sikgyeongdaejeon* [Dictionary of Korean meals]. Seoul: Hyangmunsa.

Lee, Sung-Woo. 1984a. *Hanguk sikpumsahoesa* [Social history of Korean food]. Paju: Kyomunsa.

———. 1984b. *Hanguk sikpummunhwasa* [Cultural history of Korean food]. Paju: Kyomunsa.

Munhwajae gwalliguk [Cultural Heritage Administration]. 1984. *Hanguk minsok jonghapbogoseo 15: hyangto eumsikpyeon* [Korean folklore comprehensive report 15: native foods]. Seoul: Ministry of Culture and Communication.

Nahm, Andrew C. 1988. *Korea, Tradition and Transformation*. Elizabeth, NJ: Hollym International Corp.

Northeast Asian History Foundation. 2007. *Goguryeo, Dongbugayeoksajaedan* [Koguryo: A Glorious Ancient Korean Kingdom in Northeast Asia]. Seoul: NAHF.

Shin, Chae-Ho. 2006. *Joseon sanggosa* [Ancient Korean history]. Seoul: Biboong Publishers.

Shin, Young-Hun, et al. 1972. Hanguk ui munyang [Korean patterns]. *Gonggan* 70: 1–9.

Yoon, Nae-Hyun. 2015. *Gojoseon yeongu* [Gojoseon research] I, II. Seoul: Mankwondang.

Yoon, Seo-Seock. 1974. *Hanguk sikpumsa yeongu [Korean food history research]*. Seoul: Singwang Publishing.

Yoon, Seo-Seock et al., trans. 1993. *Jeminyosul* [Essential skills to benefit the people]. Seoul: Minumsa. Chinese edition: Jia Sixie. c. 550. *Qimin yaoshu.*

Yu, Deuk-Gong. Late 1700s. *Gyeongdo japji* [Customs of the capital]. Modern Korean edition: Yu Deuk-Gong. 1972. *Gyeongdo japji* (trans: Lee Seok-Ho). Seoul: Daeyangseojeok.

Chapter 6
Soybean Sauce Culture on the Korean Peninsula

Abstract As nomads from Northeast Asia moved south and settled into a tribal agrarian lifestyle with indigenous peninsular peoples, food culture slowly began to transform from being meat-based to vegetable-based. Widely-distributed soybeans came to replace meat as a major source of protein. Fermented soybeans would have played the important role of adding savory flavor to the bland staple foods prevalent at the time, rice and barley. Korean ancestors married the cereal alcoholic fermentation and salt preservation techniques from the days of Primitive Pottery culture with soybean fermentation. This chapter elucidates the origin and dissemination of soybean sauce, distinguishing between Korean *jang* and Chinese *shi*, and the characteristics of Joseon jang and specialty sauces in Korea.

As nomads from Northeast Asia moved south and settled into a tribal agrarian lifestyle with indigenous peninsular peoples, food culture slowly began to transform from being meat-based to vegetable-based. Widely-distributed soybeans came to replace meat as a major source of protein. At the same time, soybeans became the basis of many fermented food products. Fermented soybeans would have played the important role of adding savory flavor to the bland staple foods prevalent at the time, rice and barley. Korean ancestors married the cereal alcoholic fermentation and salt preservation techniques from the days of Primitive Pottery culture with soybean fermentation, so that by the early Three Kingdoms period (57 BCE–668 CE), the five types of fermentation culture underpinning Korean foodways today had already been completely formed: rice wine, *sikhae* (lactic acid fermented fish), fermented soybean sauces, fermented vegetables (kimchi), and *jeotgal* (salt-fermented seafood). These fermented foods governed the palate of Koreans for thousands of years, and today Koreans continue to enjoy the flavors and traditions of fermented foods.

C.-H. Lee, *Korean Food and Foodways*,
https://doi.org/10.1007/978-981-19-0023-5_6

6.1 East Asian Food Culture

Toward the end of the Neolithic era, the Dongyi tribes initiated the use of soybeans as food. Eating them cooked and in fermented sauces supplied protein and flavor to their grain-based diet. The nutritional boon these soybean-based fermented foods imparted is judged to have had an outsized influence on the historical development of the Han Korean tribes living in southern Manchuria and Korea. Increased consumption of high-protein soybean foods and fermented sauces enhanced the nutritional profile of the Han people such that they physically grew into an elite group during the founding of early nations in Northeast Asia. Archeological sites of the Liao River civilization, including Hongshan culture, and histories of Goguryeo attest that the Dongyi tribes' establishment of Gojoseon spearheaded advanced culture in the region. The dietary use of fermented soybeans was introduced to China in the seventh century BCE, and by the Han dynasty (206 BCE–220 CE), fermented soybeans, called *chi* (Kor. *si*), had already been broadly disseminated there. *Doenjang* (fermented soybean paste), a native Korean dish, was introduced to Japan as *maljang* in about the eighth century CE, during the Nara period. Naomichi Ishige, a food culture historian, divides East Asia into fish sauce culture and soy sauce culture, with Northeast Asia belonging to the latter (Ishige 1993; see Fig. 6.1). This demonstrates the enormous influence the fermentation techniques of Korea had on Northeast Asian culture formation (Lee and Kwon 2003; Lee 2021).

6.2 The Origin and Dissemination of Jang (Fermented Soybean Sauces)

The first mention of jang on Korean record appears in the third year of King Sinmun of Silla (683 CE) in *Samguk sagi* (History of the Three Kingdoms): Prior to the marriage of Kim Hun-Eum's daughter, the ceremonial wedding greeting (*pyebaek*) sent to the groom's family comprised 135 cartfuls of gifts, including rice, oil, rice wine, honey, jang, si, and meats. Although this is the first occasion of the terms "jang" and "si" found in Korean literature, fermented sauces existed long before the advent of writing, and references to *jiang* (Kor. jang) and chi (Kor. si) have been found in early records discovered at Mawangdui archeological site from Han dynasty China (Lee and Kim 2016).

In light of the phrase "he did not eat meat without its sauce [jiang]," found in book 10 of *Lunyu* (*The Analects of Confucius*, c. 450 BCE), it appears that fermented soybean sauces were already well-known during the Spring and Autumn period (771–476 BCE). Other Chinese records mentioning jiang include *Zhouli* (*The Rites of Zhou*, c. 300 BCE), which contains the phrase "120 *dong* (a unit of measure) of jiang," and *Shiwu jiyuan* (The origin of things, 1197), which states that "The Duke of Zhou [d. 1032 BCE] made jiang." However, some scholars refute the idea that the meaning of "jiang" in these texts refers to a sauce made of soybeans. Many instances

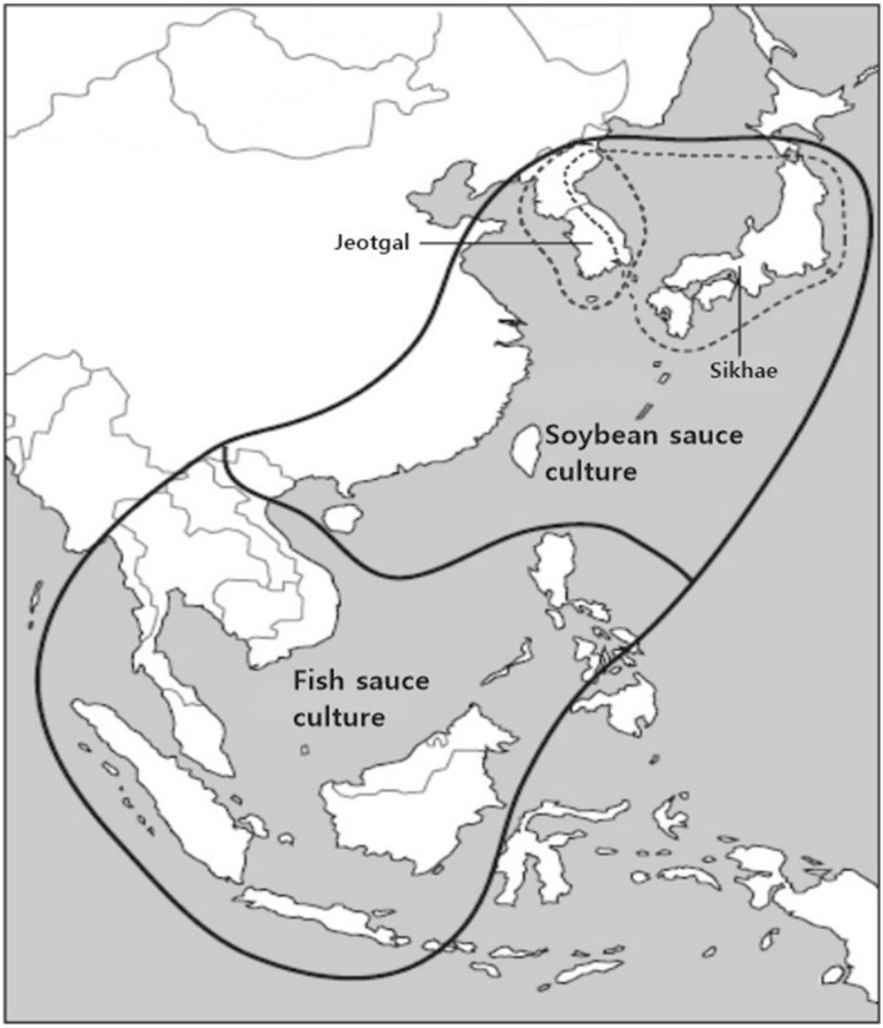


Fig. 6.1 Division of seasoned food culture in East Asia (Ishige 1993, modified by Lee 2021)

of "jiang" in ancient Chinese records may refer to yukjang (fermented meat sauce) (Lee and Kim 1998).

In the Goguryeo section of the "Dongyi biography" found in the "Book of Wei" of *Sanguozhi* (Records of the Three Kingdoms, c. 200 BCE), the people of Goguryeo are described as "*shan jiang niang*," or "people who make good fermented soybean sauces." *Haedong yeoksa* (History of Korea, 1823) quotes *Xin Tang shu* (New Book of Tang, 1060) as distinguishing "Chaekseong chi" from other chi (Kor. si), the former being a specialty item that hailed from Chaekseong, capital of Balhae (698–926, a kingdom founded by a defeated general of Goguryeo). Archeological evidence of jang includes a third-century mural from Anak Tomb

(North Korea) that depicts an earthenware crock typically used to contain fermented sauce. These sources situate fermented seasoning sauces as a well-known food product in the culture of their times. Unfortunately, documentation of specific kinds of fermented soybean sauces is not found until the later generations of the Goryeo dynasty (918–1392). One record from the Silla dynasty during the reign of King Weonseong (785–798) mentions si, and one from Goryeo reveals that si was used as a famine food (Chang 1993).

Although documentation of "chi" appears in Chinese literature earlier than "si" does in Korean records, the only seasoning flavors mentioned in the Confucian classic *Shangshu* (Book of documents, 551–479 BCE) are *yan* (salt) and *mei* (sour). In both *Li ji* (Book of Rites, 1046–256 BCE) and *Chu ci* (Songs of the South, Qu Yuan and Song Yu 200 s BCE), the query "What is chi?" appears. An Eastern Han dynasty (25–220 CE) dictionary, *Shuowen Jiezi* (Explaining graphs and analyzing characters, 100 CE), describes chi as "peiyan rushu," or salt-pickled beans. This likely refers to "soybeans fermented in a dark place with salt added," which is similar to the *cheonggukjang* traditionally produced in Korea. A detailed description of this dish appears in *Qimin Yaoshu* (Essential skills to benefit the people, Jia Sixie c. 544), one of China's first agricultural treatises, during the Northern Wei dynasty, a kingdom that engaged in significant cultural exchange with Goguryeo (Yoon et al. 1993). Meanwhile, the Jin dynasty record *Bowuzhi* (Records of diverse matters, Zhang Hua c. 290 CE) states, "There is chi in foreign lands," and likewise, *Bencao gangmu* (Compendium of *Materia medica*, Li Zhizhen 1596) lists chi as a foreign food product. The Song dynasty text *Xuezhai zhanbi* (Simple observations, c. 1240) reads, "There is no mention of 'chi' in *Buddha's Nine Discourses*, but the word is used in the local vernacular" (Lee and Kim 1998).

These concepts—the Dongyi peoples being first to use soybeans as food, fermented soybean sauces being a specialty of Goguryeo, the crock in the northern Korean tomb mural indicating fermented food storage, King Sinmun of Silla's "si," and the famous "Chaekseong si" from Balhae—all point to a long history of fermented soybeans in Korea, rooted in the northern regions of the country. In Korea "si" may refer to cheonggukjang (fermented soybeans) or *meju* (fermented soybean starter), but it was introduced to Han China (206 BCE–220 CE) as "salt-preserved beans" (chi). A fermented soybean sauce called *maljang*, which may also appertain to today's meju, developed in the southern region of Manchuria. Cheonggukjang is made by fermenting soybeans for a short period of time in a warm place (ca. 40 °C); maljang, on the other hand, requires soybeans to be aged at room temperature over a long period of time in a bath of saltwater. Maljang crossed the sea into Japan and became what the Japanese now call miso. This evidence suggests, then, that the jang of Goguryeo instigated a robust culture of fermented soybean products in the three countries of East Asia that continue to be enjoyed today (Lee 1992).

The fermented soybeans and sauces, including si, made by the Dongyi tribes on the Korean peninsula developed in diverse ways after being introduced to China. For example, *Qimin Yaoshu* describes a number of chi recipes. As mentioned above, Korean doenjang (fermented soybean paste) was introduced to Japan during the

Nara period (710–784). In *Taihō ritsu ryō* (Taihō code, 701) the Chinese characters for jang, si, and maljang appear, and although the characters representing each of these words are different, they were read as homophones in Japanese: "miso." In a Joseon translation dictionary encompassing five languages (*Bangeon jipseok*, 1766), the Korean word "jang" is listed as *wid* in Chinese, *misun* in Manchu, *wid* in Mongolian, and *miso* in Japanese. Dr. Lee Sung-Woo (1990) designed a flow chart indicating the different types of fermented foods produced in East Asia, with dissemination dates (Fig. 6.2).

The "Goryeo language" section of *Jilin leishi* (A miscellany of Goryeo matters, 1103), a text written by a Song dynasty emissary to Goryeo, explains that "*Jang* means *mizu*," while in *Jeungbo sallim gyeongje* (Revised farm management, Yu Jung-Im 1766), the Chinese characters for maljang were pronounced as "myeojo." Jang became more popular in Japan, and linguists suggest that over time, the term transitioned as follows: *misun-miljo-myeojo-miso* (Lee Sung-Woo 1990). According to Lee Sung-Woo, the Japanese philologist Kanazawa Shozaburo (1872–1967) discovered that Japanese miso probably originated in Manchuria, and author Kawada Masao classified ancient jang as yukjang (fermented meat sauce) in China, dujang (fermented soybean sauce) in Joseon, and *eojang* (fermented fish sauce) in Japan (Lee 1992).

6.3 Distinguishing between Jang and Si

It is unknown when the terms jang and si became differentiated in Korea, but the first known record to mention them separately is *Samguk sagi*, in the Silla annals, third year of King Sinmun's reign (681–692). "Si" is no longer part of the current vernacular, but in Goryeo and Joseon dynasty records it is distinguished from "jang." Choe Sejin's *Hunmong Jahoe* (Collection of characters for training the unenlightened, 1527) states that the word "jang" means ganjang (fermented soy sauce) or jangyu (jang varieties), while "si" means *jyeonguksi or dusi*, referring to a type of doenjang (fermented soybean paste). The encyclopedia *O Ju-Yeon munjang jeonsango* (Yi Gu-Gyeong 1850s) reveals that today's cheonggukjang used to be called *jeongukjang*, that is, a type of doenjang. Jung Yak-Yong's linguistics text, *Aeongakbi* (Correct language dispels incorrect usage, 1819), clarifies that jang and si are not the same product, but si is classified as a type of jang. These texts reveal that after the formative period of fermented sauce production in Korea, and by the time these products were introduced to China and Japan, jang and si were evidently considered to be separate items: jang comprised doenjang (soybean paste) and ganjang (soybean sauce), while si referred to a specific type of doenjang (Chang 1993).

In China, jang and si may have been viewed as separate food items from the beginning. *Qimin yaoshu* (Essential skills to benefit the people) shows that the word *maiqu* (Kor. *maekguk*) also pertained to jang, and that, uniquely, wheat was added in order to produce a sweeter taste (Yoon et al. 1993; Nout et al. 2014). *Haedong*

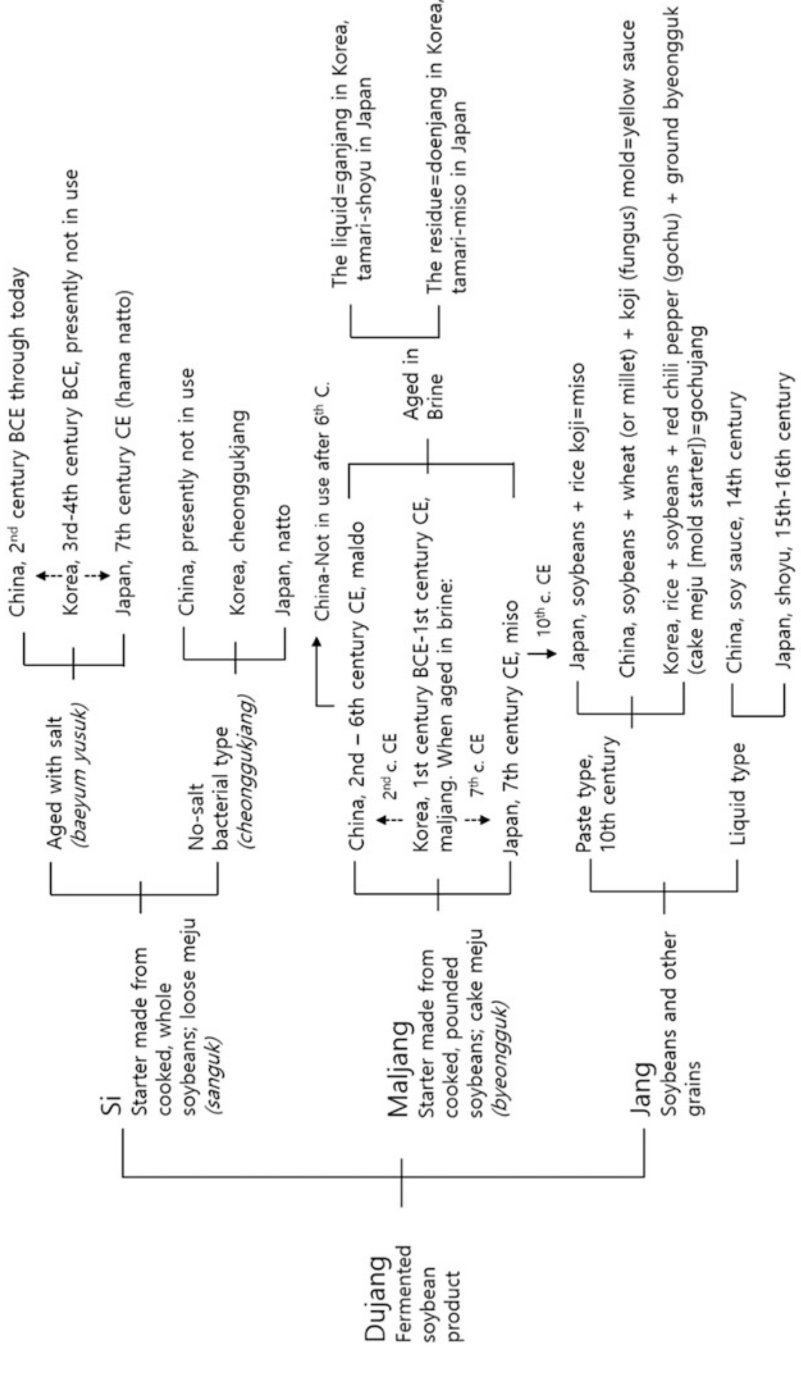


Fig. 6.2 Fermented foods of East Asia and their dissemination (Lee 1990)

Table 6.1 A comparison of Jang and Si in Korea, China, and Japan

		Korea	China	Japan
Jang	Base ingredients	Soybean meju (fermented soybean starter), mold (yellow spores)	Soybean meju (fermented soybean starter), maekguk (fermented wheat/barley starter), *duhwang* (yellow mold)	Soybeans, *miguk* (fermented rice starter), other starch starters
	Production method	Submerge meju in brine to ferment, then strain the liquids from the solids	Mix the ingredients and submerge in salted water	Mix powdered *koji* starter and cooked soy-beans with saltwater
Si	Base ingredients	Soybeans, bacterial meju	Soybeans, mold meju	Soybeans, bac-terial meju
	Production method	Make *siguk* (fermented soybean starter), then mix with saltwater and other seasonings to make sea-soned sauces	Let raw soybean starter (siguk) dry, then submerge in salted water for a sea-soned sauce	Raw siguk eaten as-is (natto)

yeoksa (History of Korea, 1823) reveals that jang sent as a tribute from Goryeo to China was received as a precious gift, thus indicating that Korean jang may have been a particularly coveted product (see Table 6.1) (Lee and Kim 1998).

In China, dehulled soybeans and mold spores were used to produce *sijeup* (extract of si) from siguk (fermented soybean starter). The Korean process of making si was similar, but used bacterial microbes produced during fermentation instead of mold spores. Judging from the appearance of the phrase "the fermented soybeans of Chaekseong" in *Xin Tang shu* (New Book of Tang), Korean si appears to have been a unique product in China. In Japan, soybeans were combined with different types of starchy cereal starters (koji) to make jang. According to the Heian period record *Engishiki* (Procedures of the Engi era, c. 927 CE), unique ingredients used in the making of jang included fermented rice starter and sweet glutinous rice. Fermented soybeans were made as a seasoning (cheonggukjang) in Korea and as a stand-alone dish (natto) in Japan.

6.4 Characteristics and Classification of Joseon Jang

Having been created long before the beginning of written history in Korea, jang formed an integral part of Korean foodways by the onset of the Joseon dynasty (1392), but because there is no extant Korean record of jang predating this period, the inevitable recipe changes that would have occurred over time can only be imagined. In "*Simu 28 jo*" (28 policy proposals, in *Dongmunseon*, an anthology of Korean literature, 1478) Goryeo politician Choe Seung-No (927–989) suggests to the king that jang, *ju* (rice wine), si, and *giang* (soup) be donated to poor people in the streets, thereby highlighting the place of jang and si as staples in the Korean diet by the early Goryeo period. According to the *Sikhwa* (Food and money) volumes of *Goryeosa* (History of the Goryeo dynasty, compiled 1392–1451), the Khitan invasion in the ninth year of King Hyeonjong's reign (1018) left cold and famine in its wake, and in response, the famine foods (salt and jang) were distributed to the suffering populace. During the famine in King Munjong's sixth year (1052) the approximately 30,000 starving people in Kaesong were given rice, millet, and si (Lee and Kim 1998).

These records of famine relief foods in the Goryeo dynasty indicate that si and jang were distinct food products within the family of fermented sauces and that they constituted staple foods on a par with rice and millet. Not only were jang and si used as seasonings, but they were also valued for their medicinal properties, as seen in *Hyangyak gugeupbang* (First aid prescriptions using native plants, 1236), where jang is listed as a prescription for gonorrhea, and si is suggested as a medicine for eye diseases. Many records from the Joseon dynasty describe the manufacture of fermented sauces, and over the years wonderfully varied recipes were developed before modern Western food was introduced to Korea. This uptick in the variety of sauces, as well as in other traditional foods, could be called the golden age of Korean cuisine. Table 6.2 introduces a few of the historical and scientific works from the Joseon period that treat this topic (Lee 1981).

Jeungbo sallim gyeongje (Revised farm management), uses a play on words to emphasize the prominence of fermented sauces in the Korean diet: "Jang [sauce] is *jang* [a military general]: It is the foremost of all foods. No matter how good the vegetables or how tasty the meat in a home, if the jang lacks flavor, the cooking will not be good. Folks living in the countryside might not be able to afford meat, but as long as their jang is good, the flavor of their side dishes will soar. The head of the family should make it his will to let sauces age for long periods in order to obtain superb flavor." During the Joseon dynasty, Koreans and their sauces were inseparable.

By tradition, meju (soybean fermentation starter) was made in the tenth or 11th month (autumn) of the lunar calendar and then fermented until the first or second lunar month (winter) of the following year, at which time soy sauce and doenjang would be made using the meju. Soybean-based jang was the most important ferment among Korean sauces, and Koreans loved—and still love—to eat it. The custom of making fermented sauces carried great meaning in the broader culture of Korean society. Korean foodways have altered significantly in the past 30+ years, as Koreans ride increasing waves of Western food culture, yet jang retains a key position in Korean cuisine (Lee and Kim 2016).

6.4.1 Characteristics of Joseon Jang

From ancient times the Korean people made jang and si separately, the mainstream type of jang being a dark sauce (*jin ganjang*) made by combining sludgy soy sauce

Table 6.2 Jang recipes as found in Joseon-dynasty literature

Jeungbo sallim gyeongje (Revised farm management, Yu Jung-Im 1766)	*Daemaekjangbeop* (barley sauce), *yuinjang* (elm sauce), *cheongtaejang* (green soybean sauce), *geupjojangbeop* (quickly-made sauce), *geupjocheongjangbeop* (quickly-made clear soy sauce), *geupjossangchojangbeop* (quickly-made double vinegar with red chili sauce), *jojeupjanggukbeop* (quickly-made vegetable sauce with meju), *Jeonjubang* (Jeonju sauce), *hajeoljeupjangbeop* (summer vegetable sauce), *jojeonsijangbeop* (jeonsijang [boiled soybean sauce]), *jeongukjang* (cheonggukjang [fermented soybeans]), *cheongtaejeonsijangbeop* (green soybean jeonsijang [boiled soybean sauce]), *susijangbeop* (watery soybean sauce), *gyenanjangbeop* (egg sauce), *jajangbeop* (roasted sauce), *jangbyeongbeop* (rice cake sauce), *damsujangbeop* (low-salt sauce), *cheollijangbeop* (1000-ri sauce)
Gyuhap chongseo (Women's encyclopedia, c. 1815)	Standard preparation of jang using water, meju, and crocks; *eoyukjang* (fish sauce), *cheongtaejang* (green soybean sauce), *geupjocheongjangbeop* (quick clear soy sauce), *gochujang* (red chili soybean paste), *cheonggukjang* (fermented soybeans), *jeupji-i* (quick pickled vegetables sauce), *jipjang* (meju with gochu sauce; *jeupjang,* quick vegetable sauce; *dubujang*, soybean curd sauce)
Imwon simyukji (Encyclopedia of rural life), Seo Yugu c. 1827)	**Jang**: *Donggukjangbeop* (Korean sauce), *cheongdujangbang* (green soybean), *namchojangbang* (spicy chili pepper sauce), *suniljangbang* (10-day sauce), *junsunjangbang* (quick soy sauce), *damsujangbang* (low-salt sauce), *gamjangjeobang* (sweet sauce kimchi), *uijangsilmibang* (tasty medicinal sauce), *Junggukjangbang* (Chinese sauce), *yeolhwangjangbang* (agitated yellow sauce), *sanghwangjangbang* (soybean and flour meju sauce), *sodujangbang* (small bean sauce), *wandujangbang* (pea sauce), *duyubang* (soybean oil), *somaekmyeonjangbang* (wheat noodle sauce), *daemaekjangbang* (barley sauce), *bujangbang* (wheat bran sauce), *jimajangbang* (mushroom and hemp sauce), *mataekjangbang* (hemp sauce), *yuinjangbang* (elm sauce), *muijangbang* (turnip and ancient grains sauce) **Si**: (meju/cheonggukjang)*: Damsibang* (low-salt si), *hamsibang* (salty si), *Geumsansasibang* (Geumsan Temple si method), *sudusibang* (watery si), *siphyangdusi* (ten-flavor soybean si), *Seongdobusijeupbang* (Seongdo si with vegetable sauce), *busibang* (wheat bran si), *gwasibang* (cucurbit si), *duhwangbang* (yellow soybeans si), *hongyeomdubang* (salted red soybean si)
Gunhak hoedeung (Encyclopedia of Korean traditional cuisine, mid-1800s)	*Chimeoyukjangbeop* (soybean sauce with fish), *saenghwangjang* (fresh yellow soybean sauce), *myeonjang* (noodle sauce), *sukhwangjang* (aged yellow soybean sauce), *daemaekjang* (barley sauce), *sodujang* (small soybean sauce), *cheongtaejang* (green soybean sauce), *yuinjang* (elm sauce), *Donggukjojangbeop* (Korean sauce), *geupjojangbeop* (quickly-made sauce), *chililjangbeop* (7-day sauce), *geupjocheongjangbeop* (quickly-made clear sauce), *jomanchojangbeop* (red chili paste), *somaengmyeonjangbeop* (wheat noodles sauce), *jojeupjangbeop* (quickly-made vegetable sauce), *Jeonjujeupjang* (Jeonju quick vegetable sauce),

(continued)

Table 6.2 (continued)

	hajeoljeupjangbeop (summer jeupjang), *jeonsijangbeop* (boiled si [cheonggukjang]), *susijang* (watery soybean sauce), *damsujang* (low-salt sauce), *cheollijang* (1000-ri sauce), *jangbyeongbeop* (rice cake sauce), *chojangbeop* (vinegar soybean sauce), *jajangbeop* (roasted sauce)
Yori jebeop (Recipes for various dishes, 1913)	How to make meju. **Jang**: How to brew soy sauce; *eoyukjang* (fish sauce), *cheongtaejang* (green soybean sauce), *jeupjang* (quick vegetable sauce), *mujang* (Korean radish sauce), *miljang* (wheat sauce), *doenjang* (soybean paste), *mepssalgochujang* (nonglutinous rice red chili paste), *borigochujang* (barley red chili paste), *maekchapssalgochujang* (barley and glutinous rice red chili paste), *susugochujang* (sorghum red chili paste), *patgochujang* (red bean red chili paste), *mugeorigochujang* (soybean malt flour red chili paste), *tteokgochujang* (rice cake red chili paste), *yakgochujang* (medicinal red chili paste), *dambokjang* (quickly-made red chili paste)
Joseon mussang sinsik yori jebeop (The best new Korean recipes, Lee 1924)	**Jang recipes**: Basic sauce recipes: *Ganjang* (soy sauce) and *jangjeup* (sauce with vegetables); *jangyu* (soybean sauces), *cheongjang* (clear sauce), *gamjang* (sweet sauce), *beopjang* (temple sauce). ***Myeoju* (meju) recipes**: *Maljang* (soybean paste), *hunjo* (soybean dumplings), *daekongjang* (large soybean sauce) *gajipjang* (cucumber and eggplant sauce), *mujang* (*damsujang*, low-salt sauce), *eojang* (fish sauce), *yukjang* (meat sauce), *cheongtaejang* (green soybean sauce) **Quick jang recipes**: *Suniljang* (10-day sauce) **Quick clear soy sauce (*geupjocheongjang*) recipes**: *Cheongjang* (clear soy sauce), *junsunjang* (quick soy sauce) **Red chili paste (gochujang) recipes**: *Gochojang* (red chili paste), *manchojang* (red chili paste) **Quick red chili paste recipes:** *Patgochujang* (red bean red chili paste), *byeorakjang* (lightning sauce), *dubujang* (soybean curd sauce), *bijijang* (bean-curd dregs sauce), *japjang* (mixed sauce) **Fermented soybean paste (doenjang) recipes**: *Seunggeoun doenjang* (low-salt soybean paste), *jjandoenjang* (salty soybean paste)

with doenjang (fermented soybean paste). During the Joseon dynasty, many varieties of sauce were developed. By early Joseon, doenjang and ganjang (clear soy sauce) were being made separately, specialty meju was made by combining other cereals (wheat, barley, rice, etc.) with soybeans for the first time, specialty sauces such as *jeupjang* were made (sauce with vegetables: a quick sauce made by pulverizing meju, mixing it with doenjang, cooked barley, rice, vegetables, and other regional ingredients, then fermenting it in a crock 7–10 days), *jeongukjang* (cheonggukjang), and varieties of *damsujang* (low-salt jang) became more universal, and spicy sauces like gochujang were also introduced. The current method of making *cheongjang* (or ganjang, clear soy sauce), by fermenting meju with salted water to produce doenjang and soy sauce, represents a centuries-old process for brewing jang that took root long before the appearance of other types of soybean-based, fermented sauces. From then until now the methods used to ferment each type of sauce have changed somewhat, from the ganjang produced in tandem with doenjang, to doenjang made in other ways, to gochujang, jeupjang, jeongukjang, and damsujang, all of which have been passed down to today. Aside from these few, specialty sauces have mostly disappeared, now existing only in the rarefied domain of gourmet chefs.

6.4.2 Classification of Joseon Jang

When fermented mold starter (meju) is steeped in salted water, the liquid that rises to the top is filtered out and becomes ganjang (soy sauce). The leftover solids become doenjang (fermented soybean paste). Doenjang is packed tightly into another crock, sprinkled with salt, and left to age for about a month before eating. Ganjang and doenjang made in this manner constitute the quintessential traditional sauces (jang) of Korea, both during the Joseon dynasty and today. The amounts of meju, salt, and water used in recipes varied regionally and over time, with slight adjustments made in an effort to continue improving the flavor of these cherished family sauces. Although the custom of making one's own family jang is disappearing, the degree to which these two sauces continue to hold sway on Korean tables is significant (Shin 2021).

Freshly-brewed soy sauce that is aged for years in an earthenware crock until it grows darker in color and develops a strong flavor is called *jinjang* (also *jinganjang* or *mugeunjang*). At the royal palace, "*jeol* meju," a fermented cake often made of black soybeans, was placed into a large crock with salted water for several years to ripen into dark soy sauce. The meju cake would disintegrate when submerged in liquid for an extended period of time, and any solids that remained would be filtered out. The result was a sweet, intensely dark jinjang.

Another sauce frequently seen in Joseon dynasty records is called *gyeopjang*, which is made by adding the previous year's soy sauce to newly made meju and letting it age. The resulting sauce boasts an even stronger flavor than jinjang. Alternatively, the method of feeding soy sauce with additional ferments or mashes was sometimes used to improve the taste, similar to the method of brewing rice wine (see Chap. 9). Jang made in this way is called *deotjang*, or sometimes *hapjang* ("combination" sauce). In Chungcheong and Jeolla Provinces this sauce is called *jeopjang* ("grafted" sauce).

Makjang is a sauce made by pulverizing meju, mixing it with salted water to make a paste, and letting it age. This may be eaten as is or made into *ssamjang* (a sauce for grilled meat made principally of doenjang and gochujang that remains popular today). Makjang is still frequently seen in Gyeongsang and Gangwon Provinces, and although differences exist regionally, as in Chungcheong and Gyeongsang Provinces, it is usually called "makjang" because it is made to be consumed directly ("mak" indicates now, or right away). Other names for it include *ppyamjang* or *ppagaejang* because the meju is pulverized (*ppata*). Ppyamjang is a fermented sauce produced mostly in Gyeongsang Province that is used only as doenjang. It is made by thickly grinding meju and then steeping it in boiled saltwater that has cooled. Ppagaejang is made in Chungcheong Province of pulverized meju steeped in the water leftover from cooking soybeans, mixed with hot pepper powder and salt.

Garujang is a Gangwon Province sauce made by grinding barley and steaming it, then mixing it with powdered meju and adding boiled, cooled saltwater to taste. The meju typically made for makjang is also used in this recipe, the difference being that in this case, the meju is mixed with barley flour. This is similar to how *borijang* is made on Jeju Island; barley is cooked and then fermented, after which it is dried and ground to a flour that is mixed, half at a time, together with meju powder. Table 6.3 summarizes these sauces.

6.5 Specialty Sauces

The poem "Six home-grown vegetables," from Yi Gyu-Bo's (1168–1241) *Dongguk Yi Sangguk jip* (Collected works of Minister Yi Gyu-Bo), mentions that in summer pickled turnips were eaten in fermented soybean sauces, while in winter turnips were consumed as kimchi. *Nongga jipseong* (A compendium for farmers, ed. Sin Sok 1665) contains a volume called *Sasichanyocho* (Necessities for every season, 1482), which describes fermentation methods for jang and other sauces and designates auspicious days for making jang and hapjang ("combination" sauces). This text introduces specialty sauces such as jeupjang (jang with vegetables) and *haejang*

Table 6.3 Types of Ganjang (Soy Sauce) and Makjang (Quick Sauce)

Name	Method	Characteristics
Jinjang (jinganjang, mugeunjang)	Soy sauce aged for several years	Dark color, strong flavor
Jinjang	Jeol (black soybean) meju steeped with soy sauce and aged; after some years the meju is scooped out	Meju made of black soy-beans; used in the royal palace
Gyeopjang (deotjang, hapjang, jeopjang)	Last year's soy sauce poured over this year's meju	Dark taste, strong flavor
Makjang Ppyamjang Ppagaejang	Meju powder stirred into salted water and aged. Water from boiled soybeans mixed with meju powder, with red chili powder and salt added	Gyeongsang Province Chungcheong Province
Garujang Borijang	Steamed ground barley, with meju powder and salt added. Barley grains fermented and ground, then mixed with meju powder	Gangwon Province Jeju Island

(crab jang). *Jeungbo sallim gyeongje* (Revised farm management, 1766) is the first text to mention *manchujang* (gochujang, red chili paste) and jeongukjang (cheonggukjang). An array of specialty sauces was developed during this period, but aside from gochujang and cheonggukjang, most are no longer in use (Lee and Kim 1998).

6.5.1 Gochujang (Red Chili Soybean Paste)

In 1984 Lee Sung-Woo published a theory, based on writings found in *Jibong yuseol* (the first encyclopedia in Korea, Jibong Yi Su-Gwan 1614), that gochu (Korean chili pepper) was first introduced to Korea from Japan during the Imjin War (Japanese invasion of Korea, 1592–1598). For many years this theory was widely taught and accepted, even to the point of becoming common knowledge in Korea. In 2011, however, Kwon, Dae-Young et al. discovered records indicating that Lee's theory was in error: The fruit Japan introduced to Korea during the Imjin War was actually the *nammancho*, a pepper native to Southeast Asia. The nammancho is an extremely spicy, nearly toxic plant, different from the gochu pepper, which is a mildly spicy, sweeter variety of pepper long cultivated uniquely on the Korean peninsula. Oral tradition has it that before Yi Seong-Gye became the founding king of the Joseon dynasty, he tasted gochujang (fermented red chili paste) at the Buddhist temple Manilsa in Sunchang County, North Jeolla Province (Kwon 2019). Written records of gochujang during the early Joseon dynasty, including *Hyangyak jipseongbang* (Native medicinal prescriptions, Yu, Hyo-Tong et al. 1433), *Signyo chanyo* (Korea's first book on dietetics, Jeon, Sun-Ui 1460), and *Euibang yuchwi* (A multi-volume collection of medical texts arranged by topic, 1477), reveal that gochujang was introduced mainly for use as a medicinal remedy, as in the following passage: "When the spleen or stomach is weak and the body lethargic, make chicken or pheasant stew and boil it with gochujang."

Later records mention gochujang by different names. *Jeungbo sallim gyeongje* (Revised farm management) introduces gochujang as "manchujang," revealing the recipe as follows: "To make a quick sauce, first pulverize makjang made from soybean meju and sift it through a sieve. Then prepare the following three flavors: per 1 *du* (18 L) of makjang powder, stir in 3 *hop* (540 ml) of gochu (chili) powder and 1 *seung* (1.8 L) of glutinous rice flour, and mix with high-quality ganjang (soy sauce) to make porridge. Pack the mixture into a crock and set it in the sun to mature. Traditional recipes add 5 hop (900 mL) of roasted sesame seed powder, though the oil from the sesame seeds will cause the sauce to spoil more quickly." Aside from the measurement volumes, this 1766 recipe mirrors today's gochujang recipe almost exactly. The endurance of this recipe stems from the harmonious flavor profile created by the combination of savory soybeans with the sweetness of glutinous rice, the heat of gochu, and the saltiness of soy sauce.

Gyuhap chongseo introduces the term "*gochojang*" (an alternate spelling of gochujang) and offers the following recipe: "If using one *mal* [18 L] of soybeans, take 2 *doe* [3.6 L] of rice and make *muritteok* [white rice cake], then pound well with the cooked soybeans, shape, and ferment to make meju [for red pepper paste]" This passage suggests that gochujang meju was made separately from regular meju, and reveals that recipes for gochujang commonly included a carbohydrate or dried meat powder, jujubes, honey, or other additives—flavorful additions to gochujang similar to those found in recipes today. *Gyuhap chongseo* also indicates that among all the gochujang found in the eight Korean provinces, those made in the regions of Sunchang and Cheonan are exceptionally delicious—a statement that attests to the ubiquity and popularity of gochujang in nineteenth-century Korea.

6.5.2 Cheonggukjang (no-Salt Fermented Soybeans)

Cheonggukjang debuts in *Jeungbo sallim gyeongje* (Revised farm management) as "jeongukjang." Here jeongukjang is described as *jojeonsijangbeop* (quick soybean sauce), which may have appeared first in the Chinese texts *Qimin Yaoshu* (c. 544) or *Bencao gangmu* (1596). The 1870 Korean encyclopedia *Myeongmul giryak* contains the phrase "*dusi sok* cheonggukjang" (cheonggukjang is a type of dusi, Chinese soybean paste), while *Jaryu juseok* (Explanations of the various characters, Jeong Yun-Yong 1856) mentions "si *(myeoju, baeyeomyusuk*)" (soybeans fermented with salt). In other words, in Chinese historical records, "chi" (Kor. "si") represented meju, or salt-fermented soybeans, but the Korean specialty cheonggukjang was also referred to as "chi." The word "cheonggukjang" is said to derive from the time of the Qing (Kor. "Cheong") invasion of Joseon in 1636, when Mongol troops carried si as a healthy food suitable for transport. This story also lends itself to the origin of the word "jeongukjang," or wartime sauce (literally, "warring nation sauce"), which in time came to be pronounced "cheonggukjang" (Lee 1984).

The "Joseon si" recipe found in *Jeungbo sallim gyeongje* (Revised farm management) reads, "Take 1 du (18 L) of soybeans, boil, and place in a straw bag to rest in a warm place for 3 days. Then open the sack and stir in 5 doe (9 L) of roasted soybean powder. Pound the mixture in a mortar and then dry in the sun. From time to time check the taste and add salt as needed. When the sauce tastes lightly salted throughout, scrape the mixture into a crock for storage." The text goes on to say that one may add eggplant, cucumber, Korean radish, or other vegetables to make jeupjang (quick-fermented vegetable sauce).

Gyuhap chongseo states that to make cheonggukjang, the soybeans must be roasted first and then boiled, after which, they are left alone to ferment until stringy. "Stringy" refers to the sticky threads produced during fermentation, as seen in natto. In Jeolla and Gyeongsang Provinces, this kind of cheonggukjang was called *damppukjang*. Damppukjang, however, was also the word for a type of boiled jjigae (stew), in which the meju prepared for cheonggukjang was dried and pulverized for use as a powder base in the stew. This has led to some confusion about the precise meanings of these terms, but over time, "cheonggukjang" gained universal currency as a type of quick sauce—aged relatively little—for use in a stew called cheonggukjang jjigae. Today cheonggukjang is made by inoculating the bacterium *Bacillus subtilis* into, or placing straw on top of, well-cooked soybeans, and then keeping them in a cloth bag in a warm place (40 °C) for 3–4 days until mucilaginous strings form. When eaten as is, this dish is known as Japanese natto. In Korea, it is crushed and mixed with salt and other spices, such as minced garlic, and stored in a crock to use in recipes as needed (Lee 1984).

6.5.3 Jeupjang (Quick-Fermented Sauce with Vegetables)

In *Sasichanyocho* (Necessities for the four seasons, 1482), the recipe for jeupjang is explained as follows: Add eggplant or cucumber and wheat bran to jang (fermented soybean sauce), then nestle the crock into warm horse manure to ripen. This method is similar to today's pickled vegetables (*jangachi*), but with one basic difference: today the eggplant or cucumbers are salt-pickled first, then dried and mixed with doenjang or gochujang. Compared to the fifteenth-century recipe, the jeupjang of today is much less pungent. Regional dialects called jeupjang *jeupjeo*, *jeupdihi* (here, "jeo" and "dihi" refer to kimchi or pickled vegetables), *chaejang* (vegetable jang) and *malttong* jeupjang (horse manure sauce), since the crock was placed in manure during the aging process. A famous version of this sauce from the south gate area of Jeonju City, handed down over generations uniquely in the Baek clan, was called *Baekssijang* (Lee 1984).

When making jeupjang, any number of ingredients may be substituted for those in the *Sasichanyocho* recipe. For example, meju powder can be used in place of wheat bran, green chili peppers can replace red chili powder, and other vegetables, including Korean radish, may be added. The crock containing the completed sauce may be placed in plant compost rather than horse manure to ferment. Despite variations in ingredients, the steps involved in making jeupjang have remained relatively stable. For example, although *Jeungbo sallim gyeongje* introduces seven jeupjang recipes, five for jeupjang meju and two for summer jeupjang, they all follow the same production method: make the meju, add a vegetable, and place the crock in manure to ripen, just as described in *Sasichanyocho* nearly 300 years earlier.

6.5.4 Damsujang (Low-Salt Sauce) and Other Types of Jang

A passage in *Jeungbo sallim gyeongje* points to damsujang as the progenitor of today's damppukjang: "During *chuseok* [Korean fall harvest festival] make a slab of meju and let it ferment over the winter. In early spring rinse it, break it into chunks, and place it in the sun to dry. Then add hot water to 3–4 doe [5.4–7.2 L] of meju, salt lightly, and place it in a small crock for 6–7 days to ripen. Enjoy with young spring vegetables—the taste is fresh and delicious." This quick doenjang, like makjang, would have been ready to eat even before *haetjang*, a fresh sauce traditionally made once a year in the spring. In some regions, however, damppukjang and cheonggukjang (the latter of which is not low-salt) are considered to be the same, and therefore damppukjang may not definitively be equated with damsujang.

Today, damppukjang is made by grinding meju into a fine flour, mixing it with gochu (Korean red chili) powder, and loosening it in water to rest overnight. It is seasoned with soy sauce and salt. Regional variations on the sauce occur in Chungcheong Province, where meju powder and gochu powder are placed in the water strained from making bean curd, and in Hwanghae Province, where barley rice is boiled like porridge, and then meju powder, gochu powder, and salt are stirred in.

Many specialty sauces developed over time, such as Korean radish sauce, fish sauce, green soybean sauce, bean-curd dregs sauce, lightning sauce, sesame seed dregs sauce, leftover kimchi juice sauce, and beef doenjang sauce. Unique sauces were created specifically for famine relief: *doraji* (balloon flower root), *deodeok* (bellflower root), or soybean hulls were ground and mixed with soybeans to add more nutrients to meju. *Jeungbo sallim gyeongje* explains that balloon flower, bellflower, crab, shrimp, ginger, akebia vine fruit, meat, or bean curd can be added to a sauce for increased nutrition. Additional varieties of jang introduced in *Jeungbo sallim gyeongje* include red bean sauce, egg sauce, roasted sauce, rice cake sauce, and 1000-ri sauce, as well as a recipe for geupjocheongjang, or quick soy sauce, which is made by straining the liquid produced during meju fermentation.

References

Chang, Chi-Hyun. 1993. *Hanguk jeollae daeduiyongeumsik ui jorigagongsajeok yeongu* [History of Korean soybean food processing technology]. Seoul: Suhaksa.

Ishige, Naomichi. 1993. Cultural aspects of fermented fish products in Asia. In *Fish Fermentation Technology*, ed. Lee Cherl-Ho, Keith H. Steinkraus, and P.J. Alan Reilly. New York: UN University Press.

Kwon, Dae-Young. 2019. *Hansik Inmunhak* [The humanities of Korean food]. Seoul: Helseureteo.

Kwon, Dae-Young, Chung Kyung-Ran, Yang Hae-Jung, and Jang Dae-Ja. 2011. *Gochu jeollae ui jinsil* [The story of gochu]. Seoul: Hyoil.

Lee, Cherl-Ho. 2021. Dongbuga balhyo munhwa ui giwon [The origin of fermentation culture in Northeast Asia]. In *Hanguk ui balhyo sikpum* [Fermented foods in Korea], ed. Shin Dong-Hwa, 13–73. Seoul: Sikanyeon Publishing.

Lee, Cherl-Ho, and Kim Jun-Cheol. 1998. Hanguk jeontong jangnyu ui munheonjeok gochal [Literature review on traditional Korean fermented soybean products]. *Jangnyu*. [Traditional Korean fermented soybean products] 61: 3–18.

Lee, Cherl-Ho, and Kim Moonsil Lee. 2016. History of fermented foods in Northeast Asia. In *Ethnic Fermented Foods and Alcoholic Beverages of Asia*, ed. J.P. Tamang, 1–16. India: Spinger.

Lee, Cherl-Ho, and Kwon Tai-Wan. 2003. *Hanguk sikpumhak immun [Introduction to Korean food science]*. Seoul: Korea University Press.

Lee, Sung-Woo. 1981. *Hanguk sikgyeongdaejeon* [Dictionary of Korean meals]. Seoul: Hyangmunsa.

———. 1984. *Hanguk sikpummunhwasa* [Cultural history of Korean food]. Paju: Kyomunsa.

———. 1990. Godae Dongasiasok ui dujange gwanhan balsanggwa gyoryue gwanhan yeongu [A study on the origin and interchange of soybean sauce in ancient East Asia]. *Hanguk sigmunhakhoeji*. [Korean Journal of Dietary Culture] 5 (3): 313–316.

———. 1992. *Dongasiasok ui godae Hanguk siksaenghwalsa yeongu [A study on the history of ancient Korean food life in East Asia]*. Seoul: Hyangmunsa.

Lee, Yong-Gi. 1924. *Choseonmussangsinsikyori (Matchless new recipes for Korean cooking)*. Youngchangseogwan.

Nout, M.J. Rob, Cherl-Ho Lee, and Han Bei-Zhong. 2014. Asian foods. In *The Oxford Handbook of Food Fermentations*, ed. Charles W. Bamforth and Robert E. Ward, 557–632. New York: Oxford University Press.

Shin, Dong-Hwa, ed. 2021. *Hanguk ui balhyo sikpum* [Fermented foods in Korea]. Seoul: Sikanyeon Publishing.

Yoon, Seo-Seock et al., trans. 1993. *Jeminyosul* [Essential skills to benefit the people]. Seoul: Minumsa. Chinese edition: Jia Sixie. c. 550. *Qimin yaoshu.*

Chapter 7
The History of Kimchi and *Jeotgal* (Fermented Fish)

Abstract Techniques for fermenting kimchi and jeotgal were developed on the Korean Peninsula during the Primitive Pottery era as early as 6000 BCE, making for a long history of this important method of storing food in Korea. As agriculture became more secure so that grains could be regularly harvested, porridge culture transitioned to cooked rice culture. Starchy grains were easy to digest, and vegetables and salty seafood added flavor. It may be that kimchi and jeotgal (which is used as a condiment) emerged as a basic element of the Korean table at this time to improve the taste of staple grains. This chapter traced the history of kimchi and jeotgal fermentation from the ancient times to the Joseon period (Nineteenth century). The varieties of kimchi and jeotgal appeared in the classic literature were classified, and the production skills were introduced. The principles in fish fermentation (jeotgal and *sikhae*) technology were related to those of kimchi and soybean fermentation.

As mentioned previously, techniques for fermenting kimchi and jeotgal were developed on the Korean Peninsula during the Primitive Pottery era as early as 6000 BCE, making for a long history of this important method of storing food in Korea. As farm culture took root in Northeast Asia around 4000 BCE, rice, broomcorn millet, and other grains quickly became staple foods. Littoral foragers were the first to boil wild grains in an earthenware pot to make a gruel-like stew, and in time the jjigae (stew) culture characteristic of Primitive Pottery-era foodways expanded to universal peninsular use (Lee 1999). As agriculture became more secure, such that a regular grain harvest could be relied on, porridge culture transitioned to cooked rice culture. Starchy grains were easy to digest, and vegetables and salty seafood added flavor. It may be that kimchi and jeotgal (the latter used as a condiment or an ingredient in kimchi) emerged as basic elements of the Korean table to improve the taste of staple grains (Chang 1972; Lee 1986).

In the Dongyi biography in the "Book of Wei," *Sanguozhi* (Records of the Three Kingdoms [China] 233–297 CE), the phrase *ja heui seonjangyang* (transliterated in Korean) appears, in which "seonjangyang" is a collective term for food fermentation techniques. Fermented vegetables are included under the purview of this term. The author comments on the similarity of plants and animals consumed in Korea and

C.-H. Lee, *Korean Food and Foodways*,
https://doi.org/10.1007/978-981-19-0023-5_7

China, reveals that the people of the northern tribal nation of Goguryeo (founded 37 BCE) used salt transported from other regions to season their vegetables, and points out that Goguryeo in particular produced excellent fermented foods (Yoon 1991). This text corroborates the research showing that fermentation techniques were already solidified before the establishment of the Three Kingdoms period of Korea (57 BCE). For example, bacteria-fermented *nuruk* (fermented yeast starter) was already commonly used at this time to make grain wine and vinegar. People had also begun making *meju* (fermented mold starter), which was used to create a variety of fermented soybean sauces (jang). In short, the technique of salting foods with sea water that became known in prehistoric times, likely due to the nature of the peninsula being surrounded by ocean on three sides, led to the making of many seafood dishes and the salt-preservation of foods such as fish, meat, and vegetables (Chang 1989).

7.1 The History of Kimchi

Korea's most popular native side dish, kimchi, is made by salt-pickling cabbage, radish, cucumber, green onion, or other vegetables with various types of flavorings and then leaving it to ferment in a crock. Recipes and ingredients vary, but the umbrella term for this type of fermented food is kimchi. Worldwide, lactic acid-fermented vegetables made by a similar process include German sauerkraut, Nepalese *gundruk*, and Japanese *tsukemono* (Lee and Park 2018). *Jangajji* (vegetable pickles stored in salt), *doenjang* (fermented soybean paste), and soy sauce can be found in neighboring China or Japan, but kimchi, with its low salt (ca. 3%), marinated red chili pepper (*gochu*), and other spices, is unique to Korea.

The distinctive flavor of kimchi derives both from the spices employed, which include garlic, gochu powder, and ginger, and from the lactic acid fermentation process, during which lactic acid, acetic acid, and carbon dioxide form. Jeotgal is a mainstay of kimchi ingredients, and the capsaicin from the chili pepper, which gives the dish heat, prevents the fatty acids in the jeotgal from oxidizing and releasing a fishy smell. Kimchi is replete with vitamin A, vitamin C, and minerals, and also contains some calcium and protein.

The first Korean text to treat the history of kimchi is an article entitled "Jeochaego" (Review of salted, fermented vegetables, Cho Baek-Hyun 1938). Ensuing writings include "The origin of Korean salted and fermented vegetables" (Chang 1975); "A study on the changes in and exchanges of kimchi between China, Korea, and Japan" (Lee 1975); "Soybean sauces and salted vegetables in ancient Korea, based on *Jeongchangwon gomunseo*" (Yoon 1987); "Kimchi processing in early and late Joseon Dynasty" (Yoon 1979); and "Analytical study on food preparation in *Jubangmun*" (Lee and Kim 1986).

7.1.1 Kimchi in Ancient Times

Vegetables cultivated during the Three Kingdoms period (57 BCE–668 CE) include turnip, eggplant, lettuce, gourd, taro, ginger, mallow greens, green onions, chives, mustard greens, and *sung* (cabbage family). Greens and roots gathered on mountains or in fields that were used in kimchi include bamboo shoots, royal fern, bracken, and root of balloon flower (*doraji*) and bellflower (*deodeok*). Korea's landscape is conducive to the growth of numerous edible wild plants, which continued to be consumed alongside cultivated plants. Those that stood up to pickling well were preserved in low-salt (ca. 3%) kimchi or high-salt pickled vegetables (*jjanji*/ jangajji).

The royal nuptial ceremony for King Sinmun (683) of Unified Silla as described in *Samguk sagi* (History of the Three Kingdoms, 1145) lists foods gifted to the bride's family, including jang (in this case, soy sauce and doenjang) and *hae*. "*Hae*" can be interpreted as fermented fish, fermented kimchi, or jeotgal, and its appearance in this list indicates that fermented seafood and vegetables were valued by members of the elite class, along with other fermented foods such as rice wine and sauces. Additional evidence supporting the conjecture that kimchi-type foods were consumed during the Unified Silla dynasty comes from the Buddhist temple Beopjusa, where a large stone jar buried in the ground, designated Tangible Cultural Asset #204, is said to have stored winter kimchi for 3000 monks during the eighth century (Park 2014).

7.1.2 Goryeo Dynasty Kimchi

The first Korean text to reveal a method of making kimchi is *Dongguk Yi Sang-Guk jip* (Collected works of Minister Yi Gyu-Bo, 1251). In the section titled "Gapoyugyeong," Yi Gyu-Bo mentions cultivating cucumber, eggplant, turnip, green onion, mallow greens, and gourds to be prepared as side dishes. Among these, turnip was pickled either with salt or in a fermented sauce in the summer to preserve it for winter consumption. These dishes may have been eaten like regular kimchi or like water-type kimchi (Lee 1984). The "*Yeji*" section of *Goryeosa* (History of Goryeo) describes four kinds of kimchi: water dropwort, bamboo shoot, Korean radish, and chive (Chang 1972), although these dishes were probably closer to salt-pickled radish dishes (*jjanjiryu*) than the kimchi eaten today. The pickling of vegetables for jang as mentioned in "Gapoyugyeong" is related to the process used during the Three Kingdoms period that of salt-pickled vegetables added to fermented soybean sauces. Over the duration of the Silla and Goryeo dynasties these vegetables pickled with coarse salt probably spawned new recipes that led to water-based radish kimchi. The term *cheongyeom* from this text brings to mind clean salt water (cheong = clear or clean, yeom = salt water), and if that is the case, then this pickled product can be connected with dongchimi (radish water

Table 7.1 A comparison of chimchae-making in China's *Qimin Yaoshu* and Goryeo dynasty texts

Method of making chimchae	China	Goryeo
Salt fermentation	Single use of salt	Single use of salt
Vinegar preservation	Salt + mash + nuruk (fermented yeast starter)	
Vinegar fermentation	Single use of vinegar	None
(seasoned vinegar)	Salt + vinegar	
Jangajji (vegetables pickled in high-salt and/or fermented products)	Salt + lees Single use of rice wine lees Meju (mold starter) + salt	None Vegetables pickled in jang (fermented soybean products)
Yangnyeom (seasoning)	Minimal use in vinegar chimchae (e.g., water dropwort, mustard, ginger, green onion, clementine peel)	Most varieties are used (including green onion, ginger, water pepper)

kimchi), a soup-like variety of pickled vegetables. This dish was lightly seasoned, similar to today's water kimchi.

The medical text *Hyangyak gugeupbang* (First aid prescriptions using native ingredients, 1236) reveals that cultivated vegetables during the Goryeo dynasty included white radish, cucumber, winter melon, turnip, cabbage, giant garlic, chives, mallow greens, lettuce, green onions, gourds, and more—a continuation and expansion of the vegetable panoply grown during the Three Kingdoms period. On New Year's Day in the second year of King Seongjong (983), Goryeo society initiated a festival in which they "bundled the sheaves and held ancestral rites between heaven and earth." Among the dishes set out for the occasion, four kinds of kimchi were provided (Chang 1975). Table 7.1 compares kimchi-making methods as found in an earlier text from China, *Qimin yaoshu* (Essential skills to benefit the people, 532–549), to the Goryeo method of making kimchi (known at the time as *chimchae*).

The method for fermenting vegetables in *Qimin yaoshu* involves a ferment, like meju or *gokjuk* (grain mash), or sometimes rice wine or rice wine lees, mixed with salt. The Goryeo method, on the other hand, uses only salt. The manner of preprocessing the main ingredients for different types of chimchae also differed between China and Goryeo: in China most chimchae was prepared with blanched or boiled vegetables, while the Goryeo method used raw vegetables (Lee and Ahn 1995).

7.1.3 Joseon Dynasty Kimchi

The most significant changes in the making of kimchi during the Joseon dynasty (1392–1910) comprised the addition of red chili peppers (gochu) and jeotgal (salt-fermented seafood). Kimchi methods found in Joseon-dynasty texts are presented below in chronological order (Lee and Kwon 2003).

1500s–1600s

Korean cookbooks from the time preceding the Imjin War with Japan (1592–1598) were unknown until Yun Suk-Kyeong discovered one from the early 1500s entitled *Suunjapbang* (Refined recipes for cultured people, c. 1540). In it, 17 sections discuss salt-pickled kimchi, among which 7 describe mixing salt with plain vegetables, 3 describe combining salted vegetables with prickly ash fruit (an aromatic in the same genus as Sichuan pepper) and pulsatilla flower root, 1 describes adding mustard to salted vegetables, 1 mentions the addition of garlic, and 1 refers to adding garlic and pepper (Lee and Ahn 1995).

In 1611 Heo Gyun published a critique of food, *Domundaejak* (Dreaming of good food at the butcher shop), in which he mentions *juksunhae* and *sangaejeo*: juksunhae seems to refer to bamboo jangajji (bamboo shoots pickled in fermented soybean sauce), a dish passed down from the time of King Sejong (1397–1450) (Chang 1972), while sangaejeo likely refers to kimchi of wild mustard greens, a type of unsalted kimchi. The text lists many fragrant herbs and describes white radishes from the southern town of Naju, Jeolla Province, as having a flavor and water content similar to that of an Asian pear. From this it can be deduced that the cultivation of white radish had developed over time into a sweeter variety. *Hanjeongnok* (1618) (an encyclopedia edited by Heo Gyun) reveals in its 16th volume, which covers farming techniques, that white radish seeds may be sown monthly for regular harvest, while leaf mustard, cabbage, and other vegetables should be planted in the seventh and eighth months. The emphasis on radish and cabbage, ingredients frequently used in kimchi dishes, underscores the elevated status of these vegetables in the food culture of Korea at the time. A phrase found in *Seonjo sillok* (Annals of King Seonjo, 1593), that “Radishes were frequently the only vegetable planted, and therefore other vegetables had to be imported from Wondong,” points to the likelihood that cabbage was among the vegetables that were sometimes imported from other regions (Chang 1975).

Records about the transmission of gochu (red chili pepper) to Korea began to appear in seventeenth-century books. In *Jibong yuseol* (Topical discourses of Jibong [penname of Yi Su-Gwang]—Korea’s first encyclopedia, 1614) Yi Su-Gwang states, “There is poison in gocho [sic]. Its name is foreign because it came over from Japan.” About 50 years later, *Boncho gangmu shibyu* (Compendium of *materia medica* supplement, 1665) mentions that “These days gochu is cultivated and can be found everywhere in the market. This chili pepper boasts many uses in addition to gochujang.” In his *Seongho saseol* (Seongho miscellany), Yi Ik (1681–1763) muses, “All I know about gochu is that it must have come from Japan: according to a poem I read, one day a Japanese fellow dipped the end of a chili pepper into his ink and wrote with it instead of using a brush.” Based on these records, Korean scholars such as Choi Nam-Sun (1948), Lee Chun-Nyoung (1964), and Lee Sung-Woo (1988) asserted that during the Imjin War (1592–1598) a spicy pepper they equated with gochu called *nammancho*, of Mexican origin, came to Korea from Japan via Southeast Asia. These assertions restricted the history of spicy kimchi in Korea to a post-Imjin War origin and fostered many mistaken interpretations of ancient literature.

Recently, Kwon et al. (2017) confirmed that the red chili pepper, gochu, has grown wild on the Korean Peninsula and in Northeast Asia from time immemorial. Using gene analysis, Kwon discovered that the Korean sweet-and-sour gochu (*Capsicum annuum*) differs genealogically from the spicier nammancho pepper (*Capsicum baccatum*) indigenous to Central and South America. Unfortunately, due to the Imjin War theory about gochu, the Chinese character for gochu in classical literature has often been misinterpreted as “prickly ash pepper” or “black pepper” by modern scholars. As a result, many theses and secondary sources have mistakenly interpreted recipes for kimchi in pre-Imjin War texts as having been made with black or prickly ash pepper. However, prickly ash pepper was rarely seen in kimchi recipes printed in *Qimin yaoshu* (China, sixth century) or in Song and Yuan dynasty (China) texts quoted in *Imwonsimnyukji* (Encyclopedia of rural life, Seo Yu-Gu c. 1827), nor did it appear much during the Heian period (Japan); Japanese kimchi today also does not use prickly ash pepper. In addition, had gochu been the pepper introduced to Korea at the time of the Imjin War, rather than the spicy nammancho, it seems unlikely that gochu would have become as universally cultivated and enjoyed in kimchi as it was immediately following the war.

The term *chimjeupjeo* appears for the first time in *Sasichanyocho* (Necessities for every season, Kang hee-Maeng c. 1482), along with *chimgwajeo* and *chimchong*. Among these, “chimgwajeo,” as seen in Yi Gyu-Bo’s *Dongguk Yi Sang-Guk jip*, has been interpreted by scholars to mean cucumbers pickled in salt; “chimjeupjeo” is seen a type of pickled vegetable in which eggplant and cucumber are made into a kimchi base with doenjang and wheat bran; and “chimchong” is thought to be green onion kimchi seasoned with salt (Lee and Cho 1988). The method for making chimjeupjeo involves harvesting eggplant in the ninth lunar month, mixing it with fermented soybean sauce (jang) and wheat bran, and then placing it in a crock nestled in horse manure to ferment for about 20 days (Yoon 1988). While this method mirrors that attributed to *jeupjang*, which is a type of jang mixed with cooked rice and vegetables, chimjeupjeo is surmised instead to be a type of kimchi. Initially, jeupjang developed as a method of pickling eggplant, cucumber, or other vegetables, but once kimchi became more developed, jeupjang changed its status from that of pickled vegetables to that of a fermented vegetable sauce.

The first Korean cookbook to offer a more detailed description of how to make kimchi is *Eumsik jimibang*, also known as *Gyugon siuibang* (A mother’s cookbook for her daughter-in-law, 1670). Here seven kinds of chimchae (kimchi) are presented with their recipes. *Eumsik jimibang* also contains recipes for fermented winter melon, fermented garlic, wild mustard kimchi, pheasant-meat chimchae, pheasant-meat *jjanji* (salt-preserved), pheasant meat *ji* (salt-pickled), radish water kimchi, and spices (ginger and prickly ash pepper). According to this book, during the 9th–10th lunar months, late fall-ripening winter melon is peeled, the rinds are sliced, heavily salted, and placed in a crock to ferment. Also in the fall, fresh garlic is mixed with prickly ash pepper, seasoned with salt, and stored in a crock to ferment.

Wild mustard kimchi is made by washing mustard leaves in cold water, placing them in a crock of warm water, and setting them over a double boiler to heat, without the use of salt. For pheasant kimchi, salt-pickled cucumbers are sliced and mixed with sliced pheasant meat, the dish is salted again to taste, as when preparing *nabak* kimchi, and then fermented. Examining the language used when describing these dishes, it appears that "nabak" kimchi was the standard form of kimchi in daily use at the time. No records exist that depict how to make nabak kimchi (a radish water kimchi eaten in springtime, unlike the radish water kimchi consumed in winter, dongchimi), but the record of saengchi ji (salt-pickled pheasant meat) above mentions a broth used universally for lightly salted kimchi, which was likely also used in the making of radish water kimchi. The record of pheasant kimchi in *Eumsik jimibang* indicates that meat was already in use in kimchi making, and now kimchi methods using seafood were introduced with the recipe for *baechu sukjeo* (aged cabbage kimchi). This recipe indicates the use of cabbage without a head (such as bok choi), which is commensurate with current knowledge that cultivation techniques at the time were insufficiently developed to produce cabbage with a head. The type of cabbage grown today (*Brassica rapa* subsp. *pekinensis*) forms a tightly-packed head and is said to date only from the end of the nineteenth century.

Intriguingly, *Eumsik jimibang* reveals that in order to retain the green appearance of cucumber kimchi and cucumber pickles, copper was added to the crock. The *Eoljeotgukji* (kimchi seasoned with salted, fermented fish), *jeonmu* ["jeonmu" is the Romanized nasalization of "jeot-mu"] (radish pickled with salted, fermented fish), and *oijeonmu* (cucumber jeonmu) all seem to be similar to today's *kkakdugi* (cubed radish kimchi). Also, the term *kkagdaegi* in the following passage from *Chunhyangjeon* (*The Tale of Chunhyang*, a folk tale based on oral tradition, codified as early as 1694): "One bowl of bean sprouts, *kkagdaegi*, and *makkeolli* (unrefined rice wine)," most likely refers to kkakdugi (Chang 1972).

The cookbook *Jubangmun* (late 1600s) contains references to *yakjihi* (eggplant, cucumber, or bamboo shoots seasoned with black peppercorn, garlic, or green onions, stir-fried together in oil and then mixed with boiling soy sauce), *saenggangchim* (vinegared ginger), *chimgosari* (salt-brined bracken [fern]), *woegaji muchimchae* (cucumber, eggplant, and radish leaves mixed with boiling salt water, drained, and placed in a crock), and *cheongtaechim* (salt-pickled large, green soybeans) (Lee and Cho 1988). *Saekkyeong* (a book on regional farming practices, Park Se-Dang 1676) mentions eggplant, curled mallow, and turnip kimchi, although the main ingredients of the more universal kimchi dishes were radish and cucumber. The use of bamboo shoot, wild mustard leaf, green onions, garlic, and curled mallow in kimchi have all been confirmed. Different types of kimchi included jangajji (vegetables pickled in fermented soybean products), jjanji (salt-pickled vegetables), and nabak kimchi (sliced vegetables in brine) (Lee 1984). This text also mentions kimchi made with pheasant meat and introduces kimchi fermented without salt. These kimchi delicacies were consumed in the homes of wealthy families and represented a new era of experimentation with kimchi making.

In an anonymous cookbook published in the late 1600s, *Yorok* (Essentials), the spices used for kimchi are listed as prickly ash pepper and ginger. Ten simple recipes for kimchi are illustrated in this book, including turnip, cabbage, wax gourd, bracken, and green soybean, as well as a recipe for salt-pickled turnips sliced into a thin, salted broth reminiscent of today's dongchimi. A kimchi made in cold climes is *muyeom chimchae*, in which radish is inundated with water and left to rest for 4 days; when bubbles arise, the liquid is discarded and the radishes are refreshed with new water. The spiced cucumber ferment called *simhwanggwa* is an example of this style of kimchi (Yoon 1991).

1700s

Among the kinds of kimchi included in *Jeungbo sallim gyeongje* (Revised farm management, Yu Jung-Rim 1766), the phrases "add gochu leaves when making *mujjan* kimchi," and "add thinly sliced gochu" appear. There is no record of the use of gochu powder, which is commonly used today, in the kimchi recipes in this text. In *Sallim gyeongje* (Farm Management), by Hong Man-Seon (1643–1715), there are recipes for eight kinds of jeochae (salted, fermented vegetables), and in *Jeungbo sallim gyeongje* there are 34 recipes for jeochae, both from Korea and abroad.

Sallim gyeongje mentions the following dishes in its section on kimchi-making: *sungchimjeo* (uses cabbage), *gangsujeo* (turnip or radish is mixed with green onion and ginger for a sour kimchi), *hwanggwadamjeo* (stuffed cucumber kimchi: young cucumber is cut on three sides, and gochu powder, salt, and garlic are placed inside and fermented), *hwanggwahamjeo* (salt-pickled cucumbers), *nabakdongchimjeo* (water kimchi with sliced radish), and *chimnabakhamjeo* (pickled radish: gochu leaves, young gochu pepper, cheonggak [seaweed], young cucumber, young squash, tender squash stem, wax gourd, prickly ash pepper, and chives mixed with radish). In this text, most kimchi recipes are divided between the *damjeo* variety, in which a little salt (ca. 3%) is used, and the *hamjeo* variety, in which much salt is used, and these are classified under cabbage kimchi, radish water kimchi, stuffed cucumber kimchi, and salt-pickled radish. Although the recipe for cabbage kimchi does not venture beyond the typical lightly salted type, cucumber kimchi appears in a new form, stuffed. Also introduced in this text is the use of gochu powder in a kimchi recipe. Nabak kimchi is newly combined here with several seasonings, such as young gochu pepper, squash, and squash stems, the first record of kimchi made with gochu and squash (Hanguk eumsik munhwa yeonguwon 1991).

In *Jeungbo sallim gyeongje*, kimchi recipes contain several kinds of vegetables, such as radish, cabbage, mustard leaf, eggplant, and cucumber. The methods for making and preserving kimchi as found in this text can be classified as follows (Lee 1992):

Hamjeo: a large amount salt is added as a secondary ingredient to vegetables in order to preserve them over the long winter.

Damjeo: varieties pickled in a low amount of salt (ca. 3%), including radish water kimchi, pickled radish, pickled cucumbers, and stuffed pickled cucumbers.

Sukjeo: cucumbers or radish that are cooked first and then made into kimchi.

Jabeop: pickles made with either salt and malt or salt, malt, and cooked rice.
Joyeom: pickles made with salt and rice wine or rice wine lees.
Sanbeop: pickles made with minced garlic mixed with salt.

This text introduces cabbage *jeo* (kimchi), in which gochu pepper is used, and *sanjeo* (garlic kimchi), which is seasoned with ginger, garlic, green onions, and chives. These recipes begin to distinguish between main ingredients and seasonings. The practice of mixing celosia blooms with gochu peppers to improve the color of kimchi is also introduced.

The first instance of a kimchi recipe similar to today's kimchi appears in *Gyeongdo japji* (Customs of the capital, Yu Deuk-Gong late 1700s), under an explanation of how to make *seokkbakji* (radish and cabbage kimchi). In the "Miscellany" chapter the author writes, "Mix radish, cabbage, garlic, gochu powder, conch, abalone, and croaker into the boiled broth of *saeujeot* (salted, fermented shrimp); let the mixture age in a crock until winter. The resulting kimchi is very spicy." This is the first record that mentions the use of jeotgal in a kimchi recipe (Lee 1988).

1800s

In the early 1800s Lady Yi Bingheogak (1759–1824) wrote in *Gyuhap chongseo* (Women's encyclopedia, 1815), "When making seokkbakji, thinly slice the gochu peppers, toss them in seasoning, and layer them between the vegetables." Finding this recipe in a general encyclopedia indicates that kimchi made spicy with red chili pepper, as it is today, had become commonplace by the early nineteenth century.

Along with seokkbakji, *Gyuhap chongseo* also mentions *donga* (winter gourd) seokkbakji and dongchimi. In the recipe for seokkbakji, radish, cabbage, and mustard leaves are pickled in salt for 3 days. Longfin herring jeot (salted and fermented) and sardinella jeot are soaked separately in water for 24 h. A few days before kimchi is put up for the winter, cucumbers pickled the previous summer are brought out (a tarnished brass coin or a brush used to clean brassware can be added to the cucumbers to brighten and green up their color) and soaked in water. An unripe wax gourd is sliced in half and cleaned out. Next, a kimchi crock is placed into the ground, into which the radish and cabbage are placed, layered with eggplant and wax gourd on top, followed by the pickled fish. Finally, a hearty amount of cheonggak (seaweed), green onion, garlic, and gochu are sprinkled on top. The layers are then repeated, beginning again with the radish and cabbage mix, and adding more of the pickled fish broth to taste. Donga seokkbakji, on the other hand, is made by taking a white wax gourd after the first frost and removing the seeds and strings, then filling it up with pickled croaker, adding mixed and pulverized ginger, cheonggak, green onion, and red chili pepper. Next, the lid of the gourd is replaced over a piece of sealing paper. In winter the mixture is poured out of the gourd into a crock, the gourd is peeled and sliced, the rind discarded, and salted water is added. The resulting dish is aged until ready to eat. This method of making kimchi marks the initial forays into adding salt-fermented seafood (jeotgal) and/or raw jeotgal sauce to kimchi. However, the method of mixing significant amounts of chili powder into this type of kimchi or layering seasonings in between cabbage leaves, as in the *tong* (whole cabbage) kimchi eaten today, had not yet been introduced.

In *Imwonsimnyukji*, kimchi made with jeotgal is called "jeotgal kimchi." The general recipe for kimchi in this text features radish with the stem and leaves still attached, to which cucumber and cabbage or other vegetables are added, along with marine products such as seaweed, croaker, abalone, conch, or *nakji* (small octopus), and seasonings, including prickly ash pepper, red chili pepper, garlic, ginger, or mustard, and abalone shell (used to mitigate the sour taste). An amount of salt conducive to jumpstarting lactic acid fermentation would also be added. Kimchi made in this way very nearly approximates the kind of kimchi made today. Ingredients would be adjusted to the maker's liking, to include fruit, meat, mustard greens, and more. In the early 1900s cabbage breeding advanced to the point where the leaves became strong enough to inspire dishes like *bossam* kimchi, which soon became a specialty in Kaesong (now in North Korea): large cabbage leaves shaped into a bowl brimming with kimchi.

"Jeongjoji," the section in *Imwonsimnyukji* on food preparation, lists recipes for 92 types of kimchi and pickled vegetables, making this the most detailed record of kimchi in Korea. In the following table, Professor Lee Sung-Woo categorizes the *chimchae* (Korean kimchi) found in the "kimchi vegetables" section of "Jeongjoji," explaining them as follows (Lee 1975) (Table 7.2):

1. *Nabak* (radish varieties): *hamjeobeop* (young radish kimchi, over-wintered kimchi); *yeomjeobeop* (radish water kimchi, eaten in winter); nabak *hwangajeobeop* (radish leaf kimchi, eaten in spring); *muyeomjeobeop* (no-salt whole radish

Table 7.2 Chimchae (Kimchi) in *Imwonsimnyukji* (Lee 1975)

Type	Method
Nabakhamjeobeop	Similar to the method found in *Sallim gyeongje* (salt-pickled gochu pepper and stems with salted seasonings), in which the salted seasonings are added separately
Nabakdamjeobeop	The addition of gochu pepper is recommended
Nabakhwangajeobeop	Gochu pepper is added
Muyeomjeobeop	No salt is used
Haejeobeop	Similar to the seokkbakji (fermented cabbage and cucumber kimchi) in *Gyuhap chongseo*
Sungjeobeop	Fish and shellfish are excluded
Hwanggwadamjeobeop	Seasonings such as green onion are added
Yongingwajeobeop	Whole cucumber kimchi (made with no seasonings or secondary ingredients, for summer use) and cucumbers pickled in salt (simple, salt-pickled cucumbers without other seasonings) together in one recipe
Dongwoljakgajeobeop	Similar to the method found in *Sallim gyeongje*
Dongwoljakgajeobyeolbeop	Similar to the method found in *Sallim gyeongje*
Hawoljakgajeobeop	Similar to the method found in *Sallim gyeongje*

kimchi, eaten in summer); *haejeobang* (salt-pickled fish brine kimchi, eaten in winter).
2. *Sungjeobang* (cabbage kimchi, eaten in winter).
3. *Hogwajeobeop* (cucumber kimchi): *hwanggwadamjeobeop* (stuffed cucumber kimchi, eaten in summer); *yongingwajeobeop* (whole cucumber kimchi, cucumbers pickled in salt, eaten summer through winter).
4. *Gajeobeop* (eggplant kimchi): whole eggplant kimchi made in winter, whole and stuffed eggplant kimchi made in summer.

Most of the kimchi recipes above are quoted from *Sallim gyeongje* or *Jeungbo sallim gyeongje*, but are comparatively limited in type and contain fewer ingredients. Here the use of mixed vegetables dwindles, while the radish is reinvented as a major player in kimchi-making (Chang 1972). Within radish kimchi, ferments using little salt (damjeo) include dongchimi; *hwangajeo* is radish leaf kimchi; and *haejeo* is *jeotgukji* (vegetables marinated in pickled fish brine); *muyeomjeo* means that salt is not used at all—the radish is placed into hot water until fermentation bubbles begin to form, at which point fresh water is poured over top and it is left to mature. Cabbage kimchi can also be made using the damjeo (low-salt) method. Though many of the Korean kimchi types reproduced in *Imwonsimnyukji* are quoted from *Sallim gyeongje*, some are sourced from Chinese texts, drawing in a broader purview of kimchi types, all of which are described in detail and divided into *eomjangchae* (vegetables fermented with salt, seasonings, and rice wine lees), *jachae* (salted, fermented fish with vegetables), and *jechae* (thinly sliced fermented vegetables). In the eomjangchae category, y*eomeomchae* refers to salt-pickling, and *joeomchae* indicates pickled vegetables made with rice wine lees. The jachae category consists of parboiled vegetables that are mixed with salt, seasonings, and cooked rice (or nuruk, fermented yeast starter) and then aged. The jechae category refers to cucumber, eggplant, gochu, or other fruits and vegetables pickled in soy sauce, within which *chojechae* refers to radish, turnip, ginger, and garlic pickled with salt and vinegar, and chimchae, which, as mentioned above, is almost the same as today's kimchi.

Types of jeotgal newly introduced in *Imwonsimnyukji* point to a significant increase in jeotgal dishes during the Joseon dynasty, including shrimp, squid, oyster, razor clam, giant clam, short-necked clam, *yeoleo* (a fish in the anchovy family), roe, and more. As jeotgal is used to season kimchi, kimchi varieties with novel flavors were created by its addition. Jang Hak-Yu records the October song of "Nongga wollyeongga" (Songs of annual farming events, 1835–1849) as follows:

> Harvest the radish and cabbage to make winter kimchi;
> Wash them well in a stream and then salt just enough to impart a salty flavor.
> Then add pickled fish sauce, gochu, garlic, ginger, and green onion;
> Pack this into an earthenware crock.
> Find a sunny spot of ground, dig a hole big enough to hold the crock,
> Pack the crock with straw, and then bury the crock.
> Put up another crock for jangajji in a straw pit house.

This record indicates that the making of kimchi each year was an important annual event not to be missed.

Kimchi dishes that appear in *Dongguk sesigi* (Korean seasonal customs, 1849) include seokbakkji, nabak kimchi, dongchimi, and jang kimchi. Jang kimchi consists of radish, cabbage, water dropwort, and ginger submerged in jang. This method of making kimchi has been passed down through the years to today and is categorized as *jangjeo*, or sauce kimchi. Late Joseon kimchi in this style used radish, cabbage, cucumber, mustard greens, and eggplant as the main ingredients, mixed with secondary ingredients like water dropwort, pine mushroom, sweet flag, and chives, finishing with seasonings such as garlic, gochu pepper, gochu powder, ginger, green onion, prickly ash pepper, and green seaweed. This type of kimchi presents a marked change from the kimchi of early Joseon and is seen as the progenitor of today's seasoned kimchi. The transition to more diverse types of kimchi also represents a positive nutritional development: the increased use of gochu and jeotgal, including clam jeot and pickled longfin or large-eyed herring jeot, to name a few, provided excellent sources of calcium and protein.

In *Buin pilji* (Indispensable knowledge for wives, c. 1855), chimchae products are categorized as follows: dongchimi, *myeongwol saengchi* (raw pheasant is boiled with fermented vegetables, the fat is skimmed off, the pheasant meat is shredded, and the pheasant and vegetables are placed into water radish kimchi broth), *yonginwoeji* (cucumber is placed into a large jar; the clear water after rinsing rice is combined with cold water and mixed with salt and then poured into the jar; the following day, water is boiled separately, cooled, and then poured in), *jangjjanji* (in summer, young cucumber, radish, and cabbage are simmered gently, then pickled with jang [fermented soybean sauce]; thinly sliced green onions and ginger are added together with green onions, green seaweed, and gochu pepper in layers; cold water is mixed with good jang, boiled down, and poured in; then the mixture is left to age), abalone kimchi, and more (Hwang 1980).

Examining the sources above, it appears that the method of making kimchi by boiling down pickled fish sauce (jeotguk) with gochu powder began in the latter half of the nineteenth century. At the turn of the twentieth century, about the time Koreans succeeded at growing the larger heads of cabbage currently used for putting up kimchi, the amount of gochu (red chili pepper) incorporated into kimchi increased dramatically. The cabbage, called *baechu* in Korean, and known in the West as Chinese or napa cabbage, is a vegetable with a long history on the Korean Peninsula. References to baechu in Korean records date back to the Goryeo dynasty (founded 918 CE), but that kind of cabbage, although bearing the name baechu, was small, with an insubstantial head, and it is thought that this cabbage was not used as a base food. Large baechu with a substantial inner head began to be bred by cultivators in Korea in the 1850s (Cho 1991). Today's baechu is easy to cultivate, boasts a sweet flavor, and is well-suited to pickling—so much so that it now commands the biggest share of any kimchi vegetable and is the first dish people outside of Korea usually think of when kimchi is mentioned.

From this time forward, the main types of kimchi consisted of cabbage and radish. Across the country people added regional variations of kimchi, and by the end of Joseon kimchi methods had developed remarkably and become more refined than many other culinary dishes. The making of native kimchi had become a foundational element of home cuisine. References to over 50 kinds of kimchi can be found in the texts mentioned above and in other food-related literature through the mid-1800s (Chang 1972). These are presented in Table 7.3, divided into everyday *jeochae* (kimchi vegetables), *chimjang jeochae* (stored kimchi vegetables), and *eomchae* (pickled vegetables).

Currently there are at least 60–100 types of regular kimchi. For the past 300 years, kimchi has been made with gochu and jeotgal (salt-fermented seafood), a tradition not seen in China or Japan. During China's Song dynasty (960–1279) many people in China ate *sikhae*, fish fermented with rice, but this practice declined during the ensuing Yuan dynasty. Song-era sikhae was a mix of "rice, fish, salt, and seasonings" (dried orange peel and boxwood were sometimes used, but mostly prickly ash pepper). Sikhae has almost entirely disappeared from modern-day China, and in Japan it has transformed into made-to-order fish sushi, but in Korea sikhae is linked to kimchi, and its original form can now be found solely in Hamgyeong province in North Korea. The seasonings once used for sikhae have become essential ingredients of kimchi.

Scientific research on kimchi began in Korea in the 1960s, and extensive publications on the topic have appeared since then. Among these, of particular interest is "The Science of Kimchi," a collection of papers presented at a symposium hosted in 1994 by the Korean Society of Food Science and Technology, and this author's book *Fermentation Technology in Korea*, published by Korea University Press in 2001 (Lee 2001).

7.2 The History and Distinctive Features of Jeotgal (Salt-Fermented Seafood)

Of the many ways to classify traditional Korean foods, the first division ought to be between salted and unsalted foods. Fermentation methods that do not use salt include the making of alcohol and vinegar. Other than these, nearly all fermentation techniques involve salt, including every kind of jang (fermented soybean sauce), kimchi, and jeotgal. Jeotgal is popularly referred to as fermented seafood, but strictly speaking, fermented seafood and marine products can be divided into jeotgal and sikhae.

7.2.1 History of Fermented Marine Products

Although the origin of jeotgal-making reaches back as early as the Primitive Pottery era (8000–5000 BCE), written records of jeotgal production appear much later (around 1000 BCE). The Chinese record *Zhouli* (Rites of Zhou, Confucius third century BCE) contains characters that refer to fermented marine products: *hai* (Kor.

Table 7.3 Types of chimchae appearing in Joseon-period literature (Chang 1972)

(1) Sangyongjeochae (common use and spring, summer, and autumn kimchi)

Division/type of kimchi	Record in which it appears							
	Sejong	Seongso	Sasi	Gyugon	Saekgyeong	Sallim	Imwon	Dongguk
Damjeo (low-salt kimchi)								
Mancheongjeo (turnip)	⊙			⊙	⊙	⊙		⊙
Gujeo (chives)	⊙							
Geunjeo (parsley)	⊙					⊙		
Chongjeo (welsh onion)			⊙					
Sanjeo (garlic)				⊙				
Gyujeo (mallow)					⊙			
Nabakwhangajeo (radish greens)						⊙	⊙	
Nabakjeo (radish)						⊙		
Hwangwajeo (cucumber)						⊙	⊙	
Yongingwajeo (whole cucumber)						⊙	⊙	
Hawoljakgajeo (whole eggplant)						⊙	⊙	
Hawoljakgajeo (stuffed eggplant)						⊙		
Gaejeo (mustard)						⊙		
Changpojeo (iris)						⊙		
Sungjeo (cabbage)								⊙

Hamjeo (high-salt jjanji)								
Juksunhae (bamboo shoot)		⊙				⊙		
Hwanggwahamjeo (cucumber)						⊙		
Hwanggwasukjeo (cucumber)						⊙		
Geunhamjeo (parsley)						⊙		
Gaejeo (mustard)						⊙		
Yukjeo (kimchi with meat)								
Saengchijeo (raw pheasant)				⊙				
Muyeomjeo (no-salt kimchi)								
Sangaejeo (mustard)		⊙		⊙		⊙		
Muyeomjeo (whole radish)							⊙	
Abbreviations								
Sejong: *Sejong sillok* (Veritable records of King Sejong, 1392–1865)								
Seongso: *Seongsobokbugo* (Classics of children and adolescents, by Heo Gyun c. 1613)								
Sasi: *Sasichanyocho* (Necessities for every season)								
Gyugon: *Gyugon siuibang* (A mother's cookbook for her daughter-in-law)								
Saek: *Saekgyeong* (Regional farming, by Park Se-Dang 1676)								
Sallim: *Sallim gyeongje* and *Jeungbo sallim gyeongje* (Farm management and revised farm management)								
Gyuhap: *Gyuhap chongseo* (Women's encyclopedia)								
Imwon: *Imwonsimnyukji* (Encyclopedia of rural life)								
Dongguk: *Dongguk sesigi* (Korean seasonal customs)								

(continued)

Table 7.3 (continued)

(2) Chimjangjeochae (Kimchi prepared for winter and over-wintering)						
	Record in which it appears					
Division/type of kimchi	Sasi	Gyugon	Sallim	Gyuhap	Imwon	Dongguk
Damjeochae (low-salt kimchi)						
Nabakdongchimi (radish)			⊙	⊙	⊙	⊙
Donggwajeo (cucumber)			⊙			
Sungjeo (cabbage)			⊙		⊙	
Dongwolgajeo (eggplant)			⊙		⊙	
Dongwolgajeo (2)			⊙		⊙	
Gaejeo (mustard)			⊙			⊙
Hamjeochae (high-salt kimchi)						
Nabakhamjeo (radish)			⊙		⊙	
Mancheonghamjeo (radish)						
Hwanggwahamjeo (cucumber)	⊙	⊙	⊙			
Yongingwajeo (cucumber)			⊙		⊙	
Yukjeochae (kimchi with meat)						
Sungjeo (cabbage)			⊙			
Haejeo (kimchi with fermented fish)						
Hamjeo (fish sauce, seokbakkji)				⊙	⊙	⊙
Donggwajeo (cucumber, seokbakkji)				⊙		
Jangjeo (fish with soybean sauce)						
Jangjeo (soy sauce, seokbakkji)						⊙

(3) Eomchae (High-salt Jangajji)

Division/type of jangajji	Record in which it appears					
	Sasi	Gyugon	Saekgyeong	Sallim	Gyuhap	Imwon
Jeupjangryu (Jangajji with fermented cereals)						
Jeupjeo (cucumber)	⊙			⊙		
Jeupjeo (eggplant)	⊙		⊙			
Janggaechae (Jangajji marinated in soybean sauce)						
Sunggaebeop (cabbage)				⊙		⊙
Hwanggwagaechaebeop (cucumber)				⊙		⊙
Donggwasanbeop (garlic)				⊙		⊙
Jangchae (Jangajji marinated in soybean paste)						
Janggabeop (eggplant)				⊙		
Janghwanggwabeop (cucumber)				⊙		
Jangjachongbeop (welsh onion)				⊙		⊙
Janggangsunbeop (bamboo shoot)						⊙
Jangmanchobang (red pepper)						⊙
Jangsasambang (deodeok)						⊙
Janggilgyeongbang (bellflower root)						⊙
Jangyukjeo (Jangajji with meat)						
Saengchihamjeo (raw pheasant)		⊙				
Saengchijeo (raw pheasant)		⊙				
Haechae (Jangajji in fish sauce)						
Janghwanggwabeop (cucumber)				⊙		

hae), *zha* (Kor. *ja*), and *qi* (Kor. *ji*). Hai refers to alcohol, mold starter, fermented yeast starter, or salt used in a curing sauce to salt-ferment animals, birds, or fish. Hai and jiang (Kor. jang) are made using the same fermentation techniques and thus can only be distinguished by their ingredients. *Shuowen jiezi*, a second-century Chinese dictionary, indicates a similar idea in an entry stating that "hai" is the same as "*rou jiang*" (Kor. *yukjang*, fermented meat sauce). Zha is thought to pertain to different types of fish mixed with cooked rice and vegetables and then salt fermented, which is the same as today's sikhae. Qi means *eoyukjang*, a sauce made of salt-fermented fish similar to hai.

The sixth-century CE Chinese text *Qimin yaoshu* discusses ingredients used in the making of fermented marine products, including jakjang (fish sauce using rice wine), meju (soybean fermentation starter), nuruk (rice wine fermentation starter), and eoyukjang, which uses grains, vegetables, and salt. The *chuk-i* method for making fermented fish guts uses only salt, but one must take care to use the right amount: too little results in spoilage, while too much overwhelms the flavor.

As mentioned above, *Samguk sagi* (compiled 1145) is the first Korean record to refer to a fermented marine product, in the Silla Annals of King Sinmun (683 CE), in which culinary gifts to his bride's family included fermented fish (hae), rice, rice wine, soy sauce, doenjang, and dried beef. Goryeo dynasty records reveal foods such as *eoyukjanghae* (similar to eoyukjang), fish fermented only with salt (*jiyeomhae*), and various kinds of sikhae (Chang 1976).

Among Joseon dynasty records, personal diaries written by private individuals have proved to be important primary sources of food culture. For example, Yu Hee-Chun's *Miamilgicho*, written in 1560, and Oh Hee-Mun's *Soemirok*, written in 1600 during the Imjin War, provide valuable information regarding types of fermented marine products in use at the time. These references have been compiled by Professor Chang Chi-Hyun and appear in the following chart (Tables 7.4 and 7.5) (Lee et al. 1986).

By the 1600s in Korea, then, the main technique for fermenting marine products consisted of salt-only fermentation, or jiyeomhae. Noodlefish jeot, shrimp jeot, clam jeot, and oyster jeot were made in this manner, as were some types of sikhae. Later texts such as *Sallim gyeongje*, *Jeungbo sallim gyeongje*, and *Eumsik jimibang* delineate four main methods of fermentation for marine products: *yeomhae* (salt curing/fermentation); *jugugeo* (fermentation with rice wine, nuruk, and salt); eoyukjang (fermentation with salt and nuruk); and sikhae (fermentation with light salt and cooked rice/millet). However, among these methods, it is unlikely that jugugeo or eoyukjang were native to Korea; they are more likely to have been introduced to the peninsula in Chinese records. In conclusion, the literature reveals that most Korean fermented marine products were salt fermented, and while the relatively complicated salted hae methods persisted, sikhae fermentation methods (bacterial) developed with the addition of vegetables and rice.

Table 7.4 Fermented marine products found in *Miamilgicho* (Yu, Hee-Mun 1560) (Chang 1976)

Fermented marine products
I. Types of *Hae* (animals fermented by various methods)
a. Eoyukjanghae (salt-fermented fish in meat dishes)
i. *Suryuhae* (fermented land animals): *Saseumjeot* (deer sauce)
ii. *Joryuhae* (fermented fowl): *Saengchijeot* (raw pheasant sauce)
b. *Jiyeomhae* (salt-fermented seafood)
i. *Eoryuhae* (fish): *Baengeojeot* (noodlefish jeot, 2[a]); *baendaengijeot* (large-eyed herring, 3); *jeoneojeot* (shad, 1); *cheongeojeot* (herring, 1); *eohae* (unspecified fish, 2)
ii. *Paeryuhae* (shellfish): *Honghapjeot* (mussel jeot, 1); *guljeot* (oyster, 2); *jogaejeot* (clam, 1); *garimajeot* (abalone jeot, 4)
iii. *Gapgangnyuhae* (crustaceans)
1. *Hahaeryu* (shrimp): *Baekhajeot* (lesser glass shrimp jeot, 5); *gonjaengijeot* (neomysis, a tiny shrimp, 1); *bomjeot* (spring shrimp, 1); *yukjeot* (shrimp caught in the sixth month, 2); *chujeot* (fall shrimp, 1)
2. *Haehaeryu* (crab): *Gejeot* (crab jeot, 8)
iv. *Eoranhae* (roe): *Jogialjeot* (corvina roe jeot, 2); *aljeot* (unspecified roe, 2)
v. *Bokjanghae* (fish innards): *Godeungeobokjangjeot* (mackerel innards jeot, 1)
vi. *Honjanghae* (mixed innards): *Saengseon*, *jeonbokjeot* (fish and abalone innards jeot, 1)
II. Types of Sikhae (fish or meat fermented with rice or millet)
a. *Eoryusikhae* (fish sikhae): *Sungeosikhae* (gray mullet, 1); sikhae (unspecified sikhae, 2)
b. *Paeryusikhae* (shellfish sikhae): *Jeonboksikhae* (abalone sikhae, 4)

[a]The numeric digit in () indicates the number of times the given dish is mentioned in the text

Table 7.5 Fermented marine products found in *Soemirok* (Oh Hee-Mun 1600) (Chang 1976)

Fermented marine products
I. types of *Hae* (animals fermented using various methods)
a. *Jiyeomhae* (salt-fermented seafood)
i. *Eoryuhae* (fish): *Baeng-eojeot* (noodlefish jeot, 5[a]); *galchijeot* (cutlassfish, 1); *ungeojeot* (anchovy, 4); *godeungeojeot* (mackerel, 3); *junchijeot* (shad, 1); *jogijeot* (corvina, 1); *hwangeojeot* (dace, 1); *gajamijeot* (halibut, 1); *nyeoneojeot* (sweetfish, 2); *daegujeot* (cod, 1); *cheoneojeot* (fresh-water fish, 2); *eojeot* (unspecified fish jeot, 1)
ii. *Paeryuhae* (shellfish): *Jogaejeot* (clam jeot, 2); *guljeot* (oyster, 1)
iii. *Gapgangnryu* (crustaceans)
1. *Hahaeryu* (shrimp): *Hahae* (shrimp, 7); *baekhahae* (white shrimp, 5); *yangsaekhae* (bi-color shrimp, 2); *samsaekhae* (tri-color shrimp, 1)
2. *Haehaeryu* (crab): *Sehaehae* (small crab, 1); *haehae* (crab, 10)
iv. *Eoranhae* (roe): *Godoeoranhae* (mackerel roe, 1); *daegueoranhae* (cod roe, 3)
v. *Bokjanghae* (fish innards): *Godoeobokjanghae* (mackerel guts, 1); *bokpihae* (guts and skin, 1)
b. Types of Sikhae (fish or meat fermented with rice or millet)
i. *Eoryusikhae* (fish sikhae): *Byeongeo* (pomfret sikhae, 1); *juneosikhae* (herring, 2); *ungeosikhae* (anchovy, 2); *yeolmogisikhae* (fresh-water salmon, 1); *cheoneosikhae* (fresh-water fish, 5); sikhae (unspecified sikhae, 2)
ii. *Joryusikhae* (fowl sikhae): *Saengchi sikhae* (raw pheasant, 2)
II. Types of processed Hae
a. *Haechaeryu* (salt-preserved fish and vegetables): *Haechae* (fish sauce mixed with vegetables)
b. *Haejeoryu* (fermented fish and kimchi): *Chimhaecheonggeun* (fish sauce mixed with green turnip leaves)

[a]The numeric digit in () indicates the number of times the given dish is mentioned in the text

7.2.2 Classification of Korean Fermented Marine Products

The classification of Korean fermented marine products consists of two major groups, jeotgal and sikhae. Jeotgal can be further divided into high-salt jeotgal, with a 20% concentration of salt, and low-salt jeotgal, with about 10% salt. Aside from these, there are also salted and dried yellow corvina (gulbi) and other salt-preserved fish (*jaban*), the preservation of which depends more or less on the work of microorganisms, although the degree to which bacteria promotes fermentation in these cases has not yet been investigated (Lee 1993). Between July 1985 and April 1986, six universities from each region of South Korea engaged in a joint study to discover and classify jeotgal throughout the country. Scholars confirmed a total of 31 kinds in use at the time, the main ingredients of which indicated four unique types: whole fish, fish innards, clam, and crustaceans (Lee et al. 1986). Further, the Cultural Heritage Administration (formerly Office of Cultural Properties) published a volume containing 15 more kinds of jeotgal (*Hanguk minsok jonghapjosabogoseo* vol. 15, 1985), for a total of 46 types. Most sikhae uses gutted fish as a base ingredient, although pollack roe sikhae has also been discovered. In all, eight different base ingredients for sikhae were found in the study (Fig. 7.1).

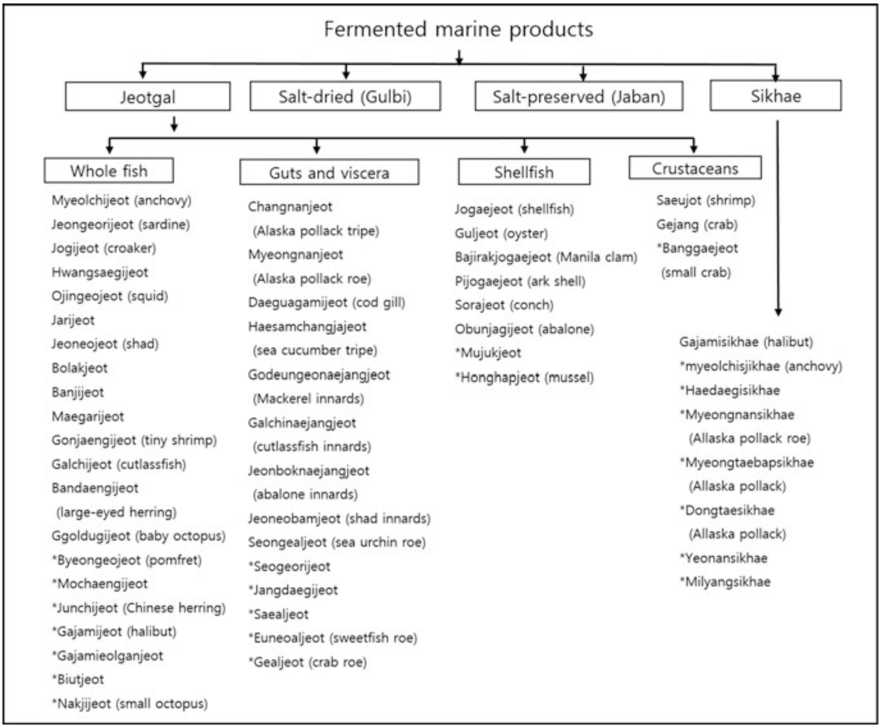


Fig. 7.1 Types of fermented marine products in Korea. **Hanguk minsok jonghapjosabogoseo* vol. 15, 1985

7.2.3 *Characteristics of Jeotgal Manufacture*

As discussed above, jeotgal is made with a salt concentration of 10–20%. Low-salt jeotgal, at the 10% level, is observed in some instances of oyster jeotgal or pollack roe jeotgal, but long-term storage of low-salt jeotgal is problematic. Most jeotgal recipes contain about 20% salt content and can be stored for a period of 3 months or more, even up to a few years. Figure 7.2 presents a flowchart of the general process used in the manufacture of Korean jeotgal (Lee et al. 1986). A feature of Korean jeotgal is that the same method of salt-preservation is used both for making jeotgal, in which the fish body maintains its original shape over a period of 2–3 months of fermentation, and for making a liquid form called *jeotguk* (fish sauce), in which the fermentation period is extended to 6–12 months.

Whole fish
↓
20% salt added
↓
Packed into a dark container
↓
Topped with a layer of salt 2-3 cm thick
↓
Covered with an air-tight lid
↓

↓	↓
Fermented 2-3 months at room temperature	Fermented 6-12 months at room temperature
↓	↓
Finished product retains original shape of fish	Crushed until ground
↓	↓
Jeotgal (fish paste) used for seasoning	Pushed through a sieve → residue
	↓
	Boiled
	↓
	Jeotguk (fish sauce)

Fig. 7.2 General process of making Jeotgal

7.2.4 Characteristics of Sikhae

Sikhae is a unique kind of fermented product typically made by combining lactic acid-fermented grains with fermented, gutted fish. Figure 7.3 demonstrates the production process of sikhae. Fish that has pickled in 6–8% salt for 1 week is mixed with gochu powder, garlic, and cooked millet or rice and then fermented 2–3 weeks at a temperature of 20 °C (68 °F). Here the starch from the millet or rice promotes acid-forming bacteria, including lactic acid, which causes the pH to quickly fall below 5.0, thereby preparing the dish for storage (Moussa et al. 1987).

Taking gajamisikhae (halibut) as an example, optimal flavor is reached after 2 weeks of fermentation, when the amino-nitrogen content attains its maximum level, and the volatile basic nitrogen content increases sharply. The hardness of fish, including the bones, begins to decrease on the third day of fermentation and is reduced to 25% of the raw fish after 2 weeks of fermentation. Further fermentation leads to rapid softening (Lee et al. 1983; Lee 2001).

Fig. 7.3 Sikhae production process

Whole fish

↓

Innards removed

↓

Cleaned and cut or cut-marked

↓

Pickled in 8% salt
18-20 hours

↓

Salty water drained

↓

Mixed with cooked millet, gochu powder, and garlic

↓

Fermented 2-3 weeks at 20°C

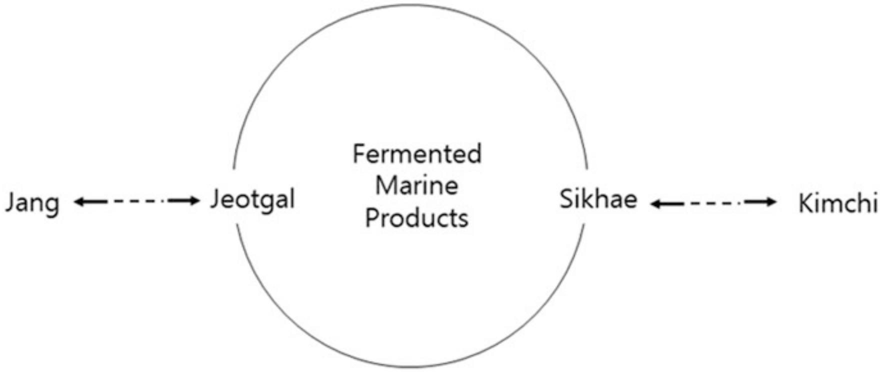


Fig. 7.4 The food science position of Korean fermented marine products

7.2.5 The Position of Marine Fermentation Technology in the Food Sciences

Marine fermentation's two major arteries, jeotgal and sikhae, encompass all the manufacturing techniques of fermented food products in Korea except alcohol and vinegar. The decomposition of jeotgal pivots on microorganisms that break down the animal proteins in seafood, producing beneficial amino acids and small-molecule peptides, along with good flavor. This process is similar to the decomposition of jang, which relies on the breakdown of soybean proteins. Meanwhile, sikhae fermentation relies on microorganisms that form acids from vegetable carbohydrates and therefore requires a relatively low amount of salt to check the growth of bacteria, and by this means the form of the fish is retained. This principle also applies to the making of kimchi (Lee and Ahn 1995) (see Fig. 7.4).

References

Chang, Chi-Hyun. 1972. Hanguk balhyo sikpum ui hyeonjuso [The future prospect of traditional Korean fermented foods]. *Hanguk singmunhwa yeongu* [Korean food culture] vol. 6. Seoul: Korea University Research Institute of Korean Culture.

———. 1975. Hanguk jeochalryu giwongo [The origin of Korean salted and fermented vegetables]. SungShin Women's University Thesis Collection, vol. 6.

———. 1976. Hanguk jeollae haeryusikpum jejosa [History of Korean fermented fish processing technology]. SungShin Women's University Thesis Collection, vol. 7:78–183.

———. 1989. *Hanguk jeonrae balhyosikpumsa yeongu [History of Korean fermented foods]*. Suhaksa.

Cho, Baek-Hyun. 1938. Jeochaego [An investigation of salted fermented vegetables]. In *Suwonnonghakhoebo* [Suwon agricultural report], vol. 3.

Cho, Hu-Jong. 1991. Kimchiwa jeontong siksaenghwal [Kimchi and the traditional diet]. *Gugmin yeongyang* [National nutrition]:91–5.

Hanguk eumsik munhwa yeonguwon. 1991. Kimchiryu [Kimchi]. *Hanguk eumsik munhwa yeonguwon nonmunjip* [Institute of Korean Food Culture Thesis Collection].

Hwang, Hae-Sung. 1980. *Hanguk eumsik* [Korean food]. Seoul: Minseo Publishing.

Korean Society of Food Science and Technology. 1994. *Kimchi ui gwahak* [The science of kimchi]. Seoul: KoSFoST.

Kwon, Dae-Young, Chung Kyung-Ran, and Yang Hae-Jung. 2017. *Gochu jeollae ui jinsil* [The truth about the introduction of the chili pepper to Korea]. Seoul: Jayu akademi.

Lee, Cherl-Ho. 1999. Dongbugasia wonsitogimunhwa sidae ui teukjanggwa sikpumsajeok jungyoseong [The Primitive Pottery age of Northeast Asia and its importance in Korean food history.]. *Minjok munhwa yeongu*. [Korea Cultural Studies] 32: 325–357.

———. 2001. *Fermentation Technology in Korea*. Seoul: Korea University Press.

Lee, Cherl-Ho, and Ahn Bo-Sun. 1995. Kimchie gwanhan munheonjeok gochal, I: Kimchi ui jejo yeoksa [Literature Review on Kimchi, Korean Fermented Vegetable Foods, I: History of Kimchi-making]. *Hanguk siksaenghwalmunhwahakhoeji*. [Korean Journal of Dietary Culture] 10 (4): 311–319.

Lee, Cherl-Ho, Lee Eung-Ho, Lim Moo-Hyun, Kim Su-Hyun, Chae Su-Kyu, and Lee Keun-Woo. 1986. Hanguk ui susanbalhyosikpum [characteristics of Korean fish fermentation technology]. *Hanguk siksaenghwalmunhwahakhoeji*. [Korean Journal of Dietary Culture] 1 (3): 267–378.

Lee, Cherl-Ho, Cho Tae-Sook, Lim Moo-Hyun, Kang Ju-Hee, and Yang Han-Cheol. 1983. Gajamisikhaee gwanhan yeongu [Studies on gajami sikhae]. *Hanguk saeommisaengmulhakhoe*. [Korean Journal of Applied Microbiology and Biotechnology] 11 (1): 53–58.

Lee, Cherl-Ho and Kwon Tai-Wan. 2003. *Hanguk sikpumhak immun* [Introduction to Korean food science]. Seoul: Korea University Press.

Lee, Cherl-Ho, and Park Hyun-Jin. 2018. Food Biotechnology. In *Food Science and Technology*, ed. G. Campbell-Platt, 105–136. Oxford: Wiley-Blackwell.

Lee, Chun-Nyoung. 1964. *Yijo nongupgisulsa [History of the agricultural technology in Joseon Kingdom], Hankukyeonguchongseo 21*. Research Institute of Korean Studies.

Lee, Chun-Nyoung, and Cho Jae-Sun. 1988. Kimchi jejo mit yeongusa [History of kimchi processing and research]. *Hanguk eumsik munhwayeongunonchong*. [Journal of Korean food culture] 1: 83–86.

Lee, Jung-Hee. 1992. Hanguk kimchiryu ui byeonhwae daehan gochal [A review on the historical changes in Korean kimchi]. SungShin Women's University Department of Living Science Thesis Collection.

Lee, Seo-Rae. 1986. *Hanguk ui balhyosikpum* [Fermented food in Korea]. Seoul: Ehwa Womans University Press.

Lee, Sung-Woo. 1975. Jung-Han-Ileseo ui kimchiryu ui byeoncheongwa gyoryue gwanhan yeongu [Studies on Movements and Interchanges of Kimchi in China, Korea and Japan]. *Hanguk yeongyangsingnyanghakhoeji*. [Journal of the Korean Society of Food Science and Nutrition] 4 (1): 71–95.

———. 1984. *Hanguk sikpummunhwasa* [History of Korean food culture]. Paju: Kyomunsa.

———. 1988. Kimchi ui munhwa [The culture of kimchi]. *Sikpumgwahakgwa saneop*. [Food Science and Industry] 21 (1): 40–45.

Lee, Sung-Woo, and Kim Gwi-Young. 1986. *Jubangmun* ui jorie gwanhan bunseokjeok yeongu [Analytical study on the cooking in *Jubangmun*]. *Hanguk siksaenghwalmunhwahakhoeji*. [Korean Journal of Dietary Culture] 1 (4): 335–349.

Moussa, Souane, Kim Young-Bae, and Lee Cherl-Ho. 1987. Gajamisikhye balhyoe gwanyohaneun misaengmule gwanhan yeongu [Microbial characteristics of gajami sikhye fermentation]. *Hanguk misaengmul, saengmyeonggonghakhoeji*. [Microbiology and Biotechnology Letters] 15 (3): 150–157.

Choi, Nam-Sun. 1948. *Joseonsangsik [Korean Common Sense]*. Hyunamsa.

Park, Chaelin. 2014. Korean Kimjang Culture: History, Significance and Future. In *Humanistic Understanding of Kimchi and Kimjang Culture*, 39–82. Trans. Sarah Kim. Gwangju City, Korea: World Institute of Kimchi.

Yoon, Deok-In. 1979. Kimchi gagongbeobe isseoseo ui Joseonchogiwa hugi ui gochal [Studies on kimchi processing in the early and late Joseon dynasty]. Master's thesis, Chungang University.

Yoon, Seo-Seock. 1987. Jeongchangwon gomunseoeseo yuchuhan Hanguk godae ui jangnyuwa chaesojeolim [The origin of soy sauces and salted vegetables of ancient Korea on the basis of records at Jeongchangwon (Shōshōin Shoso Repository)]. *Saenghwalgwahaknonjip*. [Domestic science letters] 1: 91–102.

———. 1988. "Kimchi ui yeoksa" [History of Kimchi]. *Hanguk sikpumjorigwahakhoeji*. [Korean Journal of Food Cookery Science] 4 (1): 89–95.

———. 1991. "Hanguk kimchi ui yeoksajeok gochal" [A historical review on Korean kimchi]. *Hanguk siksaenghwalmunhwahakhoeji*. [Korean Journal of Dietary Culture] 6 (4): 467–477.

Chapter 8
The Development and Distinctive Features of Korean Non-alcoholic Beverages

Abstract Traditional non-alcoholic beverages have deep cultural roots in Korea and command a strong presence at holiday tables, ancestral rites, and banquets. Over time, tea, punch, and other drinks in this category developed as post-meal libations, and some acquired symbolic meaning. Traditional beverages come in many forms, each with a host of varying recipes. Historical cookbooks record the ingredients used in these beverages, hinting at the close ties between the people and their drinks, many of which constituted delicacies, special diet drinks, and ceremonial oblations. A literature review was made to elucidate the historical background of Korean beverages and the varieties. The traditional beverages were classified by ingredients and the method of preparation. Tea recipes and production skills of various types of beverages (cha, tang, jang, etc.) were introduced.

Traditional non-alcoholic beverages have deep cultural roots in Korea and command a strong presence at holiday tables, ancestral rites, and banquets. Over time, tea, punch, and other drinks in this category developed as post-meal libations, and some acquired symbolic meaning. Traditional beverages come in many forms, each with a host of varying recipes. Historical cookbooks record the ingredients used in these beverages, hinting at the close ties between the people and their drinks, many of which constituted delicacies, special diet drinks, and ceremonial oblations. Unfortunately, the influx of foreign drinks in modern times has resulted in the dwindling of traditional non-alcoholic beverages in Korean culture (Lee and Kwon 2003).

8.1 Historical Background of Traditional Korean Beverages

The history of drinks begins with the history of humankind, the first drink being that indispensable sustainer of life, water. A chapter on food preparation, "Sikgamchwalyo," in the book *Imwonsimnyukji* (Encyclopedia of rural life, Seo Yu-Gu c. 1827) lists twelve distinct kinds of water: *chongsu* (all water), *jeongsu*

C.-H. Lee, *Korean Food and Foodways*,
https://doi.org/10.1007/978-981-19-0023-5_8

(well water), *yusu* (flowing water), *sanamcheonsu* (mountain rock spring), *eumjiyucheon* (shady stream), *taekjungjeongsu* (clear water from the center of a river), *sahajungsu* (sand river water), *yangsanlaesu* (valley water), *oncheonsu* (hot spring water), *yuhyeolsu* (milky cave water), *usu* (rain water), and *hasu* (summer water) (Lee 1985b). The Chinese text *Liang shu* (Book of Liang, compiled by Yao Silian 635 CE), in its article on Goguryeo (37 BCE–668 CE), states that "the people of Goguryeo drink *yunsu*," meaning that they drink valley water (Lee 1978). Korea acquired the nickname "land of beautiful scenery" due to its topography of mountains and valleys, and its ancient inhabitants were able to imbibe the clean water springing from hills and flowing through ravines. Bowls of collected *jeonghwasu* (clear water) were imbued with ritually symbolic meaning and placed alongside shrine offerings or used at wedding ceremonies as a vehicle for the bride and groom's 100-year vows.

Cave drawings by early modern humans suggest that honey water was a primitive drink made in ancient times by hunter-gatherers. In Chinese literature such as *Zhouli* (*Rites of Zhou*) and *Li ji* (*Book of Rites*), possibly dating from as early as the Warring States period (403–221 BCE), the following drinks appear: a sweet alcohol called *li*, a malted water called *yi* (酏), a green plum water called *yi*, a flour water called *liang*, and a sour beverage made of fermented grain called *jiang* (Lee 1998). In *Garakguggi* (the founding legend of Geumgang Gaya of the Gaya Confederacy [c. 42–532]), King Suro offers unnamed beverages to the retainer and the slave who brought his bride from a distant land. Two contemporary beverages were called *nanaek* and *hyeseo*: nanaek is thought to have been a fresh beverage garnished with the scent of orchid, while hyeseo seems to have been a fermented drink infused with orchid (Chang 1989).

These and other historical texts reveal the use of native flowers and fruits to flavor drinks in ancient times. For example, a botany text from Liang dynasty (502–557), China, praises the Korean schisandra (5-flavor) berry as being of the highest quality for drinks, and the Song dynasty's *Ben cao tu jing* (Atlas of *Materia medica*, eleventh century) mentions Koreans drying mint and making tea from its leaves. Although Korean historical texts do not mention such beverages until much later, these Chinese references indicate the possibility that such drinks were already being enjoyed during the Three Kingdoms period in Korea (57 BCE–668 CE) (Lee 1978).

The challenge inherent to using natural fruit, sprouts, or roots in beverages is their potential toxicity to the human body. People have long called upon their senses of smell, taste, and sight to discern whether a food is poisonous, as evidenced in the legend of Shennong (a prehistoric folk deity of China, Korea, and Vietnam). According to *Huainanzi* (Writings of Huainan masters, compiled c. 139 BCE), the mythical Shennong tasted every plant he encountered, suffering 70 bouts of food poisoning per day until he was able to determine the edibility of all plants.

The pottery era ushered in the discovery that many plants could be boiled to desirable effect, and soon hot drinks would enter the culinary lexicon. In time, increasingly many wild edible plants that smelled and tasted good were steeped and ingested as non-alcoholic beverages. According to *Samguk sagi* (History of the Three Kingdoms [Goguyreo, Baekje, and Silla], compiled 1145 CE), tea came to the

Korean peninsula during the reign of Seon-Deok (r. 632–647), 27th king of Silla. Hong-Deok, 42nd king of Silla, journeyed to Tang, China, and returned with tea bush seeds, with which he sowed the first tea plant in the Jiri Mountains. Introduced to Korea about the same time as Buddhism, tea came to be distributed among members of the royal family, Buddhist monks, and the Hwarang (an elite youth military group).

The habit of drinking tea that prevailed toward the end of Silla proved even more popular during the Goryeo dynasty (918–1392), a Buddhist state, when tea became de rigeur at national festivals such as *Yeondeunghoe* (the Lantern Festival) and *Palgwanhoe* (the Festival of Eight Vows). The offering of tea to the sovereign at the beginning of a national feast became an important ceremony, and the government office in charge of this ritual established a tea house. According to *Xuanhe fengshi Gaoli tujing* (Illustrated account of the Xuanhoe embassy to Goryeo, 1124; hereafter *Gaoli tujing*), written by the Chinese envoy Xu Jing, who visited Goryeo during the first year of King Injong's reign, "Although the custom of drinking tea flourished, any improvement in quality was trivial, and the tea ceremony was exceedingly formal." This passage suggests that Chinese tea was exported to Goryeo, where it was both consumed as a drink informally and used in ceremonial events (Seo 1977).

With the ushering in of the Joseon dynasty in 1392, the custom of drinking tea declined across the social spectrum due to the new ruling monarchy's rejection of Buddhism. By contrast, in Japan the traditional tea ceremony continued to expand its reach. According to Sin Suk-Ju's *Haedong jegukgi* (Record of nations beyond the East Sea, c. 1470), "The Japanese love drinking tea and have erected several roadside tea houses. People passing by pay a little something to drink their tea." Customs well-loved by the people typically do not disappear overnight with a regime change, so the sudden reduction in the consumption of tea at the founding of the new dynasty with a new state religion (Confucianism) suggests that tea may not have played a significant role in the daily routines of Goryeo commoners.

The historian Hoam Mun Il-Pyeong (1888–1939) points out three possible reasons for the decline in tea consumption: first, since most tea was imported, the improvement of native teas was not attempted; second, exorbitant taxes levied on tea producers either led to their failure or prevented them from scaling up; and third, the general populace showed little interest in drinking tea (Moon 1939). Drinks other than tea enjoyed more favor: natural streams of potable water were accessible almost everywhere in Korea, and the universally loved *sungnyung* (scorched rice tea) and rice wine were embraced by the people as daily standards. Poems that mention *ondol* (the traditional radiant floor heating system in Korea) in *Dongguk Yi Sang-Guk jip* (Collected works of Minister Yi Gyu-Bo, 1241) and *Mogeun jip* (Collected works of Mogeun, Yi Saek 1404) indicate that a single fire heated the home's ondol floors and the large, immobile cooking cauldron; to remove the scorched bits stuck to the bottom of the cauldron after cooking rice, people poured boiling water into it, which resulted in toasty scorched-rice tea, the drink of ordinary people. The custom of drinking rice wine was popular before that of drinking tea, and the prevalence of *makgeolli* (cloudy rice wine) as a common tipple is likely to have induced the saying, "cheap rice wine is better than tea." Also, according to volume 23 of *Gaoli tujing*, "A crock of fermented white rice drink [*baengmijang*] sat in the long corridor of the royal court for everyone passing to drink." This cloudy drink consisted of a thin gruel made of boiled white rice that would sour as it aged and was probably good for quenching thirst. Another non-tea beverage is found in a poem in *Mogeunjip*, which sings of drinking honeyed ice water in the steaming hot summer.

The mid to late Joseon dynasty marks the period in which the traditions enjoyed in Korea today took root. Cooking techniques for favorite foods such as rice cakes and beverages developed dramatically during this time (Yoon 1991). *Geoga pilyong* (Necessities for the family, ed. Seo Yu-Gu [1764–1845]) indicates that camphor, goji berry (Kor. *gugija*, Lycium barbarum), tree bark, orange blossom, and mung beans, among other ingredients, were used to make herbal teas not based on the tea plant. *Siuijeonseo* (Compilation of correct cooking methods; an anonymous cookbook, late 1800s) introduced the following drinks and more: *sudan* (rice-cake-ball punch), *borisudan* (barley punch), *sikhye* (sweet malt rice beverage), *gamju* (sweet nuruk beverage), *sujeonggwa* (ginger fruit punch), *baesuk* (honeyed, steamed pear), *jangmi hwachae* (rose petal punch), *dugyeon hwachae* (azalea blossom punch), *bae hwachae* (pear punch), *aengdu hwachae* (cherry punch), *bokbun hwachae* (Korean blackberry punch), *boksunga hwachae* (peach punch), *milsu* (honey drink), *nanmyeon* (noodles in schisandra berry punch), *simyeon* (thread-noodle soup), and *changmyeon* (long noodles in schisandra berry punch). Medicinal drinks were developed, as seen in *Dongui bogam* (Principles and practice of Eastern medicine, Heo Jun 1610), and honey and sugar were used to sweeten flower blossom drinks.

8.2 Classification of Traditional Korean Beverages

8.2.1 Names of Traditional Drinks as Found in Historical Literature

In *Sallim gyeongje* (Farm management, Hong Man-Seon 1715) traditional beverages are classified as *datang* and subdivided into *cha* (tea), *tang* (herbal infusion), *jang* (lactic-acid fermented rice beverage), and *galsu* (fruit and roots in sweetened water); in *Jeungbo sallim gyeongje* (Farm management supplement, Yu Jung-Im 1766) *sochajepum* (herbal tea) is divided into cha (tea) and tang (herbal infusion); and in *Gyuhap chongseo* (Women's encyclopedia, Lady Yi 1809) *dapum* (tea products) are divided into tang (herbal infusion), jang (lactic-acid fermented rice beverage), and *cheong* (sweetened fruit syrup and liquid preserves). The differing category names for these drinks, datang, sochajepum, and dapum, reflect the prevailing usage of such terms in the linguistic culture of the time.

In *Aeongakbi* (Correct language dispels incorrect usage, 1819), Jeong Yak-Yong states, "Koreans recognize that although they partake of various tea-like drinks, including tang (herbal infusions), *hwan* (herb pellets), and *go* (preserves), they refer to such medicinal drinks simply as 'tea.'" Insofar as this moniker extends to beverages that are not tea, significant linguistic confusion may ensue. *Imwonsimnyukji* (Encyclopedia of rural life) ties traditional beverages to the broad category of *eumcheongjiryu* (non-alcoholic drinks) and groups them into jang (lactic acid-fermented rice beverage), cha (tea), *suksu* (rice tea), and tang (herbal infusion). As numerous beverages unrelated to tea or medicinal remedies exist in Korea, it is suitable to designate the gamut of these traditional drinks under the umbrella designation "non-alcoholic beverages."

8.2.2 Types of Traditional Beverages

Traditional beverages, a number of which remain in use today, can be classified according to ingredients and/or production methods. Recipes in Joseon-dynasty texts illustrate changes made to these beverages as they were passed down continually over the years. Ten broad categories of traditional beverages classified by ingredients or method are listed in Table 8.1, as follows: *sunda* (pure tea), *yusada* (tea analog with or without green tea), tang (herbal infusion), jang (lactic acid-fermented rice beverage), suksu (rice tea), *mieum* (cereal gruel), *misik* (roasted cereal powder), sikhye (sweet malt rice beverage), sujeonggwa (ginger fruit punch) and hwachae (flower blossom punch). These are divided again, according to ingredient, into about 60 different types of beverages (Lee and Kim 1991). The results of correlating the traditional beverages found in historical cookbooks are shown in Table 8.2.

8.3 Tea Recipes and Types

8.3.1 Types of Sunda (Pure Tea)

The tea passed down over generations called "sunda" was first known in the Goryeo dynasty as *yucha* or *joacha*, which came to be called *jakseolcha* during the Joseon dynasty. The recipes, as found in *Nongjeong sinseo* (New book of agriculture, Sin Gi-Seon 1885) and *Dasinjeon* (The spirit of tea, Choi Uisun 1830), are quoted below (Yu and Jung 1972).

> Timing is essential when harvesting tea leaves. The best time to harvest is 5 days before *gogu* ("day of grain rain," a lunar calendar date around April 20th), the next best time is 5 days after, and then another 5 days after that. Once gathered, sort the tea leaves, discarding old leaves, stems, and fragments. When the cauldron is hot, pour in the tea leaves and stir quickly to roast; do not reduce the heat. Once the leaves are heated through, remove the cauldron from the fire and rinse the leaves in a sieve two or three times. Return the leaves to

Table 8.1 Division of traditional Korean beverages

1. Sunda types: Tea made with tea leaves (*nokcha* [green], *hongcha* [black], *urongcha* [oolong], etc.)
2. Yusada types: a beverage made with or without tea leaves that is called "tea"
   (1) tea mixed with other ingredients
   (2) blossom tea (*maehwacha* [apricot flower], *gukhwacha* [chrysanthemum flower], etc.)
   (3) fruit tea (*mogwacha* [quince], *yujacha* [citron], *gyulpicha* [mandarin peel], etc.)
   (4) grain tea (*boricha* [barley], *oksusucha* [corn], *nokducha* [mungbean], etc.]
   (5) medicinal tea (*gugijacha* [Chi. Goji, Lycium], *ogapicha* [Siberian ginseng, Acanthopanax], *gyepicha* [cinnamon], etc.]
3. Tang types: Medicinal plants boiled to make an infusion until gelatinous; diluted for drinking (*jehotang* [dried plum], *seupjotang* [jujube], *ssanghwatang* [medicinal herbs], etc.)
4. Jang types: (1) lactic acid-fermented cooked rice mixed into cold water—No longer in use today. (2) honey or sugar added to base ingredients and then aged; diluted for drinking (*mogwajang* [quince], *yujajang* [citron], etc.)
5. Suksu types: Water poured over scorched rice and boiled (*sungnyung*)
6. Mieum types: Grains boiled in water at length and then strained through a sieve; salt, sugar, and seasonings added (*ssalmieum* [rice], *daechumieum* [jujube], *jobssalmieum* [foxtail millet])
7. Misi types: Grains steamed and roasted, then ground into flour and mixed into water (*chapssalmisi* [glutinous rice], *borimisi* [barley], *susumisi* [sorghum], etc.)
8. Sikhye types: Grains of rice added to liquid malt for a sweet drink (*sikhye, gamju*)
9. Sujeonggwa types: Cinnamon, ginger, and other spices infused in water; dried persimmon, pear, or other fruit added (*sujeonggwa* [dried persimmon], *baesujeonggwa* [pear])
10. Hwachae types: Dried fruit or blossoms added to schisandra (5-flavor) berry juice, honey water, or other fruit juice
   (1) Schisandra berry juice base (*jindallae hwachae* [azalea], *borisudan* [barley], etc.)
   (2) Sugar or honey water base (*songhwamilsu* [pine pollen], *yuja hwachae* [citron], etc.)
   (3) fruit juice base (*aengdu hwachae* [cherry], *ttalgi hwachae* [strawberry], *subak hwachae* [watermelon])

Table 8.2 Types of non-alcoholic beverages appearing in historical literature

Historical record	Beverages
Gyugon Siuibang (or *Eumsik dimibang*, A mother's cookbook for her daughter-in-law, Madam Jang 1670)	*Tojangnokdunahwa* (fermented bean paste with mung bean flower), *changmyeon* (thin mung bean noodles in schisandra berry punch), *chamyeon* (thick buckwheat noodles in schisandra berry punch), *byeolchangmyeon* (thin bean paste & wheat flour noodles in sesame or schisandra berry punch)
Yorok (essentials, anonymous, 1680)	*Mogwatang* (quince infusion)
Sallim gyeongje (Farm management, Hong Man-Seon 1715) *Jeungbo sallim gyeongje* (Revised farm management, Yu Jung-Im 1766)	*Gigukcha* (chamomile tea), *gugicha* (goji berry tea), *seupjotang* (jujube infusion), *hyangsotang* (jujube-quince-perilla infusion), *sumuntang* (ginger-jujube-licorice infusion), *bingjitang* (lotus seed-licorice infusion), *hoehyangtang* (fennel infusion), *bongsutang* (pine nut and walnut infusion), *jehotang* (green plum infusion), *baektang* (thuja pine infusion), *jasotang* (perilla infusion), *mogwajang* (quince-fermented rice beverage), *omigalsu* (schisandra berry infusion with mung bean juice), *cheongcheonbaekseokda* (walnut and pine nut tea)
Somunsaseol (book of traditional Korean foods, Yi Pyo 1740s)	*Sikhye* (sweet malt rice beverage)

(continued)

Table 8.2 (continued)

Historical record	Beverages
Sul mandeuneun beop (how to make alcohol, anonymous, late 1700s or 1800s)	*Gamju* (sweet fermented yeast [nuruk] beverage)
Gyuhap chongseo (Women's encyclopedia, Yi Bingheogak c. 1815)	*Gukhwacha* (chrysanthemum tea), *gyejang* (fermented rice with cinnamon beverage), *gwigyejang* (fermented rice with angelica and cinnamon), *maehwacha* (plum blossom tea), *maejacha* (barberry tea), *wonsobyeong* (multi-colored rice cake balls in honey water), *hwamyeon* (blossoms in schisandra berry punch with noodles), *nanmyeon* (noodles in schisandra berry punch), *waemyeon* (thin noodles in soup), *samhap mieum* (seafood and cereal gruel)
Yeokjubangmun (Wine brewing methods, anonymous, mid-1800s)	*Sammieum* (ginseng cereal gruel)
Gyugon yoram (essential guide for women, anonymous, mid-1800s)	*Bom hwachae* (spring punch), *baesuk* (honeyed, steamed pear), *sikhye* (sweet malt rice beverage), *sujeonggwa* (ginger fruit punch)
Ganbon gyuhap chongseo (Women's encyclopedia, printed version, 1869)	*Hyangseolgo* (whole wild pear beverage), *sikhye* (sweet malt rice beverage)
Siuijeonseo (compilation of correct cooking methods, anonymous noblewomen, late 1800s)	*Borisudan* (barley punch), *sudan* (rice-cake-ball punch), *sikhye* (sweet rice malt beverage), *gamju* (sweet nuruk beverage), *sujeonggwa* (ginger fruit punch), *baesuk* (honeyed, steamed pear), *jangmi hwachae* (rose petal punch), *dugyeon hwachae* (azalea blossom punch), *bae hwachae* (pear punch), *aengdu hwachae* (cherry punch), *ttalgi hwachae* (strawberry punch), *boksunga hwachae* (peach punch), *sunchae hwachae* (watershield punch), *milsu* (honey drink), *simyeon* (thread-noodle soup)
Buin pilji (necessities for every wife, 1916)	*Maehwacha* (plum blossom tea), *gukhwacha* (chrysanthemum tea), *maejacha* (barberry tea), *podocha* (grape tea), *hyangseolgo* (whole wild pear beverage)
Joseon yori jebeop (Korean cooking, Bang Sin-Young 1917)	*Misu* (roasted mixed grains), *boksunga hwachae* (peach punch), *bae hwachae* (pear punch), *sudan* (rice-cake-ball punch), *sujeonggwa* (ginger fruit punch), *sikhye* (sweet malt rice beverage), *chaengmyeon* (mung bean noodle punch), *omijacha* (schisandra berry tea), *gukhwacha* (chrysanthemum tea), *maehwacha* (plum blossom tea), *podocha* (grape tea)
Joseon mussangsinsik yori jebeop (Matchless new recipes for Korean cooking, Lee Yong-Gi 1924)	*Gugicha* (goji berry tea), *gukhwacha* (chrysanthemum tea), *gigukcha* (chamomile tea), *gyulgangcha* (mandarin-ginger tea), *podocha* (grape tea), *maehwacha* (plum blossom tea), *gyulhwacha* (mandarin blossom tea), *borimcha* (Borim temple fermented tea), *gyehwacha* (cinnamon blossom tea), *omaecha* (smoked plum tea), *misamcha* (ginseng root-hair tea), *ssalmieum* (rice gruel), *joyulmieum* (millet and chestnut gruel), *jopssalmieum* (millet gruel), *daechumieum* (jujube gruel), *chaengmyeon* (mung bean noodle punch), *hwamyeon* (blossoms in schisandra berry punch with noodles), *garyeon sujeonggwa* (ginger fruit punch), *aengdu hwachae* (cherry punch), *borisudan* (barley punch), *ttalgi hwachae* (strawberry punch), *boksunga hwachae*

(continued)

Table 8.2 (continued)

Historical record	Beverages
	(peach punch), *yuja hwachae* (citron punch), *sikhye* (sweet malt rice beverage), *baesuk* (honeyed, steamed pear), *sujeonggwa* (ginger fruit punch), *tteok Sudan* (rice-cake punch), *wonsobyeong* (multi-colored rice cake balls in honey water), *jomieum* (millet gruel), *songmieum* (jujube, chestnut, and ginseng gruel), *chajomieum* (glutinous millet gruel)
Ganpyeon Joseon yori jebeop (Simple recipes for Korean cooking, Lee Seok-Man 1934)	*Omaecha* (smoked plum tea), *gukhwacha* (chrysanthemum tea), *maehwacha* (plum blossom tea), *podocha* (grape tea), *ssalmieum* (rice gruel), *songmieum* (jujube, chestnut, and ginseng gruel), *jopssalmieum* (millet gruel), *sikhye* (sweet malt rice beverage), *joenggwa* (honeyed fruit), *baesuk* (honeyed, steamed pear), *wonsobyeong* (multi-colored rice cake balls in honey water), *hwamyeon* (blossoms in schisandra berry punch with noodles), *chaengmyeon* (mung bean noodle punch), *tteok Sudan* (rice-cake punch), *borisudan* (barley punch), *ttalgi hwachae* (strawberry punch), *aengdu hwachae* (cherry punch)
Joseon yori beop (Korean cooking methods,Cho Ja-Ho 1938)	*Yeoreum milgam hwachae* (summer tangerine punch), *misi* (roasted cereal), *boksunga hwachae* (peach punch), *subak hwachae* (water-melon punch), *sunchae hwachae* (water-shield punch), *ssalmieum* (rice gruel), *songmieum* (jujube, chestnut, and ginseng gruel), *jobssalmieum* (millet gruel), *daechumieum* (jujube gruel)
Joseon yori (Korean cooking, Son Jeong-Gyu 1940)	*Aengdu hwachae* (cherry punch), *migang hwachae* (rice bran punch), *boksunga hwachae* (peach punch), *ttalgi hwachae* (strawberry punch), *sun hwachae* (watershield punch), *bae hwachae* (pear punch), *jindallae hwachae* (azalea punch), *bori sudan* (barley punch), *huin tteok sudan* (rice-cake punch), *misu* (roasted mixed cereal), *subak hwachae* (watermelon punch), *sujeonggwa* (ginger fruit punch), *sikhye* (sweet malt rice beverage), *ssalmieum* (rice gruel), *songmieum* (jujube, chestnut, and ginseng gruel), *jomieum* (millet gruel), *daechumieum* (jujube gruel)
Urinara eumsik mandeuneun beop (How to cook Korean food, Bang Sin-Young 1958)	*Wonsobyeong* (multi-colored rice cake balls in honey water), *bori sudan* (barley punch), *tteok Sudan* (rice-cake punch), *misu* (roasted mixed grains), *songhwasu* (pine pollen in honey water), *chaengmyeon* (mung bean noodle punch), *hwamyeon* (blossoms in schisandra berry punch with noodles), *sikhye* (sweet malt rice beverage), *sujeonggwa* (ginger fruit punch), *sansa hwachae* (hawthorn punch), *kongguk hwachae* (soymilk punch), *yuja hwachae* (citron punch), *ssalmieum* (rice gruel), *jomieum* (millet gruel), *chajomieum* (glutinous millet gruel), *songmieum* (jujube, chestnut, and ginseng gruel)
Yijo gungjung yori tonggo (History of royal cookery of the Yi dynasty, Hwang Hye-Seong 1957)	*Boksunga hwachae* (peach punch), *aengdu hwachae* (cherry punch), *ttalgi hwachae* (strawberry punch), *bae hwachae* (pear punch), *subak hwachae* (watermelon punch), *gyul hwachae* (mandarin punch), *baesuk* (honeyed, steamed pear), *hyangseokgo* (fragrant fruit gelatin)

> the cauldron and gradually reduce the heat, stirring until completely dry. The leaves must dry evenly in order to produce a fine fragrance and to draw out the essence and flavor of the tea.
>
> Heat control is important when boiling tea leaves. There is also an order to placing the leaves and water; placing the leaves into the pot first and then pouring in the boiling water is called *hatu*; placing half of the boiling water into the pot first, then the leaves, followed by the rest of the boiling water, is called *jungtu*; and finally, pouring the boiling water in first, followed by the tea leaves, is called *sangtu*.

The jungtu method is used in spring and autumn, sangtu is used in summer, and hatu is used in winter. The wild tea plant that is found across the Korean peninsula is *Thea sinensis* var. *bohea*. This evergreen broad-leaf shrub is ready for harvest in the 4th–5th lunar months for the making of green tea. In Korea this shrub is called *dasu* ("tea tree" in Sino-Korean) or *cha namu* ("tea tree" in hangeul) and is commercially grown mostly in the Jiri Mountains region, in the provinces of South Jeolla, North Jeolla, and South Gyeongsang. South Jeolla boasts the highest number of wild specimens. When compared with other tea-producing areas of the world, it becomes clear that the natural environment of the tea sites in Korea provide advantageous conditions for the cultivation of tea plants.

8.3.2 Types of Yusada (Tea Analog with or without Green Tea)

"Yusada" is a general term for green tea that is either mixed with other ingredients or not; different names may be used to designate specific blends of yusada, however, such as *dahonseongcha* (mixed tea), *hwayeopcha* (flower blossom tea), *gwasilcha* (fruit tea), *gokjaecha* (grain tea), or *yakjaecha* (medicinal herb tea) (Lee and Kim 1991).

Dahonseongcha (Mixed Tea)

Dahonseongcha is green tea mixed with other ingredients. *Sallim gyeongje* introduces some teas made in this style: *gigukcha* (chamomile tea), *gugicha* (goji berry tea), and *cheongcheonbaekseokcha* (walnut and pine nut tea). Gigukcha is made with dried chamomile flowers, goji berries, tea leaves, and about 300 g of sesame seeds all finely ground and strained through a sieve. This mixture is stirred into boiling water when ready to drink, with a small amount of salt and milk, to taste. Gugicha is made by kneading goji (Lycium) berries into flour, then shaping the dough like rice cake and letting it dry in the sun. After grinding the dried goji cake, tea leaves are mixed in, rice bran oil or sesame oil is added, and the whole is stirred into boiling water until the mixture thickens. A little salt is sprinkled in before serving. For cheongcheonbaekseokcha, walnuts and pine nuts are hulled, mixed with flour, and formed into small balls, then placed into the tea. *Gyulgangcha* (mandarin-ginger tea), which appears in *Joseon mussangsinsik yori jebeop* (Matchless new recipes for Korean cooking, 1924), is made from a combination of pith-free mandarin peel, ginger, and tea leaves that are brewed in water and then removed, with honey added to taste.

Hwayeopcha (Flower Blossom Tea)

Hwayeopcha is tea made by soaking flower petals in hot water, then adding honey or sugar. Plum, cassia, mandarin, or other blossoms may be used. In *Gyuhap chongseo* plum blossom tea is made by using a bamboo knife to gather half-opened plum blossom buds, drying them, and then stirring them into honey. Once placed in water, the buds daintily unfurl. In *Joseon mussangsinsik yori jebeop*, the blossoms are moistened with honey, coated in starch, and blanched in boiling water, then added to honey water for drinking. This visually appealing tea is known for its elegance and fragrant aroma.

Gwasilcha (Fruit Tea)

Gwasilcha uses a base of infused syrup, marmalade, or preserves, which are made by either mixing fruit pulp or peel with honey or sugar, or by boiling the fruit down in honey water. Flavors include quince tea, citron tea, mandarin rind tea, and pomegranate rind tea.

Gokjaecha (Grain Tea)

Regarding gokjaecha, *Gyeongdo japji* (Customs of the capital, Yu Deok-Gong late 1700s) states, “sweet rice is roasted and mixed with water; this is called tea.” Gokjaecha varieties include Job’s tears tea, barley tea, corn tea, and mung bean tea.

Yakjaecha (Medicinal Herb Tea)

Yakjaecha is a medicinal herb tea. The roots, fruit, sprouts, and sprigs of plants are used to make goji berry tea, eucommia bark tea, five-leaf aralia tea, cinnamon tea, kudzu tea, schisandra berry tea, ginger-date tea, angelica tea, watershield tea, ginger tea, and ginseng tea, among others. These herbs are either steeped in water and enjoyed straight or may be sweetened with honey or sugar.

8.3.3 Types of Tang (Herbal Infusion)

The word “tang” originally indicated hot water, but it was also used to refer to soup. In time, tang came to be known as an infusion of medicinal herbs. Soon medicinal tang (*tangyak*) was created, in part as a drink to fortify the body, and this too became known simply as tang. In Korea today there is a clear demarcation between tea and tang. Types of tang introduced in *Sallim gyeongje*, *Dongui bogam*, *Gyuhap chongseo*, and *Yorok* include seupjotang (jujube), hyangsotang (jujube-quince-perilla), sumuntang (ginger-jujube-licorice), bingjitang (lotus seed-licorice), hoehyangtang (fennel), haengnaktang (apricot seed), bongsutang (pine nut and walnut), jehotang (green plum), baektang (thuja pine), jasotang (perilla), samultang (4 medicinal herbs), ssanghwatang (several medicinal herbs), sungmaetang (green plum), onjotang (jujube-ginger), and mogwatang (quince) (Lee and Cho 1983a).

Jehotang (Green Plum Tang)

Jehotang appears for the first time in *Dongui bogam* (Principles and practice of Eastern medicine). In Buddhist circles the term *jeho* referred to either a cow’s milk product or a delicious beverage full of nutrients. Jehotang refers to the latter. It is made with 600 g of peeled, pitted, and dried green plums that are coarsely ground and then mixed with 37.5 g of *chogwa* (an aromatic similar to black cardamom, Chi. *cao guo*), 18.75 g finely ground *chuksa* (ginger family), and 18.75 g sandalwood mixed with 18.75 g of honey. These are boiled and then placed into a clay pot to cool, after which ice is added, resulting in a highly nutritive, thirst-quenching drink to be enjoyed on hot days. It was also used medicinally as a rejuvenating beverage.

The recipe for jehotang in *Gyuhap chongseo* is as follows: 600 g of dried green plums, about 30 g of sandalwood, 15 g of chuksa (ginger family), 11 g of chogwa (similar to black cardamom), and 37.5 g of honey. These ingredients are the same as those found in the *Dongui bogam* recipe from two centuries earlier; only the amounts differ. A recipe in *Sallim gyeongje* reads, “For jehotang, take 600 g of dried, pulverized green plums, then mix with two large bowls of water; boil to reduce the mixture to the amount of one bowl, then let it stand until the particles sink and the liquid becomes clear. Do not use an iron dish for this. Next, grind 300 g of chuksa and place it in a porcelain bowl with 1875 g of honey; boil until the color turns reddish. After cooling, be sure to add ground sandalwood and deer musk. When jehotang is in its gelatinous state, mix it with cold or ice water to drink.”

Tang Beverages Listed in *Sallim Gyeongje*

Sallim gyeongje introduces following tang recipes. Seupjotang involves pitting plump jujubes and boiling them in water to make a thin syrup, then adding equal amounts of ginger juice and honey and mixing well to blend the flavors. This mixture is placed into a porcelain jar, stirred, thinned to taste, and then seasoned with a hint of deer musk. To drink, one large spoonful is mixed with boiled water.

For hyangsotang, 18 L of pitted and halved dried jujubes are mixed with five peeled and pulverized quinces, along with 300 g of perilla leaves. These are ground together until evenly blended and then divided into five equal portions. The resulting flour is sprinkled evenly into an empty teapot and roasted over a fire, after which boiling water is poured in to make juice. The juice is reduced over a low, steady flame until gelatinous. Hyangsotang may be enjoyed cold or hot.

Sumuntang is made by grinding together 18.75 g of ginger, 1.8 L of jujubes, 112.5 g of salt, 75 g of licorice root, and 1.9 g each of dried whole cloves and elecampane, adding a little dried orange peel, and then reducing.

Bingjitang contains 600 g of roasted, unhulled lotus seeds that are ground into a fine powder with 37.5 g of lightly roasted licorice root powder and a pinch of salt. This is boiled vigorously and enjoyed a small amount at a time.

Haengnaktang is made by placing 131.3 g of apricot seeds into a pot of vigorously boiling pure water, then removing the pot from the heat and covering with a lid until completely cooled. This is repeated 5 times, after which the seeds are shelled and finely ground in an earthenware dish. Meanwhile, 600 g of good honey is boiled down by half. Once the honey cools, the apricot seeds are immediately stirred in until evenly distributed.

For bongsutang, remove the hulls of 37.5 g each of pine nuts and walnuts and grind, then add 18.25 g of honey and mix thoroughly. Stir into boiling water to drink.

Baektang involves plucking branches from a thuja evergreen and tying them together with cords, then hanging these to dry inside a large crock that is sealed with paper. Once the needles have dried, they are removed and ground. If they taste bitter, a small amount of white yam may be added to improve the flavor.

For jasotang, gently roast red perilla leaves until fragrant, then add boiling water, pour the concoction into a bottle, and seal the opening.

Dongui bogam states, “Tang involves adding medicinal ingredients to boiling water and then making a reduction as a cure or health tonic.” Rather than fuss with complicated, one-off tea recipes or rare ingredients, people of the Joseon dynasty turned to longer-lasting tang as a medicinal beverage to increase strength and prevent disease.

8.3.4 Types of Jang (Lactic Acid-Fermented Rice Beverage)

Jang includes beverages such as *tteumuljang* (rinsed rice-water jang), *sumijang* (water-flavor jang), and *sikchojang* (vinegar jang). Jang is a drink of ancient date introduced, as mentioned above, in the Confucian classics *Li ji* (*Book of Rites*) and *Zhouli* (*Rites of Zhou*); it is made by fermenting grains to create a beverage with a sour taste (Lee 1978). A jang recipe found in the Chinese record *Qimin yaoshu* (Essential skills to benefit the people, Jia Sixie c. 544 BCE) reads, “Cook rice and then place into a jar while hot. Fill the rest of the jar with water. Every 3–4 days add another bowl of rice, along with more cold water. Even in summer this will not go bad. If the water is cold, the drink will be clear and cool." According to this passage, jang appears to be a sour beverage consisting of starchy rice or thin rice gruel that undergoes lactic acid fermentation (Kim et al. 1991).

Water in China during this time was not good for consumption, so the people relied on drinks such as "jang water." Green plums or other fruit would sometimes be added to improve the flavor of this refreshment. In *Shiming* (a Chinese dictionary, Liu Xi or Liu Zhen c. 200 CE), the following passage appears: "They say jang (the beverage) is jang (a general), as it consistently regulates one's body heat." The biography of Kim Yu-Sin in *Samguk sagi* (History of the Three Kingdoms) relates the following story: "On his way to join the war, Kim Yu-Sin stopped his horse in front of a house and commanded the resident to bring him a cup of jang water. Upon drinking this he declared, 'Ah, the old taste of my hometown water!'" It can be inferred that the *jangsu* ("jang water") in this story mirrors the jangsu recipe in *Qimin yaoshu*.

The use of the words *iljang* (one bottle of jang) in the myth of Naksanidaeseong Gwaneum Jeongchwi (Avalokiteshvara) in *Samguk yusa* (Memorabilia of the Three Kingdoms, Ilyon c. 1280) and *baejang* (one cup of jang) in *Samguk yusa*'s story of Hyoseonssangmi at Jinjeong Temple implies that jang was not uncommon during the Three Kingdoms period (57 BCE–668 CE). The term "jang" can also be found in documents from the Goryeo dynasty (918–1392). As mentioned above, there is the passage in *Gaoli tujing* about the large jar of baengmijang (white rice fermented drink) sitting in a long corridor of the royal court for passersby to drink. After the Goryeo dynasty, *jangsu* disappeared from Korean culture, and knowledge of the beverage faded with it. In *Jaryu juseok* (Explanations of the various characters, Jeong Yun-Yong), a dictionary published in King Cheoljong's seventh year (1856), "jang" is referred to as sungnyung (scorched-rice tea). *Imwonsimnyukji* describes jang as a beverage of dried medicinal ingredients mixed with grains, or grain flour with seeds, submerged in water.

Today, jang refers to beverages made from medicinal herbs, seeds, or grains that are aged for use in tea and sweetened with sugar or honey. The resulting mixture is stirred into boiling water for drinking. The difference between jang and tang lies in the method of production: tang ingredients are heated until they reach a gelatinous state, whereas jang ingredients are aged. This distinction is inconsistent across types, however, which leads to categorization challenges and frequent conflation of various aspects of these drinks (Lee and Kim 1991).

Mogwajang (Quince Jang)

In *Sallim gyeongje*, the recipe for mogwajang is described thus: remove the bottom of the quince and scoop out the seeds. Turn it upside down, pour honey into the fruit, and replace the lid. Next, thread a bamboo skewer through the fruit and set it in a steamer. Gently steam. Mash the fruit with half a cup of pre-boiled honey and a pinch of ginger juice. Take three bowls of boiled water from a large pot and mix thoroughly with the fruit mixture, then filter to remove the pulp and pour it into a bottle to store.

Gyejang (Fermented Rice with Cinnamon Jang)

Gyuhap chongseo offers a recipe for *gyejang*: “Draw 30 small bowls’ worth of water from a flowing stream and boil them down to one-third the original amount, then fill the pot with ice until the water turns very cold. Take one bowl of good rice wine and 75 g of ground cinnamon-tree bark and pour the wine, herb, and water into an enamel crock. Seal firmly with oiled paper, and partake after 7 days.”

Gwigyejang (Fermented Rice with Angelica and Cinnamon Jang)

For *gwigyejang*, “Place 1200 g of angelica root into 20 bowls of good water and boil until reduced to four bowls. Dry the angelica root and then stir in 600 g of melted deer horn gelatin until well blended. Add 75 g each of cinnamon and dried ginger and mix with 3.6 L of high-quality honey. Place in a ceramic jar and cover by alternating four sheets of mulberry paper with three sheets of hemp cloth. In summer store the jar in a cool location, and in winter store in a warm location. Drink half a cup at a time on an empty stomach” (*Gyuhap chongseo*).

Yujajang (Citron Jang)

In *Jeungbo Hanguk sikpumsa yeongu* (Revised Korean food studies, Yoon 1987), jang is described as a beverage made by soaking and fermenting medicinal fruits; yujajang is citron (*yuja*) marinated in honey and aged. The marmalade produced in this process is called *yujacheong*, which is placed in boiling water to make *yujacha* (citron tea). In this case, as in many other instances too, no clear distinction is made between jang, tang, cheong, and cha. This lack of clarity may reflect the current vernacular used in historical records for the beverages described.

8.3.5 Types of Sungnyung (Scorched-Rice Beverage)

A record of sungnyung can be found in Seo Yu-Gu’s *Onghui japji* (Onghui journal, early 1800s). It states, “Decocted medicinal herbs are called *suksu*. Apparently, the people of Song dynasty, China, heartily enjoyed this type of beverage: During the reign of Emperor Renzong of Song, the monarch commanded the Academy of Letters to create a delicious ‘tang’ beverage, upon which the academy produced perilla suksu. Also during Song, merchants bottled and sold suksu made of corn juice. When Koreans cook rice and remove it from the pot to serve, they leave the scorched rice that adheres to the bottom. After the meal, water is poured into the pot and boiled to make sungnyung [scorched-rice tea], which is also called suksu. Though the name mirrors that of the Song beverage, the drinks are different." This text clarifies that although suksu in China was an herbal tonic, in Korea the term was used to denote sungnyung (Lee and Kim 1991).

Jilin leishi (Korean matters, Sun Mu c. 1103), a Chinese text with a glossary of Korean terms, interprets suksu as "mellow water" in the Goryeo dialect. This "mellow water" appears to refer to sungnyung, and thus it can be surmised that the pronunciation of "suksu" gradually morphed into "sungnyung." In 1888 W. E. Griffis, a missionary living and working in Japan, published *Corea, The Hermit Nation*, in which he declares, based on his visits to Korea, that sungnyung was a universally enjoyed beverage: "Strange as it may seem, the peasant, though living between the two great tea-producing countries of the world—Japan and China—and in the latitude of tea-plantations, scarcely knows the taste of tea. . . .The most common drink, after what the clouds directly furnish, is the water in which rice has been boiled [sungnyung]. Infusions of dried ginseng, orange-peel, or ginger serve for festal purposes, and honey when these fail. . .".

Jeungbo sallim gyeongje (Revised farm management) mentions that Koreans make a beverage by scorching the rice grains left in the bottom of the cauldron after making rice, then adding water and boiling it briefly. *Imwonsimnyukji* notes that when cooking rice, one should lower the heat and let the rice steam for about 1–2 min longer after cooking, then raise the heat again (Lee 1985b). Apparently, steaming the rice in this manner allows it to become fully plumped, and raising the heat again facilitates the formation of *nurungji* (toasted/scorched rice), from which aromatic sungnyung is made.

Nurungji and sungnyung were not always the end goal of this process. Rice was a staple food in the daily lives of many people; pouring water into the stationary cast-iron cauldron, which sat over a wood-burning stove, and heating it to remove the scorched rice from the bottom would have been a natural way to meet the needs of the people's culinary lifestyle. As the wood-burning stove became obsolete and the cauldron portable, in the form of an electric pot or pressure cooker, the habit of making sungnyung at home gradually disappeared.

8.3.6 Types of Mieum

Mieum is a beverage made by boiling simple grains in copious amounts of water, then draining the liquid through a sieve and adding sugar, salt, and spices. The author of *Jaemulbo* (Encyclopedia, Yi Man-Yeong 1798) states that grains must be cooked past the point of gruel (*juk*) to be used as a beverage. Since the moisture content exceeded that of gruel, mieum was used as liquid food, health food, and baby food. No part of it would be left dry when served as a beverage. Rice mieum, millet mieum, ginseng-and-glutinous grains mieum, jujube mieum, and mieum made from other grains frequently appear as beverages in cookbooks published after 1930 (Lee 1935, Cho 1938, Hong 1940, Lee 1924).

Mieum types in *Gunhak hoedeung* (a mid-1800s cookbook) include *yulmi* (adlay), *misu* (rice), *cheongnyangmi* (clean rice), *seomi* (millet), *gyeongmi* (nonglutinous rice), *jeommi* (glutinous rice), *chumo* (sorghum), *cheongeumcho* (buckwheat), *nokdu* (mung bean), *gyomaek* (knotgrass), and *daechu* (jujube) (Lee 1981). *Yeok jubangmun* (How to make seasonal drinks, mid-1800s) introduces fibrous mieum with the following recipe: “Take equal amounts of lotus seed flour, herb flour, and pearl barley flour and strain them together using a silk cloth. Once filtered, make a thin paste and boil until heated through, then mix in honey to drink” (Lee and Cho 1983b).

Samhap mieum, made of sea cucumber, mussels, beef, and glutinous rice, appears in *Gyuhap chongseo*. The recipe reads, “Soak the sea cucumber, scrub it clean on a rock, then scald until the dark color disappears. After soaking the mussels, wash them clean and place into a large cast-iron kettle. Add to the pot a large chunk of beef trimmed of its fat, pour in good water, and then boil. Once the meat is tender, add 1.8 L of glutinous rice. Straining the mieum and mixing in a little jang (fermented soybean sauce) makes a great energy supplement for old and young people and aids significantly in the recovery of sick patients.” The medicinal properties and protein content provide high nutritional value. The mieum table for Lady Hyegyeong’s 60th birthday celebration, described in *Wonhaeng Eulmyojeongriuigwe* (Royal protocols to mark the 60th birthday of Queen Heongyeong) included jujube mieum, *baekgam* (sweet white rice) mieum, *baek* (white rice) mieum, *cheonsggyeol* (clean rice) mieum, etc. (Kim 1986).

8.3.7 Types of Misi

Misi, or *misutgaru*, as this beverage is often called, is made by steaming and roasting grains to be used in drinks. According to *Samguk yusa*, the venerable monk Jinpyo steamed 360 L of rice and dried it as a nourishing foodstuff to take with him while hiking in the mountains. This is the original form of today’s misutgaru. In *Shuowen jiezi*, a Chinese text from the first century, the word *bi* appears (Chi. *bei*; dried rice, or easily portable food), attesting to the ancient origin of this type of food. At some point in history, a person roasted grain flour and mixed it with water to make a drink, thus discovering a simple way to sate hunger while traveling. Grains used for misutgaru include nonglutinous rice, glutinous rice, barley, millet, sorghum, soybeans, black sesame, pearl barley, perilla seeds, and sesame seeds.

Joseon yori beop (Korean cooking methods) affirms that misutgaru can be used as a pleasant beverage rather than merely a substitute for food. The text suggests stirring a sweetener into water, adding a spoonful of misutgaru, and finishing with ice.

A recipe from *Joseon yori jebeop* (Korean cooking) offers the following: “Thoroughly clean good, glutinous rice and remove all impurities. After draining the water, place the rice into a pot and stir continuously to prevent burning. Roast until the rice turns golden, then grind it in a millstone and strain it through a sieve." The steaming and drying of the rice are implied (Bang 1917). According to source material from *Hanguk minsok jonghap josa bogoseo* (A general survey of Korean folklore, Cultural Heritage Preservation Bureau 1984), glutinous rice is roasted, steamed, and dried, after which it is roasted again until slightly yellow, then ground into flour. The flavor can be enhanced by sprinkling refined rice wine over the rice and letting it sit with the lid on to finish steaming. As seen in these texts, misutgaru can be made from any number of ground grains, according to personal preference.

8.3.8 Types of Sikhye

Sikhye is well known and loved in Korea. Enjoyed by Koreans on national holidays and at the end of every feast, this rice drink may be served with thinly shaved ice as a sweet and refreshing post-meal beverage.

In *Joseon yorihak* (Korean gastronomy, Hong 1940), Hong, Seon-Pyo describes sikhye almost reverently: "The artistic presentation and light, clean taste of Korean sikhye make it a first-rate beverage even in China; indeed, I feel that nothing surpasses sikhye. Drinking sikhye boosts digestion and helps the blood circulate, naturally promoting a brisk feeling in the heart." The earliest known record of sikhye is found in *Li ji*, in which upper-class families of Zhou dynasty, China, (1046 BCE–256 BCE) are depicted enjoying a refreshing beverage called *dansul* (Korean pronunciation), a sweet drink made with fermented rice that is the ancestor of gamju. Gamju consists of fully fermented rice that is boiled and then strained; sikhye is not strained, but has whole grains of rice floating in it. Sikhye is sometimes confused with the similarly pronounced sikhae, but the latter, as mentioned in Chap. 7, is a lacto-fermented fish dish in which salt-pickled fish is mixed with grains, red chili pepper flakes, garlic, and other seasonings. The term "sikhye" first appears in Korean literature in Yi Pyo's cookbook, *Sumunsaseol* (Book of knowledge for daily living) from the 1740s (Lee 1983).

The basic flavor note of sikhye is malt. *Siuijeonseo* describes the process of making malt: "Gently pound unhulled barley with a mortar and pestle, then winnow in a winnowing basket. Soak, dry, and place into an earthenware jar for sprouting. Splash water on the barley and winnow again, and once the barley begins to sprout, wash it and set it in a steamer over water. From time to time throughout the day, water the sprouts to encourage further sprouting ahead of cooking. (Note that if the body of the barley is damaged, it will rot.) Dry about half the sprouts by rubbing and winnowing with your hands until fully dried. For sprouting on the ground, first sprout the grains as mentioned, then sweep the shed floor clean and lay out the sprouts, covering them with a wet straw mat; occasionally rinse with water and cover again for a period of several days." This cookbook suggests that wheat may also be used to make malt. The production of malt hinges on the diastatic enzyme amylase, which converts carbohydrates to sugars. This enzyme produces rice starch, glucose, maltose, dextrin, and other sweeteners. Maltose is responsible for the unique flavor of sikhye.

The *Ganbon gyuhap chongseo* (Women's encyclopedia) recipe for sikhye is as follows: "Wash the rice clean as jade and then steam until well cooked; place the lid on the steamer and heat over a slow fire heaped with coals for even cooking. Then place into an earthenware jar and fill the remaining space with malt powder and hot water. After a good while over the fire, fill the jar again with filtered water, then seal the jar with [mulberry] paper and place on a heated floor. If you set it there in the early evening, it should be ready by about 2:00 in the morning. Mix honey with cold water and pour it into the jar with jujubes, chestnuts, white sesame seeds, or pear, etc., for a refreshing and delicious drink. If you plan to transport it over a long distance, do not add the jujube, chestnuts, or other fragrant ingredients. If you add a whole citron, the flavor soars." This recipe nearly mirrors that of today's sikhye. Either glutinous or nonglutinous rice may be used in the making of sikhye, but nonglutinous is preferable; although glutinous rice is good for digestion, the individual grains shrivel during processing, are not as soft, do not float in the drink, and stick to one's mouth. In the Uiseong region of North Gyeongsang province a specialty sikhye drink called *seokgamju* is made by boiling rice with black sugar and honey until it dons a reddish hue (Cultural Heritage Preservation Bureau 1984). Sikhye is a standard offering at ancestral shrines, complete with whole grains of rice and garnished with pine nuts and thinly sliced jujubes (Hwang 1985).

Lotus leaf sikhye is made by wrapping hot glutinous rice in lotus leaves and then pouring malt syrup on top. The leaves are gathered up, bound together, and placed into a crock filled halfway with water. This is left to marinate on the warmest spot of the heated floor. The sikhye is ready when the rice ferments.

8.3.9 Types of Sujeonggwa (Ginger Fruit Punch)

Sujeonggwa is made by decocting cinnamon, ginger, and black peppercorns in water, then mixing in sugar and cooling, after which pine nuts, persimmon, or pear, etc., are added. Sujeonggwa presented at Joseon-dynasty royal banquets included ingredients such as pomegranate, citron, mandarin, ginger, dried persimmon, lotus, Eucommia, hawthorn, or cherry. Honey was the favored sweetener, and pine nuts garnished the drink. Schisandra berry or safflower were used to impart a reddish hue (Kim 1989). At a banquet in 1827, the host simply mixed honey into water, garnished it with pine nuts, and called it sujeonggwa. The sujeonggwa made today, with dried persimmons and ginger, did appear on a ceremonial table prepared in 1868. *Siuijeonseo* describes sujeonggwa variously as dried persimmon sujeonggwa, honeyed pear infusion, and flower punch. Today sujeonggwa is made by first boiling down the ingredients, then preparing the drink to be consumed cold, like punch.

Dongguk sesigi (Korean seasonal customs, Hong 1849) indicates that sujeonggwa involves making a persimmon reduction, then adding ginger and pine nuts to the liquid. *Gyugon yoram* (an anonymous cookbook, 1869) calls for placing dried persimmons in a jar with hot water and resting it in a warm place until the water is infused with sweetness, then moving it to a cold place and garnishing with pine nuts when ready to drink. Whether dried persimmons are boiled down or infused, they form the base liquid for sujeonggwa, lending a gently sweet-and-sour taste to the refreshing, aromatic drink (Lee and Lee 1983). If dried persimmons are soaked in water too long and then boiled down, however, the liquid will become murky, resulting in a less refreshing taste. It is better to prepare the dried persimmons separately by soaking them in previously made sujeonggwa until they soften and float (Lee 1985a). In addition, if cinnamon and ginger are boiled together, their tastes will become muddied and no longer aromatic. These spices should be boiled separately in order to draw out the flavor of each, and once they have infused their separate liquids, they can be combined for the best flavor (Kang 1988).

For dried persimmon sujeonggwa, it is important to choose flavorful dried persimmons. *Gotgam*, or long, pointy dried persimmons, work well. They should be somewhat moist and covered in a powdery white sugar bloom, and the seeds should remove easily. Dried persimmon wraps can be made by removing the seeds of the dried persimmons, spreading them into a thin single sheet, placing skinned walnuts onto the fruit sheet one at a time, rolling and pressing tightly, and then slicing (Kang 1988).

Pear sujeonggwa is made by peeling a pear, quartering it, and scooping out the core. Whole peppercorns are pressed into the back of the pear. Sugar is used to sweeten ginger water, the pear is added, and the whole is boiled together. After boiling, the drink is cooled and garnished with pine nuts.

8.3.10 Types of Hwachae

Hwachae is a representative Korean punch made from a base of schisandra-infused water, honey water, or fruit juice garnished with thin slices of seasonal fruit, flower petals, or pine nuts. It may also made by adding seasonal fruit and a few pieces of ice to clean, natural water. The beverage cools the body when hot and replenishes nutrients that have been lost through sweat.

An examination of records spanning much of Korea's history reveals the varied ingredients used to make hwachae. During the Three Kingdoms (57 BCE–668 CE) and Unified Silla (668–935) periods, ingredients included chestnut, jujube, peach, hazelnut, mulberry, and pine nut. The Goryeo dynasty-period (935–1392) texts *Gaoli tujing*, *Hyangyak gugeupbang* (First aid prescriptions using native plants, 1236), and *Cheongsan byeolgok* (Verdant mountain song) mention ingredients used during this period: chestnut, cherry, pine nut, hazelnut, nutmeg, crabapple, plum, peach, pear, jujube, persimmon, kiwi berry, wild grape, and cultivated grape. The variety of ingredients increased during the Joseon dynasty, as evidenced in *Domundaejak* (Licking my lips by the butcher's door [a book of food criticism], Heo, Gyun 1611) and *Jeungbo sallim gyeongje*, which mention hwachae made with chestnut, jujube, walnut, juniper berry, persimmon, ripe persimmon, dried persimmon, plum, apricot, peach, grape, raisin, pear, mandarin, quince, crabapple, apple, citron, pomegranate, green plum, water chestnut, hazelnut, acorn, lotus seed, elm, gardenia seed, goji berry, Korean blackberry, bamboo seed, hawthorn, and peach seed (Hwang 1985). In modern times, aside from nonnative fruits imported from abroad, the ingredients for hwachae remain the same.

The first mention of hwachae enjoyed with ice is found in *Samguk sagi*. The "Silla annals" of this record reveal that in the fifth year of King Jijeung's reign (505), the winter solstice was designated as a day for collecting and storing natural ice. Since a specialized ice house was required for storage, demand for ice was confined to a small contingent of the noble class. At the beginning of the Goryeo dynasty (918–1392), the king enacted a system of regular ice distribution to subjects. In 1279 King Chungnyeol decreed that thenceforth, any subject would be permitted to store and use ice, which resulted in a sharp increase in demand. *Gyeongguk daejeon* (Joseon laws, 1471) contains a provision for the distribution of ice, including a detailed plan on how to deliver ice to all subjects. The fact that ice delivery extended to "invalids and law-breakers" speaks to the prodigious amount of ice prepared (Kang 1989). Ice was widely used for storing food and helping medical patients, and was also enjoyed in cold soups and hwachae. *Dongguk sesigi* describes foods prepared for holidays throughout the year, such as *wonsobyeong* (multi-colored rice cake balls in honey water) made for the first full moon of the lunar year, *hwamyeon* (hwachae made with azalea blossoms and noodles) for the third day of the third lunar month festival, *sudan* (balls of honeyed rice cake in ice water) for Yudu, a festival held the first day of the sixth lunar month, peach hwachae for the seventh day of the seventh lunar month festival, and pear, citron, or pomegranate hwachae for the ninth day of the ninth lunar month festival. It appears that seasonal fruit was mixed into beverages enjoyed by the public on special occasions (Lee 1964). Three types of hwachae, categorized by the juice base used in production, are described below.

Hwachae Based on Schisandra Berries

The schisandra berry is also known as five-flavor fruit (*omija*). Its skin and flesh are sweet and sour, while the center is spicy and bitter, and the combination of these four flavors produces a fifth: salt. In Eastern medicine schisandra berries are used as a remedy for thirst, cough, eye conditions, weakness or fatigue, and red or blotchy skin resulting from too much alcohol. To make a schisandra berry infusion, the berries are washed in water, then soaked overnight in clean water. The berries are then strained through a double sieve. Sugar or honey may be added to sweeten, and a pinch of salt will reduce the sour taste. Schisandra can be consumed hot like tea, but drinking it cold is more refreshing. Schisandra punch made in this way can support additions of any fruit and/or thin mung bean noodles.

Azalea hwachae is made by covering schisandra punch with a film of mung bean starch and garnishing with blanched azalea flowers. Similarly, lotus hwachae consists of filming schisandra soup with mung bean starch and floating lotus petals on top. Thinly sliced pears garnish pear hwachae, *changmyeon* is schisandra berry punch with thin mung bean-starch noodles, and *borisudan* is a hwachae of schisandra berry punch topped with barley grains that are simmered and then covered in mung bean starch and boiled again, then rinsed (Lee and Kim 1991).

Hwachae with Honey or Sugar

Honey is the most valuable sweetener found as-is in nature. It is unclear when the Korean people began eating honey or keeping bees, but *Nihon shoki* (The chronicles of Japan, Prince Toneri 720 CE) relates that the king of Baekje taught others beekeeping, so it can be surmised that harvesting honey from apiaries was already being practiced during the Three Kingdoms period (57 BCE–668 CE). From ancient times honey water was touted as the ideal beverage for suppressing heat. Honey water was not only good for relieving both outdoor heat and inner body heat, but it also tasted delicious and had positive medicinal effects. Depending on the manner of its extraction, honey's scent, color, density, and flavor differed: dark honey tended to be used for medicine, while light honey was stirred into drinks. Types of honey suitable for hwachae included clover, acacia, and rapeseed.

The first time sugar was imported to Korea is unknown, but there is a record of Maengso, who was a disciple of the Goryeo monk-prince Uicheon Daegak Guksa (1055–1101), thoroughly enjoying sugar. The sweet stuff was probably imported from Song dynasty, China. By the late Joseon dynasty (1392–1897), sugar was frequently used as a substitute for honey (Chang 1986).

One type of sweetened hwachae is s*onghwamilsu*, which is made by mixing powdered pine pollen into honey water. Another is *tteok sudan*, for which ropes of *huin tteok* (white rice cake) are rolled out thin, pinched off into bean-sized pieces, pressed in the center until very thin, and then coated with starch and cooked in boiling water. These are cooled in cold water, then placed into honey water. A third is wonsobyeong, which involves making multicolored dough balls from glutinous rice flour, placing a filling inside, boiling, and dropping the balls into honey water. Finally, citron hwachae is made by adding julienned citron zest to sugar water and garnishing with sugar-coated pieces of citron flesh (Lee and Kim 1991).

Hwachae Made with Fruit Juice

Fruit juice hwachae is a popular beverage enjoyed when summer fruits abound. Sugar and water are mixed with fruit juice, and chunks of fruit are added to the punch. Typical examples include cherry, strawberry, grape, peach, citron, quince, and mandarin.

References

Bang, Sin-Young. 1958. *Urinara eumsik mandeuneun beop* [How to cook Korean food], Ewusa.

Bang, Sin-Young. 1917. *Joseon yorijebeop* [Korean Cooking]. Seoul: Sinmunsa.

Chang, Chi-Hyun. 1986. Traditional spices in Korea. *Food Science* 19 (2): 5.

Chang, Chi-Hyun. 1989. Goryeo daehakgyo Hanguk singmunhwa yeongsanghwasaoep yeongu bogoseo [Report of Korean Food Culture Film Production Project, Korea University].

Cho, Ja-Ho. 1938. *Joseon yoribeop* [Korean Cooking Methods]. Seoul: Kwanghanseolim.

Griffis, William Elliot. 1888. *Corea, the hermit nation*. New York: Scribner's sons.

Heo, Jun. 1610. *Dongui bogam* [Principles and practice of Eastern medicine]. Modern Korean edition: Heo Jun. 2001. Seoul: Namsandang.

Hong, Seok-Mo. 1849. Dongguk sesigi [Korean seasonal customs]. Modern Korean edition: Hong Seok-Mo. 1969. *Dongguk sesigioe* (trans: Lee Seok-Ho). Seoul: Eulyumungo.

Hwang, Hye-Seong. 1957. *Yijo gungjung yori tonggo* [History of royal cookery of the Yi dynasty], Hakchongsa.

Hong, Seon-Pyo. 1940. *Joseon yorihak [Korean gastronomy]*. Seoul: Jokwangsa.

Hwang, Hae-Sung. 1985. (*Tteok-hangwa-eumnyo*) *Jeontong ui mat* [Traditional Korean flavors (rice cake, sweets, and drinks)]. Seoul: Jubusanghwal.

Kang, In-Hee. 1988. *Hanguk ui mat* [The Taste of Korea]. Seoul: Daehankyogwaseo.

———. 1989. *Hanguk siksaengwhalsa* [History of Korean foodways]. Seoul: Samyoungsa.

Kim, Chun-Ryeon. 1986. 18segi gungjungyeonhoeeumsikcho—*Wonhaengeulmyojeongniuigwe* jungsimeuro [A study of court food culture in 18th-century Yi dynasty—based on the ceremonial book Jeongniuigwe]. *Hanguk siksaenghwalmunhwahakhoeji* [Journal of the Korean Society of Food Culture 1 (2): 77.

Kim, Young-In. 1989. Hanguk uiryeeumsiksangcharime gwanhan yeongu [A study on the table setting of Korean ceremonial foods]. *Hanguk sikmunhwahakhoeji*. [Korean Journal of Dietary Culture] 4 (3): 213–219.

Kim, Sun-Young, Souane Moussa, Kim Gie-Eun, and Lee Cherl-Ho. 1991. Microbial characterization of *Jangsu*. *Korean Journal of Food Science and Technology* 23 (6): 689–694.

Lady, Yi Bingheogak. 1809. *Gyuhap chongseo* [Women's encyclopedia]. Modern Korean edition: Lady Yi Bingheogak, 1975. *Gyuhap chongseo* (trans: Chung Yang-Won). Seoul: Bojinje.

Lee, Yong-Gi. 1924. *Joseon mussangsinsik yori jebeop* [Matchless new recipes for Korean cooking] Youngchangseogwan.

Lee, Seok-Man. 1934. *Ganpyun Joseonyorijebeop* [Smple Korean culinary book], Sammunsa.

Lee, Sang-Man. 1935. *Sinyeonyangyoribeop [New cooking for nutritious dishes]*. Seoul: Samunsa.

Lee, Choon-Nyoung. 1964. Ijo mongeopgisulsa [History of the agricultural technology in Joseon Kingdom]. *Hanguk yeongu chongseo* [Korean research series] 21. Seoul: Research Institute of Korean Studies.

Lee, Sung-Woo. 1978. *Goryeoijeon Hanguk siksaengwhalsa* [The history of Korean dietary life before Goryeo]. Seoul: Hyangmunsa.

Lee, Sung-Woo. 1981. *Hanguk sikgyeongdaejeon* [The great bibliography of Korean food classics]. Seoul: Hyangmunsa.

Lee, Hyo-Gee. 1983. *Sumunsaseol* ui jorihakjeok gochal [Culinary review of *Sumunsaseol* (Book of knowledge for daily living)]. Hanguk saenghwalgwahak yeongu 1 [Korean Living Science Research], 85. Seoul: Hanyang University.

———. 1985a. *Joseonwangjo gungjungyeonhoeeumsik ui bunseokjeok yeongu* [Royal Ceremonial Food in Joseon Dynasty]. Seoul: Suhaksa.

Lee, Sung-Woo. 1985b. *Hanguk yorimunhwasa* [History of Korean Culinary Culture]. Paju: Kyomunsa.

Lee, Hyo-Gee. 1998. *Hanguk ui eumsikmumhwa* [Korean food culture]. Seoul: Sinkwang Publishing.

Lee, Sung-Woo, and Lee Hyo-Gee. 1983. *Gyugon yoram [Essential guide for women]. Hanguk saenghwalgwahak yeongu 1 [Korean Living Science Research], 27.* Seoul: Hanyang University.

Lee, Sung-Woo and Cho Jun-Ha. 1983a. *Yorok* [Essentials]. Hanguk saenghwalgwahak yeongu 1 [Korean Living Science Research], 35. Seoul: Hanyang University.

———. 1983b. *Yeokjubangmun* [How to make seasonal drinks]. Hanguk saenghwalgwahak yeongu 1 [Korean Living Science Research], 7. Seoul: Hanyang University.

Lee, Cherl-Ho, and Kim Sun-Young. 1991. Hanguk jeontongeumnyoe gwanhan munheonjeok gochal I: Jeontongeumnyo ui jongnyuwa jejo bangbeop [Literature review on traditional Korean non-alcoholic beverages: Types and preparation methods]. *Hanguk sikmunhwahakhoeji*. [Korean Journal of Dietary Culture] 6 (1): 43–54.

Lee, Cherl-Ho and Kwon, Tai-Wan. 2003. *Hanguk sikpumhak immun* [Introduction to Korean food science]. Seoul: Korea University Press.

Moon Il-Pyoung. 1939. *Chagosa [Korean tea]. Hoamjeonjip [Hoam collections]*. Vol. 2. Seoul: Chosunilbo Press.

Munhwajae gwalliguk [Cultural Property Preservation Bureau]. 1984. Hanguk minsok jonghapbogoseo: hyangtoeumsikpyeon [Korean folkways report: local foods]. Seoul: Ministry of Culture and Communication.

Seo, Geung. 1977. *Goryeo dogyeong [Gaoli tujing (illustrated account of the Xuanhoe embassy to Goryeo)]*. Seoul: Gojeongugyeokchongseo.

Son, Jeong-Gyu. 1940. *Joseon yori* [Korean cooking].

Yoon, Seo-Seock. 1987. *Jeungbo Hanguk sikpumsa yeongu* [Korean food history research supplement]. Sinkwang Publishing Co.

———. 1991. *Hanguk eumsik yeoksaswa jori* [Korean food: history and cooking]. Seoul: Suhaksa.

Yu, Chun-Hee, and Jung Jae-Gi. 1972. Studies on Korean green tea. *Korean Journal of Nutrition* 5 (3): 109.

Chapter 9
The History and Manufacture of Traditional Korean Alcoholic Drinks

Abstract The history of alcoholic beverages in Korea closely mirrors the hills and valleys of the culture as a whole. There are no native gods associated with alcohol in Korea, likely because the country's ancient history is so closely tied to that of China. However, a story in *Samguk sagi* (History of the Three Kingdoms), points that in the third century CE a man from the Baekje kingdom, named Inbeon, brought his wine-making method to Japan and came to be revered as the god of wine in that region. Toward the end of Goryeo, the Yuan method of liquor distillation was conveyed to the Korean Peninsula. Joseon-dynasty (1392–1897) literature records over 300 liquor names, comprising various forms of grain alcohol and distilled liquor, medicinal flavored wine, fruit wine, composite wine, and mixed drinks, many of which were brewed or distilled at home with local ingredients. However, not long after Joseon-dynasty authority was abruptly dismantled by Japan's annexation of the peninsula, the Japanese Governor-General of Korea levied a compulsory liquor tax (1907) with the objective of cracking down on the free-wheeling production of Korean alcohol. A liquor law enacted in 1916 stipulated that all alcoholic drinks produced in Korea must be standardized in the form of *yakju* (filtered wine), *takju* (cloudy wine), and *soju* (distilled liquor). This chapter reviewed the history of alcoholic drinks in Korea, and the classification of types and production techniques of Korean alcoholic drinks were introduced.

Of all the beverages made by the human family, alcohol is the oldest. The origins of alcohol reach far into the age of mythology. Osiris, the Egyptian god of wine, was renowned for creating grain wine; the Greek god Bacchus invented grape wine; the Indian deity Soma made sweet liquor; and in China Yu the Great's daughter, Yidi, is credited with inventing rice wine. Evidence suggests that naturally fermented alcohol based on honey or fruit was enjoyed as early as the Primitive Pottery era in Korea. Unique natural environments in distinct regions of the world facilitated the brewing of countless types of alcoholic drinks, each with a specialized form and flavor.

The world map of alcohol is colorful, with various countries producing drinks of distinctive character: cognac and champagne from France; Riesling and other Rheinhessen wines from Germany; vermouth from Italy; Jerez sherry from Spain;

C.-H. Lee, *Korean Food and Foodways*,
https://doi.org/10.1007/978-981-19-0023-5_9

laojiu, a Shaoxing rice wine, and fenjiu, a sorghum-based distilled liquor, from China; scotch from Scotland; tequila from Mexico; sake from Japan, and so on. In the English-speaking world, the word "spirits" hints at a deep connection between alcohol and the psychological world. Figure 9.1 reveals alcoholic drinks and fermented foods enjoyed in different parts of the world (Lee 2009).

9.1 The History of Korean Alcohol

The history of alcoholic beverages in Korea closely mirrors cultural fluctuations over the centuries (see Table 9.1) (Lee 2012). There are no native gods associated with alcohol in Korea, likely because the country's ancient history is so closely tied to that of China. Korea seems to have accepted Yidi, daughter of Yu the Great of Chinese legend, as their god of spirits. A story in *Samguk sagi* (History of the Three Kingdoms), however, does point to a native wine god, just not on Korean soil: in the third century CE a man from the Baekje kingdom named Inbeon brought his wine-making method to Japan and came to be revered as a god of wine in that region. During the Unified Silla period (668–935 CE) clear wine was a popular drink among members of the upper class. Known as Lelang wine, the recipe gradually improved as it was passed down from Goguryeo (37 BCE–668 CE) to Unified Silla, during which time it was even exported to China. Texts such as *Goryeosa* (History of the

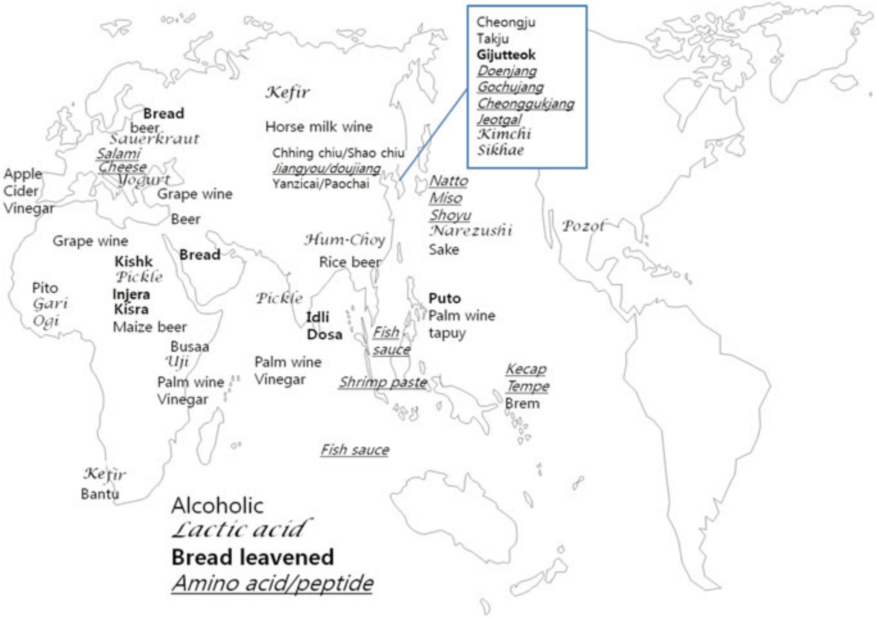


Fig. 9.1 Ferments around the world

Table 9.1 Overview of the history of Korean alcohol

8000–5000 BCE: The beginnings of Primitive Pottery with its fermentation culture along the coast of the Korea Strait
2500 BCE: *Shijing* (Book of Songs, compilation of records dating from 11th to 7th centuries BCE)—The phrase "Yao's one thousand wines" indicates the universality of alcoholic drinks in Northeast Asia at around 2000 BCE
c. 100 BCE: S*amguk sagi* (History of the Three Kingdoms)—Alcoholic drinks are mentioned in the founding myth of Goguryeo
28 CE: *Samguk sagi*—During the Samhan and Goguryeo periods the making of grain wine from *nuruk* (cereal alcohol fermentation starter) and malt is established, and people gather together to drink, sing, and dance
c. Third century: *Kojiki* (Records of ancient matters, Japan)—Baekje man, named Inbeon, brings wine-brewing techniques to Japan
Seventh century: *Samguk sagi*—The refined rice wine of Unified Silla is popular with the upper class; Silla wine is perfected with its *nagnangju* brew and exported to Tang, China
1123: *Gaoli tujing* (Illustrated account of the Xuanhe embassy to Goryeo)—Brewing grain wine from nonglutinous rice and nuruk is established in early Goryeo for *cheongju* (clear rice wine), *jungyangju* (wine brewed multiple times), and takju (turbid rice wine), which are also used for drinks mixed with fruit or medicinal herbs
Eleventh–thirteenth centuries: *Goryeosa* (History of the Goryeo dynasty), *Isanggukjip* (Collected works of Minister Yi Gyu-Bo)—Korea begins from this time forward to produce wines based on wheat or rice that become well-known in other countries
c. 1240: Toward the end of the Goryeo dynasty, when distillation methods are introduced from Yuan, China, soju production explodes
Fifteenth–nineteenth centuries: Over 300 names of brewed grain wine and distilled liquor are recorded in Joseon literature, including medicinal or fragrant grain alcohol, fruit wines, mixed wines, and mixed liquors made as home brews by Korean families; soju is exported to Japan, China, and elsewhere
1800s: Toward the end of the Korean Empire (1897–1905), several alcoholic drinks from around the world begin to be imported
1883: Fukuda, a Japanese businessman, establishes a clear rice-wine production factory in Busan (Korea)
July 1907: The colonial Governor-General proclaims a tax on alcohol; in September, as the tax goes into effect, the manufacture of Korean alcohol comes under government control
January 1916: The Governor-General's new liquor law relegates all Korean manufactured alcoholic drinks to three types: yakju, takju, and soju
1917: The Governor-General's alcohol manufacture licensing is modified to include an allocation system for regional distribution rights
1945: Even after liberation, the liquor tax established under Japanese occupation remains in force
August 1966: The use of rice to make takju and yakju is forbidden, and wheat is substituted
1991: The use of rice to make takju and yakju is permitted again
1993: Heat-sterilized packaging is employed to export takju and yakju to the United States, Japan, and elsewhere
2000: Regional monopolies of sterilized takju and yakju are abolished

Goryeo dynasty, compiled 1392–1451), *Gaoli tujing* (Illustrated account of the Xuanhe embassy to Goryeo, 1124), and *Dongguk Yi Sang-Guk jip* (Collected works of Minister Yi Gyu-Bo [1168–1241]) reveal the dynamic culture of drinking that flourished in the ensuing Goryeo dynasty (918–1392).

Toward the end of Goryeo, liquor distillation was introduced to Koreans from Yuan, China, and soon a spirit called soju proliferated across the country. Joseon-dynasty (1392–1897) literature records over 300 alcoholic drinks, comprising various forms of grain alcohol and distilled liquor, medicinal flavored wine, fruit wine, composite wine, and mixed drinks, many of which were brewed or distilled at home with local ingredients. Records show that Korean soju came to be exported to Japan and China.

However, not long after the Joseon government was abruptly dismantled by Japan's annexation of the Korean Peninsula, the Japanese Governor-General of Korea levied a compulsory liquor tax (1907), with the objective of cracking down on the free-wheeling production of Korean alcohol. A liquor law enacted in 1916 stipulated that all alcoholic drinks produced in Korea must be standardized in the form of *yakju* (filtered wine), *takju* (cloudy wine), and soju, and that the sediment resulting from making yakju must not be filtered out, thereby effectively reducing Korean rice wine to a lower grade than that of Japanese sake. In 1917 the Japanese Government-General instituted a regional allocation system that would corner selling rights for pro-Japanese brewing businesses. Despite the fact that this liquor law suppressed Korean alcohol production, it survived after Korea was liberated from Japanese rule in 1945 and led to regional monopolies of the tagyakju (cloudy and clear wines) industry. This law remained in effect until 2000. Due to the financial difficulties and food shortages the nation faced after the Korean War, the use of rice in the production of tagyakju was prohibited in 1966. Wheat was used as a substitute until 1991, the year the restriction on rice as an ingredient in winemaking was lifted.

In the 1980s popular movements to revive traditional Korean brewing methods began to proliferate. In 1992 in the Food Technology Department at Korea University, this author's lab, succeeded in producing heat-sterilized, packaged makgeolli, which paved the way for the export of Korean makgeolli to countries like Japan and the United States (Fig. 9.2) (Lee et al. 1989, 1991; Lee and Kim 1993).

Examining the history of Korean alcohol production as described in historical literature, it becomes clear that soju (distilled liquor) and takju/yakju (unfiltered wine and clear rice wine) as enjoyed in Korea today are not the same as they were in the past. The most basic traditional alcoholic drink in Korea is a fermented grain wine that relies on rice and nuruk (a natural fermentation starter) as base ingredients, but at present, takju and yakju are made with wheat flour. In addition, koji mold (a controlled fermentation starter) is used instead of nuruk in the production of clear rice-wine, just as it is in Japan. Distilled spirits may be mixed in to create a stronger drink. Yakju is considered to be a low-grade clear wine: despite filtering, not all the sediment is removed (Lee 2012). Traditional Korean soju is made by fermenting rice or another grain and then distilling it, but today soju is made with molasses or sweet potato starch and is diluted with water.


탁주유통기한 연장방법 개발

인천탁주 고대식품공학과 이철호교수팀에 의뢰 성공

해외 수출도 가능…상온 6개월까지 저장

Method developed for extending the shelf life of makgeolli

Incheon takju: Success for Professor Lee Cherl-Ho and his team from the Korea University Dept. of Food Technology

Overseas export possible—6 months of room temperature storage

Fig. 9.2 A newspaper reports the development of *Nongju*, or packaged Makgeolli, in Korea. (*Source*: *Sikpum yutong sinmun* [Food industry news], 1993.3.23)

9.2 Traditional Alcoholic Drinks in Historical Literature

Korean alcoholic drink types and brewing methods can be found mainly in historic cookbooks or in books about food culture. Aside from two texts (*Dongguk Yi Sang-Guk jip* and *Hallim byeolgok* [Song of Confucian scholars, 1213–1259]) dating from the Goryeo dynasty that discuss the practical aspects of life, no other Korean record referring to the subject of alcoholic drinks exists before the Joseon period. When it came to official publications, Korea's monarchs mobilized public or personal finances to publish medical encyclopedias and tomes on agriculture, not cookbooks. Families of the nobility recorded secret recipes of their individual households, and the manuscripts were then passed down from a daughter-in-law to her descendants. A few cookbooks that were expressly made to be sold are extant today (Lee and Kim 1993).

The oldest Korean literature on food is Heo Gyun's *Domundaejak* (Licking my lips by the slaughterhouse door, 1611), which enumerates regional specialty foods and famous dishes found throughout the country during the reign of King Gwanghae (r. 1608–1623) (Lee 1981). Heo Gyun wrote this book during his banishment to Ganghwa Island; facing the coarse foods of his place of exile, his humorous title refers to him standing at the gate of a slaughterhouse, imagining the delicious foods he enjoyed in his hometown. He mentions two types of wine but does not record the recipes.

In about 1670 a cookbook written in *hangeul* (the Korean alphabet) appeared, the colloquial script suggesting that this book belonged to a private household. This record is known as *Gyugon siuibang* or *Eumsik jimibang* (A mother's cookbook for her daughter-in-law, c. 1670) (Lee 1981a). Most Sino-Korean cookbooks quote Chinese recipes verbatim, but here the author records recipes she discovered on her own, making this cookbook of enormous value to the field of traditional Korean gastronomy. Of a total of 132 items in the book, 51 concern alcoholic beverages. The high number of wines recorded suggests that, among the many tasks required of a wife in a wealthy household, brewing alcohol was deemed a key skill. The Korean cookbook *Jubangmun* (Brewing alcohol, 1600s) appeared at roughly the same time, and in light of the phrase "book price one *nyang*" on its jacket, it is assumed to have been published to sell. *Jubangmun* contains 27 recipes for brewing alcohol, in addition to a general treatment of cooking (Kim and Lee 1986).

In the 1700s cookbooks began to appear with greater frequency. *Eumsikbo* (A record of food, publication date unknown) describes how to make 12 kinds of alcoholic drinks (Kim and Lee 1988). When Hong Man-Seon (1643–1715) retired from his post as a public official, he wrote a lifestyle encyclopedia called *Sallim gyeongje* (Farm management, 1715), and with its 61 detailed recipes for traditional wines and liquors, this book is indispensable as a scholarly reference work. As the quintessential family encyclopedia of the eighteenth century, *Sallim gyeongje* was quoted extensively by later generations, extended and/or summarized in *Sallim gyeongjebo, Jeungbo Sallim gyeongje, Sallim gyeongjecho*, and *Sallim gyeongjechalyo*, and became the mother of Seo Yu-Gu's voluminous encyclopedia on everyday needs, *Imwonsimnyukji* (Encyclopedia of rural life, 1827).

In the 1800s a number of encyclopedias similar to that of Seo Yu-Gu's *Imwonsimnyukji* appeared, including *Gosasib-i jip* (an encyclopedia of traditional life in 12 volumes, Seo Myeong-Eung [edited by grandson Seo Yu-Gu]), *Haedong nongseo* (Korean farming book, Seo Ho-Su late 1700s), *Gyuhap chongseo* (Women's encyclopedia, Lady Yi Bingheogak 1809), and *Onghui japji* (Onghui journal), all of which discuss cooking and/or farming. *Imwonsimnyukji* is a comprehensive lifestyle encyclopedia consisting of 51 volumes that cover such topics as farming, food, medicine, and more, along with detailed articles on rites and rituals. Around 1850 the vast *Ojuyeon munjangjeon sango* (Random expatiations, Oju Yi Gyu-Gyeong) was published, an encyclopedia in 60 volumes encompassing the past and present of Korea and surrounding nations. These volumes contain numerous entries regarding cooking methods and ingredients. This work is extremely valuable to researchers of the Joseon dynasty.

In the latter 1800s several cookbooks were published, including *Eumsik beop* (Cooking methods, anonymous), *Eumsik bangmun* (How to cook, anonymous), and *Gyugon yoram* (Essential guide for women, anonymous) (Lee and Lee 1983; Lee 1983). Aside from these, cookbooks of uncertain date from this period include *Kim Seung-Ji taek jubangmun* (Kim Seung-Ji's brewing methods), *Sul binneun beop* (Methods for making alcohol, anonymous), *Jubangmun* (Brewing alcohol), and *Siuijeonseo* (Compilation of correct cooking methods, anonymous). *Sul mandeuneun beop* (How to make alcoholic drinks, late 1700s) describes how to make 19 different kinds of drinks, and *Yeokjubangmun* (Calendar brewing) includes recipes for 40 drinks (Lee and Cho 1983a). *Siuijeonseo*, written in the late 1800s, approximates a modern Korean cooking system, functioning as a bridge to twentieth-century cookbooks. It contains detailed recipes for food and 17 types of traditional drinks (Lee 1981b).

In *Imwonsimnyukji*, author Seo Yu-Gu divides Korean alcoholic drinks into 11 categories: *iryu, juryu, siyangnyu, hyangyangnyu, gwanayangnyu, sunnaeyangnryu, jecharyu, yangyoryu, yeryu, sororyu,* and *uijuryu.* Dr. Lee Sung-Woo reorganizes Seo Yu-Gu's classification into modern parlance, as follows (with the modern designation in italics): *sangyong yakju* (iryu; everyday wine), *teugyong yakju* (juryu, siyangryu; special occasion wine), *teukju* (yangyoryu; special wine), *hongju* and *baekju* (jecharyu; red wine and white wine), *gamju* (yeryu; sweet rice wine), *gahyangju* (hyangyangju; fragrant wine), *gwasilju* (gwayangryu; fruit liquor), *soju* (sororyu; distilled liquor), *yagyong soju* and *yagyong yakju* (uijuryu; medicinal distilled liquor and medicinal clear wine), and *sokseong balhyoju* (sunnaeyangryu; quick-fermented wine). Dr. Lee broadly classifies these drinks according to production method, targeted purpose, ingredients, and aspects like flavor and color (Lee 1981).

While historical cookbooks reveal detailed recipes on how to brew wine and distill spirits, alcoholic drinks are also mentioned in histories and collections of prose and poetry (Chang 1989). Table 9.2 lists a few representative alcoholic drinks mentioned in specific works of historical literature. Over 50 distinct drink names are mentioned with some frequency in these records. Even where the recipes are not included, the specific use or quality of a given drink can often be surmised, based on its name, description, or context (Lee and Kim 1993; Lee 2017).

9.3 Types and Categorization of Korean Grain Wine

The alcoholic drinks described in historic records can be bundled into three broad categories: brewed, distilled, and other. The traditional method of making Korean rice wine involves mixing nuruk into steamed glutinous or nonglutinous rice and then fermenting. The distillation of rice wine generates spirits, and the “other” category comprises *jaejeju*, or pure rice wine mixed with liquor, fruit, or other add-ins.

9.3.1 Yangjo gokju (Brewed Grain Wine)

Sungokju **(Pure Grain Wine)**

Yangjo gokju is the oldest type of traditional Korean grain wine and can be divided between pure rice wine and *yagyong gokju* (medicinal wine) or *gahyang gokju* (flavored wine). Pure rice wine types are divided into *takju* (cloudy), *yakju* (filtered), and *cheongju* (clear): these three wines come from a single brew—the level of filtering determines the final product. The majority of alcoholic drinks mentioned in historical records are fermented grain wines, but among these there is great variance. Pure rice wine can be further divided according to the number of times it is brewed: single, double, triple, or quadruple (see Table 9.3). Single and double brews can be made into regular ferments or quick ferments, while triple and quadruple brews are fermented at length over a low temperature. As seen in Table 9.2, double-brewed types are the most common (Lee and Kim 1993).

Table 9.2 Representative traditional alcoholic drinks in historical literature

Historical record	Single-brewed rice wine		Double-brewed rice wine		Triple-brewed rice wine	Medicinal/fragrant grain wine		Distilled liquor
	Samilju	*Ihwaju*	*Sogokju*	*Byeokhyangju*	*Samhaeju*	*Gwahaju*	*Gugiju*	*Soju*
Dongguk Yi Sang-Guk jip (1168)	○	○			○			
Hallim byeolgok (1213–1259)		○			○			
Dongak jip (1571–1637)					○	○		
Dongui bogam (1610)							○	○
Jibong yuseol (1613)							○	○
Eumsik jimibang (c. 1670)	○	○	○	○	○			○
Yorok (c. 1680)			○	○	○	○		
Jubangmun (late 1600s)	○	○	○	○	○	○		○
Chisaeng Yoram (1691)			○					
Bukgwanji (1693)								○
Uibanghap-pyeon (c. 1700)			○	○		○		
Eumsikbo (c. 1700)	○		○	○	○	○		
Gugeup sinbang (1700s)								○
Sallim gyeongje (1715)	○	○	○	○	○	○	○	○
Gamjeojong sikbeop (1766)	○	○	○	○	○	○		
Jeungbo sallim gyeongje (1766)	○	○	○	○	○	○	○	○
Yeokjubangmun (late 1700s)	○	○		○	○	○		○
Sul mandeuneun beop (late 1700s)		○		○				
Mincheon jipseol (late 1700s)	○		○		○	○		
Gosa sibijip (1787)	○	○	○		○	○	○	○
Jaemulbo (1798)								○
Godae gyugaon yoram (c. 1800)	○		○	○	○	○		○
Godae gyuhap chongseo (c.1800)								○
Chunhyangjeon (c. 1800)						○		

Kim Du-Jong bon yangsaengseo (1800s)							○	
Gyuhap chongseo (c. 1815)			○				○	○
Nongga wollyeongga (1816)			○					
Imwonsimnyukji (c. 1827)	○	○	○	○	○	○	○	○
Yangjubang (c. 1837)	○	○	○	○	○	○	○	○
Gunhak hoede ung (mid-1800s)				○				
Sallim gyeongje chwalyo (mid-1800s)			○		○	○		
Dongguk sesigi (1849)	○		○	○	○	○		
Eumsik bangmun (mid-1800s)			○					
Ojuyeon munjangjeon sango (1850)		○						
Kim Seung-Ji taek jubangmun (1860)		○	○					○
Gunbumok (1896)								○
Siuijeonseo (1800s)	○		○	○		○		
Sul binneun beop (late 1800s)			○			○		
Jujeong (late 1800s)			○					
Buin pilji (1916)						○	○	
Joseon sesigi (1916)	○			○	○			
Joseon mussang sinsik yori jebeop (1924)	○	○			○			

Table 9.3 Grain wine categorization and types

Single-stage brew	Regular	*Gyemyeongju* (cockcrow wine), *hailju* (summer's day wine), *hailcheongju* (summer's day clear wine), *hajeolsamilju* (3-day summer wine), *hajeolju* (summer day wine), *cheonggamju* (clear sweet wine), *pyeonju* (level wine), *hapju* (mixed wine), *hwanggamju* (yellow sweet wine), *naegukhyangonju* (royal pharmacy wine), *dongpaju* (east wave wine), *baekhwachun* (white spring blossom), *buuiju* (floating ants wine), *ongnoju* (clear dew wine), *jeomgangju* (sticky wine), *jeomgangcheongju* (clear sticky wine), *hwanghwaju* (yellow blossom wine), *ihwaju* (pear blossom wine)
	Quick	*Geupju* (quick wine), *geupsiju* (quick-time wine), *ililju* (1-day wine), *sigeupju* (urgent wine), *geupcheongju* (quick clear wine), *samilju* (3-day wine)
Double-stage brew	Regular	*Jugyeopju* (bamboo leaf wine), *jeolju* (seasonal wine), *dugangju* (Dugang wine), *cheongmyeongju* (clear wine), *hahyangju* (lotus-scented wine), *hyangonju* (fragrant brew), *Yuhwaju* (Yuhwa wine), *sasiju* (four seasons wine), *gamju* (sweet rice wine), *hwanggeumju* (golden wine), *haenghwachunju* (apricot blossom spring), *jinyangju* (pure wine), *jinsangju* (royal wine), *ilduju* (single-container wine), *yukbyeongju* (6-water-bottle wine), *ohoju* (5-water-bottle wine), *ilhaeju* (one pig-day wine), *obyeongju* (5-bottle wine), *byeolju* (special wine), *Yeonhaeju* (Yeonhae wine), *sincheongju* (new clear wine), *sinsangju* (new frost wine), *Sobaekju* (Mt. Sobaek wine), *sesinju* (wild ginger wine), *seoktanju* (delectable wine), *seoktanhyang* (delectable fragrant wine), *baekdanju* (birch wine), *bakhyangju* (squash-scented wine), *mannyeonghyang* (abundant year fragrance), *Dangbaekhwaju* (Tang dynasty 100-blossom wine), *danjeomju* (sweet wine), *namseongju* (masculine wine), *gugaju* (panegyric wine), *gyeongmyeonnokpaju* (placid ocean waves), *hoesanchun* (spring in the mountains again), *musiju* (anytime wine), *sajeolju* (four seasons wine), *jipseonghyang* (collective fragrance), *sogokju* (little nuruk wine), *byeokhyangju* (fragrant green wine), *baekwhaju* (100-blossom wine), *baengnoju* (white dew wine), *nokpaju* (ocean waves), *gamhyangju* (sweet fragrant wine), *gamhahyangju* (sweet water fragrant wine)
	Quick	*Chililju* (7-day wine), *Dugangju* (Dugang wine)
Triple-stage brew		*Samhaeju* (3 pig-days wine), *hosanchun* (bottle mountain wine), *illyeonju* (1-year wine), *sunhyangju* (mild fragrant wine), *seongtanhyang* (glorious fragrant wine), *samoju* (3 ox-days wine)
Quadruple-stage brew		*Samaju* (4 horse-days wine)

Yagyong (Medicinal) and Gahyang (Flavored) Grain Wines

Medicinal and flavored wines include ingredients such as fruit, flower petals, tree shoots, roots, or medicinal herbs that are added to different pure grain wine ferments by various methods. Typically named after the dominant fragrance, examples include *ogapiju* (aralia wine), *gugiju* (goji berry wine), *dugyeonju* (azalea blossom wine), and *songsunju* (pine sprout wine), as indicated in Table 9.4.

Table 9.4 Medicinal and flavored grain wine types

Medicinal grain wine	Ogapiju (aralia wine), gugiju (goji berry wine), *changpoju* (iris wine), *bognyeongju* (poria mushroom wine), *gamgukju* (chrysanthemum wine), *gobonju* (angelica wine), *cheonmundongju* (asparagus tuber wine), *musulju* (35th day in sexagenary cycle wine), *milju* (honey wine), *gyemyeongju* (cockcrow wine), *baekhwaju* (100-blossom wine), *jaju* (roasted wine), etc.
Flavored grain wine	*Songaekju* (pine resin wine), *songjeolju* (pine sprig wine), *songjaju* (pine cone wine), *songnyeongju* (pine sap wine), *songhwaju* (pine pollen wine), *dohwaju* (peach blossom wine), *yeonyeopju* (lotus blossom wine), *beopju* (chrysanthemum and pine needle wine), *dangnamunnipsul* (mulberry leaf wine), *gukhwaju* (chrysanthemum blossom wine), *baehwaju* (pear blossom wine), *yujapiju* (citron peel wine), *hayeopju* (lotus wine), *hayeopcheongju* (clear lotus wine), *dugyeonju* (azalea blossom wine), etc.

9.4 Production Techniques of Korean Grain Wine

Most brewing methods described in historical literature concern tagyakju. Aside from yagyong types, almost all takju and yakju use nonglutinous and/or glutinous rice as the main ingredient, with nuruk and flour. The final product depends on whether glutinous or nonglutinous rice is used, or the ratio of a mixture thereof, before adding nuruk and other ingredients. The manner of processing the grain to prepare it for fermentation in winemaking also differs: it may be made into porridge, doughnut-shaped rice cakes, bricks of steamed white rice cake, or steamed rice.

Grain wine made from rice can be categorized in terms of commonalities in the manufacturing process by, for example, the number of add-ins (brew stage), the form of the ingredients, the preprocessing methods, the fermentation periods, the main and secondary ingredients, and the ratio of nuruk to rice. The method of making representative alcoholic drinks can thus be organized according to the number of times these aspects appear in historic texts, as below (Lee and Kim 1993).

9.4.1 Typical Iyangju (Double-Brew) Production Method

Table 9.5 presents commonalities in the production methods of double-brewed pure grain wines. In most cases, the *mitsul* (base ferment/mash) is made from nonglutinous rice, while the *deotsul*, additional mashes, use either nonglutinous or glutinous rice at a similar rate. The mitsul is frequently made by processing the rice in the form of porridge (*juk*) or doughnut-shaped rice cakes. This is followed by preparing *jiebap*, which, whether in the form of porridge or rice flour mixed with hot water to make a paste, is steamed for use in brewing.

Records state that only 3 days are needed to complete the initial fermentation process, but the time that elapses between adding a mash and the finished product is often omitted from these texts, leaving the reader only with the phrase "until the liquid becomes alcohol." Generally speaking, this period would last about 7 days;

Table 9.5 Number of times Iyangju (Double-brew) manufacture occurs in historic texts, according to type or form of ingredient

		Mitsul (base ferment)	Deotsul (additional mash)
Main ingredient	Glutinous rice	8	27
	Nonglutinous rice	48	24
	Glutinous + nonglutinous rice	3	1
Form of rice product	Doughnut-shaped rice cake	11	
	Porridge	24	4
	White rice cake	10	
	Rice steamed for brewing		54
Secondary ingredient	Wheat flour	20	13
	Other ingredients	5	2
			(good clarified rice wine 1)
Nuruk	Ground nuruk	30	6
	Nuruk	17	5
	Coarsely ground nuruk	2	
	Coarse nuruk	1	
	Nuruk juice	1	
Fermentation period	3 days	17	3
	4–7 days	15	21
	More than 7 days	3	15
Fermentation temperature	Low temperature	4	2
	High temperature	3	2

drinks requiring "a long time," however, might age for a period of 2 months. In the latter case, the "long time" does not refer to the amount of time required to reach fermentation, but to the aging period, which was often employed to achieve a higher-quality, better-tasting product. Methods for brewing representative examples of iyangju, including *sogokju, byeokhyangju, baekhwaju, baekhaju, gamhyangju,* and *nokpaju,* are described below.

Sogokju (Little Nuruk Wine)

Wine lovers claim sogokju as the most representative Korean wine due to its outstanding flavor. With more mentions than any other alcoholic drink in historic texts, it is thought to be the most widely known wine since the beginning of the Joseon dynasty (1392). The name "sogokju" derives from the use of only a small amount of nuruk (made with wheat grits or flour) during production.

Records of sogokju with a base ferment and/or additional mash phase made of nonglutinous rice include *Eumsik jimibang*, *Yeokjubangmun*, *Buin pilji* (Necessities for every wife, Lady Yi Bingheogak 1915), *Yorok* [Essentials, anonymous c. 1680), *Eumsikbo*, *Gyugon yoram*, *Sul mandeuneun beop*, *Gyuhap chongseo*, *Jubang* (Wine brewing, trans. Kim and Lee 1990), *Imwonsimnyukji*, *Yangjubang* (Making spirits, anonymous c. 1827), and *Sallim gyeongje*. Only *Siuijeonseo* uses glutinous rice for the purpose (Lee and Cho 1983b). The ratio of rice to flour to nuruk/water is different in every record; for example, 36 L: 5.4 L: 5.4 L/72 L; 9 L: 900 mL: 900 mL/54 L; 54 L: 5.4 L: 9 L/6 bowls; 18 L: 1.26 L: 1.26 L/23.4 L.

Most fermentation periods last 7 days. One record instructs that for wine made in the second lunar month, if the ferment tastes bittersweet after 3 days, then a mash should be added. Shorter fermentation times include 2 days, 4 days, and 5 days, while longer fermentation stretches to 30 days or more. Records in which additional mashes are based on nonglutinous rice include *Jubang*, *Yeokjubangmun*, *Sallim gyeongje*, *Gyuhap chongseo*, *Eumsikbo*, *Yorok*, *Buin pilji*, *Eumsik jimibang*, *Sul mandeuneun beop*, *Imwonsimnyukji*, and the Korea University holdings of *Gyugon yoram* and *Gyuhap chongseo*. Again, only *Siuijeonseo* records the use of glutinous rice for this stage. The ratio of rice used for the mitsul (base ferment) and deotsul (additional mashes) varies from record to record, examples being 9 L: 54 L, 90 L: 90 L, 18 L: 54 L, etc. Most recipes with an additional mash or mashes call for a fermentation period of 21 days, but in some cases, 30 days.

Taking together the recipes in the sources mentioned above, general principles emerge: sogokju uses nonglutinous rice for the base ferment, and the mixed ingredients tend to reach a ratio of nonglutinous rice to nuruk 11:1, or nonglutinous rice to wheat flour 13:1, which implies that the rice generally comprises about 10 times the amount of nuruk and/or wheat. It is often difficult to ascertain the volume of water added—only that it is enough to steam rice cake. In many cases the record simply states, “Prepare the rice.” The standard fermentation period seems to be 7 days.

In the twentieth century, there was a trend toward using *seomnuruk* (a lower quality, coarser nuruk) in place of traditional nuruk. The use of *suguk*, a form of nuruk brewed with water or juice, is also frequently seen. The form of rice prepared for the base ferment is also processed differently: instead of the traditional watery rice porridge, white rice cake is more common. Most recipes that include an additional mash do not add nuruk or secondary ingredients at that point, and so comparing the amounts of rice added during the mitsul stage and the deotsul stage is a good way to understand the manufacture process. Nonglutinous rice may be used at either or both stages, and there are many cases in which the additional mash calls for about two times the amount of rice used for the base ferment, but there seem to be no cases in which the amount of rice used in the base ferment is the same as that used in the additional mash. The form the rice takes for the mashes tends to be steamed, porridge-like, or mixed with water and made into dough.

Sogokju is made using a 10:1:1 ratio of nonglutinous rice to nuruk to wheat flour. The brewing method is as follows: Glutinous rice is washed, ground, and cooked to make porridge. The base ferment is made by combining the ingredients at the ratio mentioned and fermenting at a low temperature for 7 days. Next, a steamed-rice or rice-porridge mash is added in an amount 1–2 times the rice used in the base ferment and left to age at a low temperature for 3 weeks. The nuruk in this case is coarse, and nuruk steeped in water or juice may substitute (Korea Food Research Institute 1992). Another name for sogokju is “crippling wine:” It is so delicious that people will continue to drink it, even when they have become too drunk to stand.

Byeokhyangju (Fragrant Green Wine)

Byeokhyangju is a type of clear rice wine. Pyongan Province (in North Korea) was famous for its byeokhyangju, which is so named for being green (“byeok”) and fragrant (“hyang”). Passages about this drink in some of the records listed above reveal the following: Nonglutinous rice is used in the base ferment, and the ratio of liquid to nuruk is 8:1. The small amount of nuruk suggests that the way the nuruk is prepared is of little importance here. The rice is made into porridge, with a 1:1 ratio of rice to hot water. Initial fermentation time is 4–5 days. The additional mash uses nonglutinous rice and does not necessarily require nuruk, but normally the ratio of nonglutinous rice to nuruk is about 7:1, while the volumetric ratio of the rice in the base ferment and that in the mash is the same. Aging continues for about 2 weeks.

Baekhwaju, Baekhaju, Bangmunju (100-Blossom Wine)

Although most rice wines call for rice in the form of porridge, wines by the designation “100-blossom wine” do not; although how the rice is processed for these wines is difficult to ascertain, since references to its form are vague. All that can be gleaned is that hot water is poured over the rice, but instead of being steamed, the rice undergoes raw fermentation. The base ferment employs nonglutinous rice, the volume of rice to wheat flour 15:1, and rice to nuruk, 5:1. Nonglutinous rice is ground into flour and made into a slurry with hot water, then cooled, after which nuruk and wheat flour are added. At this point other ingredients (wheat flour) may be mixed in, at a uniform volume of about 1.8 L, with a ratio of 1 part add-in to 20 parts rice. Fermentation lasts between 3 and 7 days. Jiebap (rice steamed for the additional mash) is made with twice the amount of nonglutinous rice as that used for the base ferment. The ratio of nonglutinous rice to nuruk is 18:1. It appears that wheat flour is used only for the base ferment. Total fermentation time lasts about 7 days.

Gamhyangju (Sweet Fragrant Wine)

In the book *Yeokjubangmun*, gamhyangju appears as *gamhahyangju*, but a glance at the recipe shows that the two names denote the same wine. For the base ferment, glutinous rice is washed with water, ground, and typically made into doughnut-shaped rice cakes. The ratio of rice to nuruk is 1.3:1, and, unique to this recipe, the nuruk is passed through a fine sieve. Also unusual is the nearly equal ratio of rice to nuruk. The manner of making the base ferment nearly mirrors the process of making a ferment for distillation. The fermentation period lasts 3 days. The amount of glutinous rice used in the additional mash is ten times the amount used to form the base ferment. Once the jiebap is prepared, it is added to the base mash and left to ferment in a warm spot. The fermentation process of this wine is unique: for a spicy result, it is fermented 6 days in a warm place and then an additional 7 days in a cool place. Total fermentation lasts 7–21 days.

Nokpaju (Ocean Waves)

This clear wine has been made in Korea at least since the end of the Goryeo dynasty (pre-1392) and is said to elicit the feeling of peaceful ocean waves when drinking. Nonglutinous rice is often used in the making of the base ferment, which is usually processed in the form of porridge or cooked rice mixed with water. The ratio of rice to nuruk is about 10:1, and in most cases wheat flour is not added; when it is, the ratio is 1:2, nuruk to flour. The fermentation period lasts 3 days. The additional mash process consists of steaming glutinous rice and adding it to the base ferment, with double the amount of rice that was used for the base ferment. Nuruk and wheat flour are not added. The fermentation period is 12 days.

9.4.2 Typical Danyangju (Single-Stage Brew) Production Method

Table 9.6 presents the main ingredients, secondary ingredients, and other aspects of making danyangju (single-stage brew wine), as well as the number of times this information appears in historic records (indicated by the numbers in parentheses). Most danyang wines can be made within 10 days. About half of the recipes for these wines use glutinous rice, half nonglutinous rice. As a secondary ingredient, undiluted alcohol, high-quality wine, or takju (cloudy wine) may be used to inoculate the base ferment in order to induce rapid fermentation. The use of *jeungja*, or jiebap, rather than other rice-processing methods (such as doughnut-shaped rice cakes or porridge), also plays a role in reducing the overall time to completion (Lee and Kim 1993).

Types of single-stage brew wine include *ihwaju*, *ililju*, and *buuiju*, which are described below.

Ihwaju (Pear Blossom Wine)

The name of this wine is misleading: it is not a fragrant wine, but a takju made using the single-stage brewing process. Its name derives from the time of year it is traditionally made: pear blossom season. Nonglutinous rice is often used to make this wine, although uniquely, the nuruk is prepared separately. To make the nuruk,

Table 9.6 Number of times elements of danyangju manufacture are mentioned in historic texts

Main ingredient	Glutinous rice (11), nonglutinous rice (13), glutinous + nonglutinous rice (2), glutinous millet (1)
Processing of main ingredient	Jeungja/jiebap (13), rice cake (3), porridge (4), doughnut-shaped rice cake (1), mixed (1)
Secondary ingredients	Takju (2), high-quality wine (3), undiluted alcohol (3), soju (1), wheat flour (5), soybean flour (1)
Form of nuruk	Mung beans (1), nuruk cake (10), floured (12), filtered (2), coarse (1), none (1)
Fermentation period	1 day (2), 2 days (2), 3 days (9), 7 days (3)
Fermentation temperature	High temperature (3)

3 days before the first "pig day" of the new year (12th day of the 60-day sexagenary monthly cycle), nonglutinous rice is soaked, ground, and shaped into lumps the size of an egg. These are placed into an earthenware jar and topped with a layer of pine needles. The brew is left to ferment in a cool spot for 7 days, after which it is dried for 12 h, and then the jar is buried in the earth. After undergoing the drying process once more, the opening is covered with paper and sealed. Ihwaju is made using nonglutinous, doughnut-shaped rice cakes, with a 1:4 ratio of nuruk to rice, and fermented 3–7 days. An unusual aspect of this wine is that it is diluted before drinking.

Ililju (One-Day Brew)

During the busy farming season farmers return home in the evening after working all day and brew this drink overnight to take with them the following day. The alcohol content of this sweet-tasting gamju (sweet rice wine) is low, and it was favored by women as well. The ratio of nonglutinous rice to nuruk is about 6:1, and most ililju fermentation is artificially sped up by the addition of a bowl of good, undiluted rice wine. The rice used for the mash is either steamed or made into porridge.

Buuiju (Floating Ants Wine)

Buuiju, also known as *dongdongju* ("floaties" wine), acquired its name from the ant-like bits of sediment (called "wine bugs") that rise to the top during fermentation. In most cases glutinous rice is used for the mash, and the ratio of ground nuruk to rice is 1:10. If the liquid is too clear after fermenting for 3 days, cooked rice grains may be added to create the effect of floating bits.

9.4.3 *Samyangju (Triple-Stage Brew) and Sayangju (Quadruple-Stage Brew) Production Methods*

It is relatively rare to find wines brewed with more than two stages of additional rice mashes. They tend to be made at the beginning of the first month of the new year and undergo long fermentation at a low temperature. Low-temperature fermentation, while producing slow microbial growth, results in robust, full-bodied flavor. Thus, extending fermentation by continuing to feed the brew with additional rice mashes results in a high-quality product with excellent flavor.

Table 9.7 lists triple- and quadruple-stage manufacture processes, as well as the number of times each element of the process is mentioned in historical literature. The drinks included in this category are *samaju*, *samhaeju*, *hosanchun*, *illyeonju*, *sunhyangju*, *seongtanhyang*, and *samoju*. Samhaeju (3 pig-days wine, or 120-day wine) is notable for having flourished toward the end of the Joseon dynasty: the drink was as common as soju, and there was a samhaeju distillery in Mapo (a district in Seoul), where a burial ground, as it were, was created to house hundreds of jars of samhaeju interred for aging. The making of samhaeju, which began during the 12 days following the first "pig day" of the first month of the new year, was brewed with two mash feedings over low heat for a long period. This wine had been a favorite of members of the upper class from the time of the Goryeo dynasty (918–1392). Unlike typical yakju (filtered wine), samhaeju went through three stages of preparation, which gave the resulting drink a pure, strong taste. It was a representative spring-season wine that lasted a long time.

The base ferment of triple- and quadruple-brewed wine can be made with glutinous or nonglutinous rice (the literature shows an almost even use of each) in the form of porridge, with ground nuruk added in a 1:4 ratio, nuruk to rice. Wheat flour is added at almost a 7:1 ratio, flour to nuruk. After fermenting at a low temperature for 12 days, the first deotsul is added. The first mash uses about three times the amount of rice as used in the base ferment and takes the form of nonglutinous, doughnut-shaped rice cakes. Wheat flour and nuruk are not added at this stage in most cases. Fermentation continues for a further 12 days at a low temperature. The second mash uses four times the amount of nonglutinous rice as used in the base ferment, this time in the form of steamed rice. The final (low-temperature) fermentation lasts anywhere between 12 days and 2 months (Rhee et al. 2004).

The form of rice used for samhaeju differs depending on the number of feeding stages. High-quality triple- or quadruple-brewed wines were enjoyed mainly by the upper class, as sufficient leisure time was required for production.

Table 9.7 Number of times elements of triple- and quadruple-stage brewing are mentioned in historical literature

		Base ferment	1st additional mash	2nd additional mash	3rd additional mash
Main ingredient	Glutinous rice	1		1	
	Nonglutinous rice	4	5	3	1
	Glutinous + nonglutinous rice			1	
Processed form	Steamed rice made for brewing (jiebap)		1	2	1
	Unshaped rice cake	1		1	
	Porridge (mixed with water)	4			
	Doughnut-shaped rice cakes		4		
Secondary ingredients	Wheat flour	4	1	1	
Nuruk	Nuruk	1		1	
	Ground nuruk	4	1	1	
Fermentation period	5 days	1			
	12 days	3	3	3	
	1 month	1	1		
	3 months			1	1
	3, 5, 7 days	1			
Fermentation temperature	Low	4	4	4	

9.4.4 Medicinal and Flavored Grain Wine Production Techniques

According to *Imwonsimnyukji*, the addition of flower petals and other flavorings to yakju (filtered wine) yield a drink called *hyangyangju* (flavored wine). The wine is not made by mixing fragrant herbs into the final product, however; rather, medicinal or fragrant herbs are added earlier, to be fermented together with the wine. The text further states that yakju made simply of jiebap and nuruk is called "*minja* yakju" (plain wine), but when in the process of making minja yakju pine sprouts are included, the resulting drink is called pine sprout wine (*songsunju*); when ginseng is added it is called ginseng wine (*insamju*), and so on.

Flavored wines begin to be mentioned in literature toward the end of the Goryeo dynasty (918–1392). A representative Goryeo wine is *hwaju* (blossom wine), the common name for a number of drinks in which various kinds of flowers may be fermented, including *dohwaju* (peach blossom), *songhwaju* (pine pollen), *yeonyeopju* (lotus blossom), *gukhwaju* (chrysanthemum blossom), *yujapiju* (citron peel), *baekhwaju* (100-blossom), *hayeopju* (lotus), and *dugyeonju* (azalea blossom wine) (Chang 1977). Two blossom wines that appear frequently in historical literature, described below, are pine sprout wine and azalea wine.

Songsunju (Pine Sprout Wine)

Imwonsimnyukji reveals that for pine sprout wine, boiled pine sprouts are packed into a jar with the water they were boiled in and left to infuse for a few days, and then that water is used to make wine in the standard way. In *Eumsik bangmun* and *Gyuhap chongseo*, however, pine sprout wine is made by making the base ferment, then blanching pine sprouts and adding them to the base ferment when the first mash would typically be added, afterward distilling the wine into soju and either drinking it as is, or mixing in a strong wine such as baeksoju or samhaeju before drinking (Korea Rural Development Administration 2014).

Dugyeonju (Azalea Blossom Wine)

The base ferment of azalea wine is made on or around the first pig day of the first lunar month of the year. In early spring, the stamens and pistils of azalea flowers are removed, and the blossoms are added to the additional mash with glutinous or nonglutinous rice. The rice and blossoms are not blended together, but layered. In other texts, azalea blossom wine is made by placing a silk pouch of azaleas into a jar of previously fermented grain wine and waiting a month or more for the essence of the azaleas to infuse the wine.

A common thread among flavored wines is that the blossoms are added during the first mash stage, after the base ferment is complete. The most prevalent fragrances come from pine trees, whether sprouts, needles, sap, resin, or branches. Wines made from conifers include *songsunju* (pine sprout), *songaekju* (pine resin), *songjeolju* (pine sprig), *songnyeonju* (pine nuts), and *songhwaju* (pine pollen).

Other types of fragrant wines include *dohwaju* (peach blossom), *yeonyeopju* (lotus blossom), *beopju* (chrysanthemum and pine needle), *dangnamuipsul* (mulberry leaf), and finally, *gukhwaju* (yellow chrysanthemum petals), which *Yorok* refers to as a medicinal wine when rehmannia and goji berry roots are added.

9.5 Distilled Liquor

9.5.1 The Origin of Soju and Its Transformation Process

The technique for distilling liquor may have originated in Persia, making its way to Europe by the thirteenth century, where grape wine was distilled to create brandy. In Korea in the late fourteenth century, the wild ginseng diggers of Pyongan Province called soju *arangju*, and further south, in Kaesong (North Korea), it was known as *arakju*. However, in *Hanguk-eo daesajeon* (Dictionary of the Korean language), "arangju" is defined as the dregs of low-quality, high-proof distilled liquor. In Arabic a similar drink is called *arag*. The consensus among scholars is that distilled liquor came from Arabia to Manchuria via Yuan, China, and from there to Goryeo, Korea (Lee 1984; Ji 1981).

The classic *Ben cao gang mu* (Compendium of *Materia Medica*, Li Shizhen 1596) states, "Distilled liquor has not been with us since ancient times, but began in the Yuan dynasty (1279–1368)." The first Chinese recipe for distilled spirits was thought to appear in the Yuan encyclopedia *Jujia biyong shilei quanji* (Complete collection of classified affairs essential for home life). These records provided a basis for the generally accepted notion that distilled liquor was first made in China during the Yuan dynasty. However, other records seem to indicate that the inception of distilled liquor in China predates the Yuan. Tang poet Bai Juyi (772–846) penned a line of poetry that reads, "The first liquor opened/smells of pumpkin," and among Li Bo's (701–762) poems, "Spring liquor of the south" is mentioned. "Spring liquor" is a high-proof liquor, and thus the final character in the line, which typically refers to "springtime," probably refers to a strong liquor here. In his work *Kaoliangjiu* (Kaoliang wine), Wei Yan-Shou (1791) describes the origins of distillation as follows: "In China distilled spirits were already known in antiquity. In the 800s BCE 'arrack' was being produced in India, and the Greek philosopher Aristotle stated that he could distill sea water into salt. According to these sources, the history of distillation goes back much further than previously thought." These texts suggest that distilled liquor may have originated in China even earlier than the Tang dynasty (618–907) (Lee 1984).

During the Goryeo dynasty (918–1392), Mongols established a plan to conquer Japan via Korea. Boats, troops, and provisions were demanded of the Koreans, military bases were set up in Kaesong and Andong, and Jeju Island was turned into a military outpost. To this day, Jeju, Andong, and Kaesong are famous for their soju. The first Korean record of soju in Japan claims that the liquor was sent to Tsushima Island (located in the Korea Strait between Korea and Japan) in 1404 (4th year of the reign of Taejong of Joseon). It can be surmised, then, that the basic forms of Korean alcohol—yakju, takju, and soju—were established at least as early as the Goryeo dynasty.

By the beginning of the Joseon dynasty soju was not yet widely known among the populace; only yagyong (medicinal wine) was familiar. By the 19th year of King Jungjong's reign (1524), however, soju enjoyed widespread circulation among the people. According to *Joseon wangjo sillok* (Annals of the Joseon dynasty), in the 21st year of King Seongjong's reign (1588) Minister Jo Hyo-Dong presented a memo to the king stating, "During King Sejong's reign (1397–1450), soju was rarely seen in the homes of the nobility, but these days the appearance of soju at each and every banquet results in a huge expense, and therefore it ought to be prohibited." The drinking of soju, then, had not only become commonplace by the sixteenth century, but had even begun to be viewed as a social problem.

The state of soju production in Korea before 1905 reveals regional differences based on climate: in Pyongan, Hamgyong, Hwanghae, and Gangwon Provinces—all in northern or east-central Korea—people enjoyed soju year-round, but in southern regions soju was produced only in the warmer months, between May and October. Seoul soju was made in Gongdeok-dong. Each region made soju slightly differently, but the conventional process of brewing with nuruk for the base ferment and then distilling the resultant wine had been standard across the peninsula for generations.

After Japan's annexation of Korea (1910), the Japanese Empire repealed the late Joseon-dynasty liquor tax law and imposed a new one that enforced the use of a Japanese-style starter (koji) in the making of soju. Following the Japanese sake-making process, steamed rice was made in a large brewer's steamer (siru), and the koji was pulverized and used at a low ratio. The Korean still (*gori*) was retrofitted with a cooling device so no steam would escape (Cho 1991). In 1919, six facilities for processing distilled spirits in this new way were established across the country. During this time of change, molasses also became a base ingredient. In 1925, stills with steam suction were developed in an effort to improve soju manufacture. By 1927, the soju industry had turned its back on the traditional Korean fermentation process and completely embraced the black koji method, which enabled the production of soju to skyrocket (Lee and Bae 1968).

After liberation from Japan in 1945, alcohol made from rice was prohibited because of a nationwide shortage of the grain. The production of soju was limited, and for some time wheat soju prevailed. In the midst of continued rice shortages in 1949, drinks such as *jubak* (brew residue) or takju (cloudy wine) were distilled, soju was made using whatever grain the Treasury decreed was allowed, and spirits were diluted with water to stretch available grains. When the tax law was revised in 1961, a distinction was made between distilled soju and diluted soju, and in December 1964 the use of grain in distilled soju was prohibited, following which a great number of soju distilleries failed. Some stayed afloat by making sweet potato soju, but due to the poor quality of diluted soju made with sweet potato, the practice was abolished in 1973. The year 1965 marked a crisis in Korean soju production because the restriction on grain use in spirits caused the practice of traditional soju distillation to disappear entirely, ushering in an era of diluted soju (Lee 2012).

9.5.2 Classification of Korean Distilled Liquor

Pure-grain distilled liquor in Korea is called soju, although the traditional form differs significantly from today's more diluted soju. When medicinal wine or flavored grain wine is distilled, however, the resultant spirits include *jungnyeokgo* (bamboo shoot liquor), *iganggo* (pear-ginger liquor), *gamhongno* (sweet red liquor), and *cheonchukju* (coconut milk liquor).

Other categories of distilled spirits include *honseongju* (compound spirits), *gwasilju* (fruit liquors), and *iyangju* (special-brew liquors). Grain soju is added to wine for mixed types such as *gwahaju*, which mixes soju with yakju (filtered grain wine) to extend the shelf life of the wine. Most fruit liquors are made using a specialized fermentation process, and include *bongnaechun* (wheat liquor made in a double-boiler), *jiju* (in which the liquor crock is buried in the earth to age), and *saju* (specially prepared for use in ancestral rites). See Table 9.8 for an expanded list.

9.5.3 Manufacturing Techniques for Traditional Soju

During the Goryeo and Joseon dynasties, soju was made through a brewing and distillation process that saw no particular change or progression over time. Distilled spirits were made in the home utilizing iron cauldrons with lids and steamers. The most primitive method involved placing prepared alcohol or rice wine lees into the cauldron, then situating a bowl underneath the upturned cauldron lid. As a fire was lit beneath the cauldron, cold water would be poured into the hollow part of the upturned lid. When the heat hit the cauldron, the evaporating alcohol in the liquor or dregs would liquify on account of the cold water in the lid, and drip into the bowl. Thus the making of soju was literally called “soju is coming down” (*soju naerinda*).

Table 9.8 Standard distilled liquors and other types

Standard distilled liquors	Pure-grain distilled liquor	*Andong soju* (Andong), *munbaeju* (wild pear), *chapssal soju* (glutinous rice), *samhae soju* (3-pig-day), *hongju* (red soju), *bori soju* (barley), *sacheol soju* (4 seasons), *susu soju* (sorghum), *oksusu soju* (corn), etc.
	Yagyong (medicinal) distilled liquor	*Seomnaju* (Thai liquor), *jungnyeokgo* (bamboo shoot liquor), *Jindohongju* (Jindo red soju), *iganggo* (pear-ginger liquor)
	Flavored distilled liquor	*Gamhongno* (sweet red liquor), *cheonchukju* (coconut milk liquor), *tobap soju* (yakju lees)
Other types of liquor	Honseongju (mix of wine and spirits)	*Gwahaju* (soju mixed with filtered grain wine), *waemirimju* (Japanese liquor), *songsunju* (pine sprout liquor), *ganghaju* (ginger-lotus liquor)
	Fruit liquors	*Podoju* (grape), *mogwaju* (quince), *aengdoju* (cherry), *sanchiju* (wild gardenia), *muhwagwaju* (fig), *ttalgiju* (strawberry), *jariju* (purple plum), *seondoju* (immortal peach), *seoriju* (snow pear), *yeonyukju* (lotus), *seogwapiju* (watermelon rind), *sansayukju* (hawthorn berry), *milgamju* (tangerine), *yujaju* (citron), *seongnyuju* (pomegranate), *songjaju* (pine cone), etc.
	Iyangju (special brew liquor)	Liquor with a specialized method of fermentation: *cheongseoju* (liquor ages in a crock immersed in cold water in summer), *bongnaechun* (wheat liquor made in a double-boiler), *wasongju* (liquor made and aged in a hole in a pine log), *juktongju* (liquor made in the hollow of a segment of bamboo), *jiju* (liquor crock buried in the earth to age), *dongyangju* (“winter heat,” a mash heated in its crock via double-boiler over the preparation of the additional mash)
	Teuksu (special) liquor	*Singukju* (nuruk water liquor)

This type of still was known as a *neunji*, and a more advanced version was called a gori. The latter piece of equipment was two-tiered: the lower part had a wide bottom and narrow neck, and the upper part was just the opposite: a narrow bottom and wide neck. Though typically made of clay, gori made of copper and steel also exist. These are called *tonggori*, *donggori*, and *soegori*, respectively (Institute of Korean Culture, Korea University 1982).

Few historical records treat the traditional distillation of specific types of spirits. The National Tax Service designates as traditional liquors Andong soju, munbaeju (wild pear liquor), and *igangju* (pear-ginger liquor), among others, and thus somewhat more is known about the manufacturing methods of these drinks (Lee and Kim 1993).

Andong Soju

Andong soju, an intangible cultural property, is brewed with nonglutinous rice mashes and ground nuruk and then distilled in a soju gori. Currently a man by the name of Jo Ok-Hwa, of Sinan-dong, Andong city, holds the title of master of the technique. Owing to its popularity nationwide, Andong soju was commercialized in 1920, under the Jebiwon trademark. In the wake of the 1962 Grain Management Act, which prohibited rice from being used to make liquor, soju makers were forced to cease operation of their traditional distilleries and produce only the requisite diluted soju. In 1975 the government imposed a policy of one soju manufacturer per province, at which point Andong soju was subsumed by Daegu Kumbokju and functionally disappeared from the market. Finally, in 1990 businesses were legally permitted to resume production of traditional liquors, and Andong soju quickly re-emerged (Ji 1981).

The following is a detailed recipe of Andong soju: Polished rice is soaked overnight and then steamed. This hard-cooked rice (*godubap*) is cooled and mixed with ground nuruk at a 3:1 ratio of rice to nuruk, and an ample amount of water is added. After 13 days of fermentation, the liquid is placed into a soju gori to distill. This process does not use the common mitsul, deotsul (base ferment, additional mashes) method of brewing. Instead, it begins with 3.4 kg of rice, 1.9 kg of ground nuruk, and 8 L of water, from which 18.5 L of mixed rice and nuruk is obtained (Cho 1991).

There is no mention of Andong soju in historical texts. However, *Goryeosa* (History of Goryeo) relates a story about the military official Kim Jin-yi, who was commissioned as a sergeant major to repel Japanese troops and proceeded to his post in North Gyeongsang Province, but instead of reporting to duty he drank soju all night and lost himself to “liquor, women, and gambling.” Considering that the post was in North Gyeongsang Province, it is possible that these events took place in the region of Andong (a major city of that province).

Munbaeju (Wild Pear Liquor)

Although munbaeju is not mentioned in historic literature, just as Andong soju is not, it is nevertheless a traditional drink which hails from the northwest region of Korea, near Pyongyang. When this liquor is fully aged, the scent is reminiscent of wild pear blossoms in full bloom. Wild pear liquor may have been introduced from China during the Goryeo dynasty. It is made of millet, sorghum, and nuruk. Uniquely, this high-proof soju is aged for an extended period after distillation (Ji 1981).

The recipe for munbaeju is as follows. First make the nuruk: mix 36 L of wheat with 9 L of water and ferment for 5 h, then grind and shape into a brick 20 cm long and 5 cm wide. Hang this up for 10 days to dry. Next take 36 L of nuruk and add 27 L of millet with water at a 1:1 ratio to make the base ferment. Let ferment for 5 days. Feed the ferment with the first additional mash, consisting of 22.5 L of sorghum, and the following day use the same amount of sorghum for the second mash. This time, however, make the sorghum watery, almost like porridge, and if a little bit of *nurungji* (scorched pieces) develops on the bottom of the pot, try to retain that aroma by heating carefully. Glutinous sorghum works better for this. If you take 180 L of this 16-proof fermented wine and distill it like soju, the result will be 54 L of 40-proof liquor with a strong aroma of wild pear. The distillation rate of this liquor is 73%.

More recently, mass-produced nuruk has been used to meet an increasing demand for munbaeju. Munbaeju made in this way calls for 36 L of millet to be soaked in water for 8 h, after which it is steamed in a siru to make *jobssalbap*. The steamed millet is cooled and mixed with 50 g of grain starter culture (white mold koji), then fermented in a wrap cloth for 8 h. It is moved to a koji tray and spread into a bed about 3 cm thick and fermented at about 35 °C for 1 day. Next, 36 L of water is added in order to make a watery nuruk. After resting for 4 days, the starter is used as a base ferment called *jumo*. The first mash consists of 27 L of sorghum, and the next day another 27 L of sorghum is used for the second mash. The wine is fermented for 10 days before distilling.

Chapssal Soju (Glutinous Rice Liquor)

Grind 1.8 L of glutinous rice with 1.8 L of nonglutinous rice, add 40 cups of water and boil for a long time. After cooling, but when still warm, add 7.2 L of nuruk and place in a room that is not too cold. On the next day, steam 18 L of glutinous rice and mix it in when cool. After 7 days, ladle out the clear wine and distill (Yoon 1991).

Milsoju (Wheat Liquor)

Wash 18 L of wheat, and after wet-steaming, add 9 L of nuruk all at once and stir. Brew with 1 jar of cold water, and after 5 days distill to make soju. This yields four large bowls of soju.

Noju Idubang (*Idu* Liquor)

Take 1.8 L each of glutinous and nonglutinous rice and place in water to soak. Next, grind the rice and add 16.2 L of nuruk for the base mash. Brew for 3 days, then steam 36 L of glutinous rice for an additional mash. Distill after 7 days. The wine is prepared in the manner of yakju, with glutinous and nonglutinous rice, and when distilling, the strength of this liquor can be controlled by adjusting the level of heat and the coldness of the water.

Samhae Soju (3 Pig-Days Liquor)

Samhae soju is a representative early spring yakju (filtered rice wine) spirit, but according to *Ilseongnok* (Diary of self-examination: a record of daily court proceedings 1760–1910), in the year of the Dog under King Heonjong's reign (1838), "The ferment used in high-quality samhaeju is also used as an ingredient in soju, so that lately when people say 'samhaeju,' they think it is synonymous with 'soju.'" In light of this statement, it can be inferred that distilling samhaeju to make soju was a widespread practice.

Igangju (Pear-Ginger Liquor)

The origin of this famous spirit resides in the ginger cultivation region of Jeonju, Jeolla Province. A recipe in *Jeungbo sallim gyeongje* reads, "Peel the pear and grind it in an earthenware dish to release the juice, then strain it through a fine piece of cloth to remove the flesh. Also make and strain ginger juice, then mix these two juices well with honey and place into a soju bottle to steam in a double boiler." In *Joseon jujosa* (A study of Korean alcoholic drinks, 1935) the recipe is recorded as follows: "[Igangju] is a kind of light-brown, sweet alcoholic drink enjoyed mainly by the upper class. To make it, peel 5 pears and grind together with 187.5 g of ginger, then add 18.75 g each of turmeric and cinnamon, mix together, and boil. Wrap 360 mL of the boiled solution in a cloth and place into 18 L of soju mixed with a solution of 750 mL of dissolved sugar; steep for 2–3 h. The turmeric will infuse the liquor with a light brown color, and the cinnamon, pear, and ginger will lend the drink a unique flavor. The resulting amount should be about 17.1 L." Based on this recipe, the drink could be classified as a type of yagyong (medicinal liquor), or perhaps a flavored soju. In the past, it was common for soju to be made with medicinal ingredients, without making particular mention of that fact in a recipe.

Jo Jeong-Hyung of Jeonju has been designated Intangible Cultural Property No. 6 for his use of traditional techniques in the making of igangju. His recipe calls for 5.3 kg of polished rice, 2 kg of nuruk, and 8 L of water for the base ferment. After 3 days, he mixes 10.6 kg of barley with 1.5 kg of nuruk and 16 L of water for the additional mash, which is left to ferment for 4 days. From this he makes 15-proof yakju (filtered wine), which he then distills like soju (Cho 1991).

Hongju (Red Liquor)

Hongju is also known as *jichoju* (gromwell liquor) and can be categorized as a fragrant or medicinal soju. The current recipe for hongju, which is produced on the island Jindo, involves grinding barley grains to make nuruk in two stages: 2.7 kg of barley grains are mixed with water and left to ferment for 3 days. When bubbles arise on the 5th or 6th day, 8 kg of barley grains are steamed for use in the first mash, and the wine is left to ferment another 12 days. Next, the liquid is distilled, during which time 100 g of gromwell is placed in the mouth of the soju gori. As the liquid passes through the gromwell, it takes on the distinctive red color of hongju.

Gamhongno (Sweet Red Liquor)

Sweet red liquor is a composite soju that is boiled down and then made sweet by the addition of honey. It is dyed red with gromwell root and has a high alcohol content. The name indicates the two major qualities of this drink: sweet taste and red hue.

Cheonchukju (Coconut Milk Liquor)

This liquor was introduced from India. Fruit juice is fermented and then distilled.

Tobap Soju (Yakju Lees Liquor)

The lees of kaoliang liquor or yakju are mixed with twice the amount of the fruit of a fir tree, pine tree, or pine nut tree and then placed into a sealed container in the ground for 15 days or more, after which the wine is distilled.

Seomnaju (Thai Liquor)

This liquor was introduced from Thailand and has a high alcohol content. It is recognized in Traditional Korean Medicine as having a medicinal effect (Lee et al. 1992).

Jungnyeokgo (Black Bamboo Liquor)

The sap from roasted bamboo sticks is added to wine and distilled. This is a specialty of the Honam (Jeolla Province) region.

9.5.4 Honseongju (Compound Liquor)

Traditional Korean honseongju is a mixture of soju with tagyakju, the high alcohol content allowing for longer storage. A few representative compound liquors and their recipes are listed below (Jung 1978).

Woemirimju (Japanese Sweet Liquor)

This liquor is made by mixing brewed glutinous rice wine with soju and stirring every 7 days for 21 days. The taste is very sweet and was traditionally enjoyed by women.

Jeonju Gwahaju (Jeonju Summer Liquor)

Jeonju gwahaju is mentioned in many historical texts, including *Sallim gyeongje*, *Imwonsimnyukji*, *Gyuhap chongseo*, and *Dongui bogam*. The wine is made using everyday rice, and once the desired degree of fermentation is reached, soju is added. This liquor was supposed to help imbibers to pass the summer easily (Lee 1992).

Songsunju (Pine Shoot Liquor)

Make a base mash using pine shoots and nonglutinous rice, then add another mash, and after 5–6 days mix with distilled samhaeju (3 pig-days liquor). It will be ready to drink in 10 days.

Ganghaju (Ginger-Lotus Liquor)

Also known as *sincheongju* (new clear wine), this drink is native to the town of Yeonggwang in South Jeolla Province. It is made with ground nuruk, Korean angelica root, longan berries, cinnamon, jujubes, and ginger and is fermented for 16 days, after which *hyoju*, a regional soju, is poured in, and the clear liquor is scooped out and strained through a sieve.

Gwasilju (Fruit Liquor)

The name "fruit liquor" may be misleading: this wine is not made by fermenting fruit, but uses the fruit or other parts of a tree to infuse the drink, which makes it more akin to a fragrant wine (gahyangju). In other words, fruit is added to conventional liquor in order to achieve yagyong (medicinal liquor) or specialty liquor. *Imwonsimnyukji* quotes *Ben cao gang mu* in stating that grape wine is used when the goal is to brew a medicinal spirit or specialty wine. It goes on to describe the brewing method: "Juice the grapes and mix the juice with nuruk; in some cases, ground dried grapes may be mixed with glutinous rice-fermented wine." Wine grapes do not have a long history of importation into Korea, so grape wine was a relatively unfamiliar drink. When the Goryeo king Chungnyeol went to meet the Mongolian princess who would be his bride, the Yuan dynasty emperor gifted the couple with grape seeds. King Chungnyeol had them planted, but because people were not familiar with the techniques for cultivating grapes at that time, the plants did not flourish. To a people familiar with grain wines, perhaps grape wine tasted strange, and little interest was generated in the drink. Any grape wines that appear in Korean historical literature are traditional liquors using grape juice to infuse the drink, that is, grapes as seasoning (Institute of Korean Culture, Korea University 1982). Songjaju (pine cone liquor) appears in post-Joseon literature and is brewed with pine nuts. 1.8 L of pine nuts are soaked in water overnight. The next day they are washed, ground, and boiled with 19.8 L of water. When the liquid reduces to 18 L, the dregs are removed. Meanwhile, 18 L of white rice is ground and boiled. The water from the boiled rice is mixed with the pine nut liquid and placed in a jar. It is ready to drink in 10 days. This method does not use nuruk, and thus it is difficult to see, from a common-sense perspective, how fermentation occurs. *Sallim gyeongje* states that this wine is made like *hyangonju* (fragrant wine), where 3.6 L of pine nuts are shelled and ground together with 18 L of nuruk powder.

It is rare to find fruit liquor recipes in historic cookbooks. Many of the fruit wines mentioned do not seem to use fruit principally for its nutrients or flavor, as fruit liquor does. However, the following fruit liquors appear in more recent literature: quince liquor, wild cherry liquor, sanchi ginseng liquor, fig liquor, strawberry liquor, mulberry liquor, immortal peach liquor, pear liquor, lotus fruit liquor, watermelon juice liquor, hawthorn pulp liquor, mandarin liquor, citron liquor, pomegranate liquor, and more (Chang 1987).

9.6 Nuruk Production Techniques

The two-step fermentation of alcohol using grains requires a starter to saccharify the starch. In Korea this alcohol fermentation starter is called nuruk, in China the name is *qu*; in Japan, koji; in Southeast Asia, *ragi*; in India *bakhar ranu* or *marchaar* (Lee 2001, 2009). The first record of a natural alcohol starter appeared in the Western Zhou dynasty (1046–771 BCE) in the ancient poetry classic *Shijing* (Book of songs), in which qu is mentioned as an ingredient used in the process of making liquor. Presumably, its use in brewing predates its initial appearance in a written text (Yokotsuka et al. 1998). The fact that there is a myth from China's Heroic Age that Yidi, daughter of Yu the Great (c. 2123–2025 BCE), was a wine goddess indicates that the use of qu was probably already known in China by that time. The origin of nuruk, as described in Chap. 2, likely dates back to the Primitive Pottery era (c. 6000 BCE) along the Korea Strait (Lee 1999a).

The sixth century CE text *Qimin Yaoshu*, by Jia Sixie, describes about ten methods for making a natural starter (qu) (Yoon et al. 1993). The author recommends making qu during the 7th lunar month, when outdoor temperatures hover around 20–30 °C. The way qu is described here bears some similarity to how nuruk is made in Korea. Figure 9.3 compares the methods for making two types of natural starters, *shenqu* and *chunjiuqu*, as mentioned in *Qimin Yaoshu*. Shenqu uses equivalent amounts of roasted, steamed, and raw barley, grinding these together coarsely and then shaping the mixture into cakes for solid fermentation. Chunjiuqu, on the other hand, uses wheat as its base ingredient.

Nautral starters used for brewing can largely be divided into two types, *byeongguk* (cake type) and *sanguk* (loose type). Byeongguk is made by adding a little water to grain flour, pressing it firmly into a nuruk mold so it becomes dense like rice cake, then allowing it to incubate mold. Sanguk involves spreading out kernels of grain and allowing mold to grow on them. Korean nuruk and meju (the latter is a natural starter made of soybeans) are representative forms of byeongguk, and Japanese koji is an example of sanguk. In Korea, different kinds of mold are named after the color they exhibit: *Aspergillus oryzae* is known as yellow fungus, *Mucor* and *Rhizopus* are called white fungus, and *Aspergillus niger* is known as black fungus.

Figure 9.4 compares the production methods of Korean nuruk, Japanese koji, Indonesian *ragi*, and Philippine *bubod* (Lee 2001; Lee and Kim 2016).

The chart identifies nuruk, ragi, and bubod as the byeongguk form of starter, and Japanese koji as the sanguk form. Japanese koji is made in a process of controlled fermentation via pure mold inoculation, while the others employ natural fermentation, which fosters the growth of naturally occurring bacteria. During natural fermentation, diverse microorganisms, molds, bacteria, and yeasts grow on the nuruk cake. *Aspergillus oryzae* (1×10^7 cfu/g), *Aspergillus niger* (1×10^7 cfu/g), *Rhizopus* sp. (1×10^6 cfu/g), and yeast (1×10^5 cfu/g) have been observed growing on nuruk (Kim 1968).

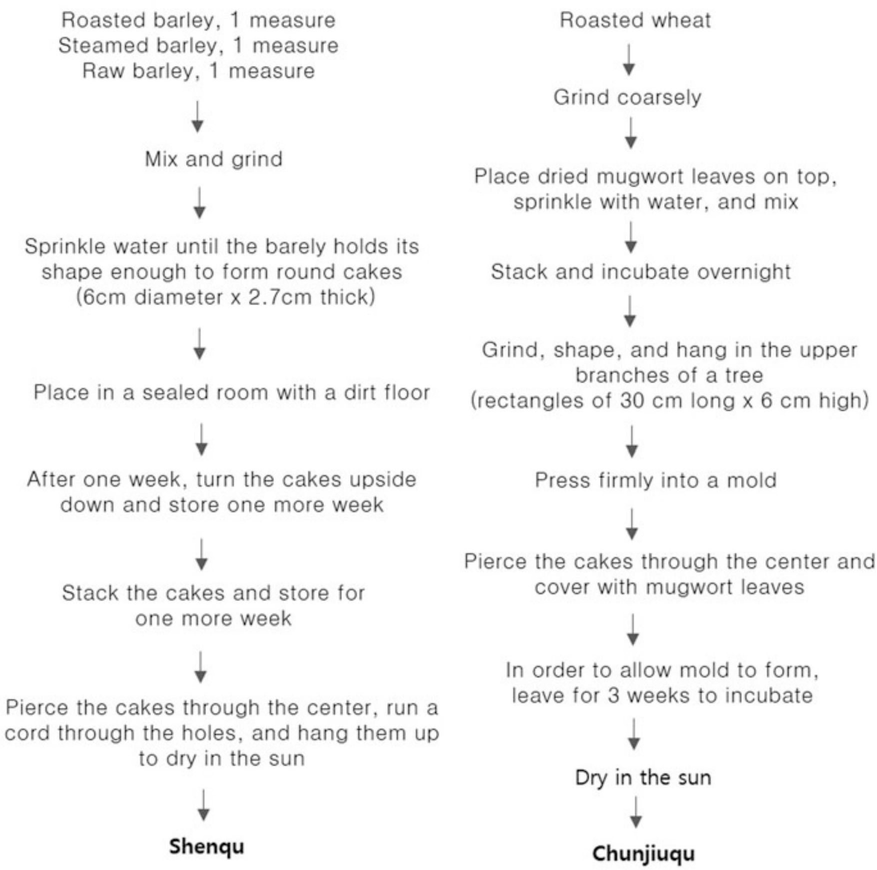


Fig. 9.3 Manufacture methods for Shenqu and Chunjiuqu as found in *Qimin Yaoshu*

Table 9.9 compares the main ingredients of solid fermentation starters and the form they take, as well as the main microorganisms at work, across several Asian countries (Lee 1999b; Lee and Kwon 2003).

Generally speaking, the enzymatic activity in Japanese-style koji is higher than that of nuruk. This is due to the sanguk method of fermentation used in making koji, in which the wide surface area of the granulated kernels encourages prolific incubation of pure fungus. In the case of nuruk, the byeongguk method has mold growing on the surface of more compact, shaped cakes, thus leading to a lower growth of amylase enzyme. However, yeast and lactobacilli grow together with the fungus, and due to the interaction of various enzymes related to the bacteria, nuruk-based drinks produce a more full-bodied flavor. Lactic acid plays an important role in the fermentation of grains for nuruk. The lactobacilli produced in the early stages of fermentation lower the pH of the cake, thus preventing pathogenic bacteria from forming, and fostering instead a healthy fermentation (Rhee et al. 2004).

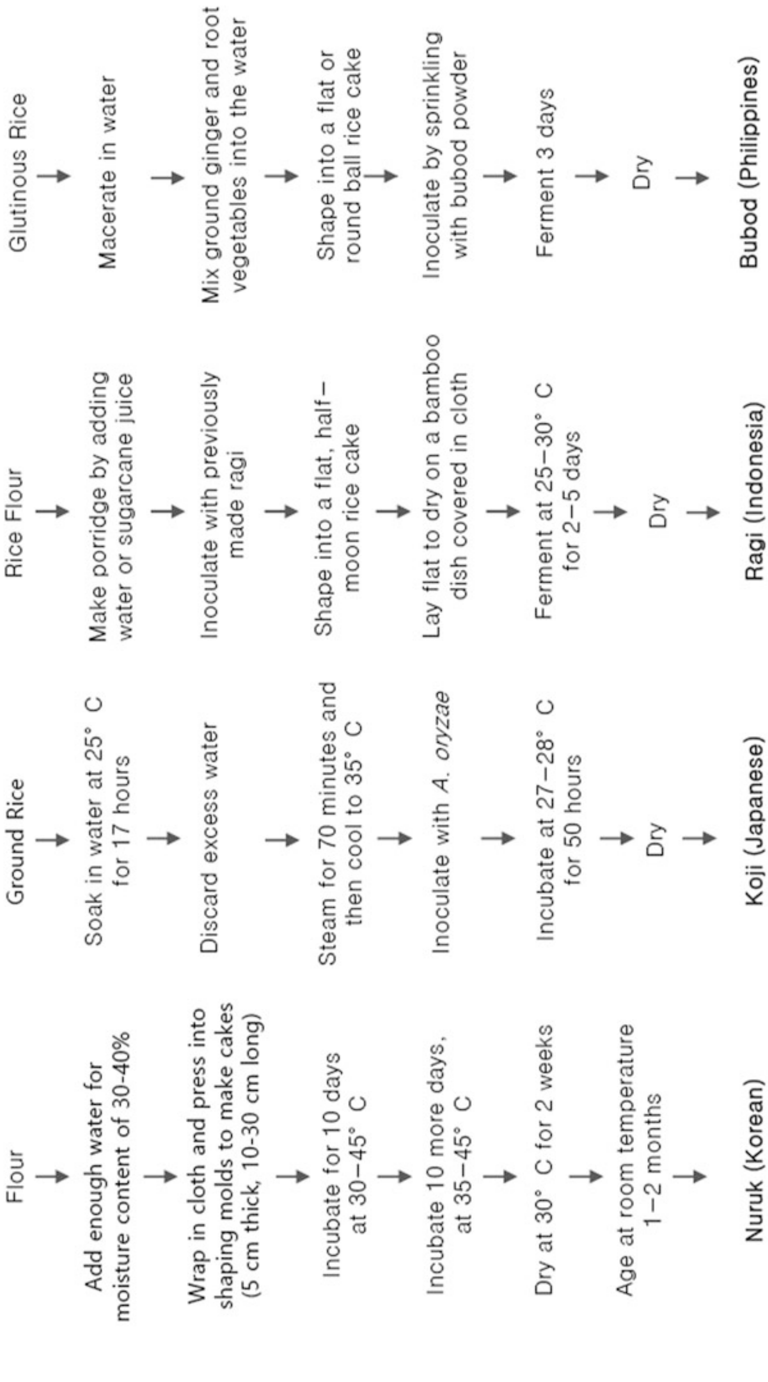


Fig. 9.4 Asia-Pacific rim solid fermentation starter manufacture method, per country

Table 9.9 Names and characteristics of solid fermentation starters, per country

Country	Name of starter	Ingredients	Form	Microorganisms
China	Qu	Wheat, barley, broomcorn millet, rice (grains, coarse flour, or fine flour)	Granules or cakes	*Rhizopus, Asp. oryzae*
				Amylomyces, yeast
Korea	Nuruk	Wheat, rice, barley (grains, coarse flour, or fine flour)	Large cakes	*Aspergillus oryzae, Rhizopus, yeast,* lactic acid bacteria
	Meju	Soybeans (yellow) (grains, coarse flour, or fine flour)	Large balls	*Aspergillus oryzae*
			Granules	*Bacillus subtilis*
			Small cakes	Yeast
Japan	Koji (for brewing)	Rice (grains)	Granules, loose grains	Aspergillus
	Koji (for soybean sauces)	Wheat (grits, soybean cake)	Granules, loose grains	Aspergillus
Indonesia	Ragi	Rice, glutinous rice (fine flour)	Fine flour	Endomycopsis
Malaysia	Ragi	Bran	Flat cakes	Mucor
Philippines	Bubod	Rice	Small cakes	Rhizopus
				Sacharomyces
Thailand	Loopang	Bran	Powder	Amylomyces
India	Marchaa	Rice	Flat cakes	Aspergillus
				Hasenula anomala
				Mucor fragilis
				Rhizopus arrhizus

References

Chang, Chi-Hyun. 1977. Jeollaeyagyongjugo: Dongui bogame natanan yagyongjureul jungsimeuro [Review of medicinal alcoholic drinks in *Dongui bogam*]. *Jujeonggongeop* [Liquor Industry] 7 (4): 6.

———. 1987. *Hanguk oeraeju yuipsa* [History of Foreign Alcoholic Beverages in Korea]. Seoul: Suhaksa.

———. 1989. Urinara sul ui yeoksa [History of Korean alcoholic beverages]. *Hanguksik munhwahakhoeji* [Journal of the Korean Society of Dietary Culture] 4 (3): 271–274.

Cho, Jeong-Hyung. 1991. *Dasi chajaya hal uri ui sul* [Restoring Korean Alcoholic Beverages]. Paju: Seohaemunjip.

Institute of Korean Culture. 1982. *Hanguk minsokmunhwa daegwan 2: Ilsangsaenghwal uisikju* [Survey of Korean Folk Culture 2: Daily Life, Food, Clothes, and Houses]. Seoul: Korea University.

Ji, Il-Sun. 1981. Soju ui byeoncheongwa jujil [Changes in soju and its quality]. *Juryugongeop* [Alcohol and Liquor Industry] 1 (1): 26.

Jung, Ji-seok. 1978. Honseongjue gwanhan gochal [A review on mixed alcoholic drinks]. *Juryugongeop* [Liquor Industry] 8 (4).

Kim, Chan-Jo. 1968. Takju yangjue gwanhan misaengmulhakjeok mit hyosohakjeok yeongu [Microbiological and enzymological studies on *Takju* brewing]. *Hanguk eungyongsaengmyeonghwahakhoe* [Journal of the Korean Society for Applied Biological Chemistry] 10: 69–100.

Kim, Gwi-Young, and Lee Sung-Woo. 1986. *Jubangmun* ui jorigwajeonge gwanhan bunseokjeok gochal [A review of the cooking methods in *Jubangmun*]. *Hanguksik munhwahakhoeji* [Journal of the Korean Society of Dietary Culture] 1 (4): 335.

———. 1988. *Eumsikbo* ui jorie gwanhan bunseokjeok gochal [A review of the cooking methods in *Eumsikbo*]. *Hanguksik munhwahakhoeji* [Journal of the Korean Society of Dietary Culture] 3 (2): 135.

Kim, Seong-Mi, and Lee Sung-Woo. 1990. *Jubang* ui jorigagonge gwanhan bunseokjeok gochal [A review of the cooking methods in *Jubang*]. *Hanguksik munhwahakhoeji* [Journal of the Korean Society of Dietary Culture] 5 (4): 415.

Korea Food Research Institute. 1992. *Ssareul iyonghan myeongjugaebalyeongu* [Studies on Rice Wine]. Iseo: KFRI.

Korea Rural Development Agency, Ed. 2014. *Kyugonyoram, Emsikbangmun, Jubangmun, Sulbitneunbeob, Gamjeokyungjangseol, Wolyeonongga*. Chinhan M&B.

Lady Yi Bingheogak. 1915. *Buin pilji* [Necessities for Every Wife]. Photographic edition.

Lee, Cherl-Ho. 1999a.“Dongbugasia wonsitogimunhwa sidae ui teukjanggwa sikpumsajeok jungyoseong” [The primitive pottery age of northeast Asia and its importance in Korean food history]. *Minjok munhwa yeongu* [Korea Cultural Studies] 32: 325–357.

———. 1999b. Cereal fermentations in countries of the Asia-Pacific region. *Fermented cereals—a global perspective*. *FAO Agricultural Services Bulletin* 138: 63–97.

———. 2001. *Fermentation Technology in Korea*. Seoul: Korea University Press.

———. 2009. Food biotechnology. In *Food Science and Technology*, ed. G. Campbell-Platt, 85–114. Oxford: Wiley-Blackwell.

———. 2012. Makgeolli Hyeonhaetaneul geonneoda [Makgeolli crosses the Korea Strait]. In *Sikpumsaneop Hansik sehyehwae nalgae dalda* [Food Industry Pushes Korean Foods into the World], ed. Korea Food Security Research Foundation, 15–40. Seoul: Sikanyeon Publishing.

———. 2017. *History of Korean Food*. Seoul: Jayu Academy.

Lee, Cherl-Ho, Lee Hyun-Deok, Kim Ji-Yong, and Kim Ki-Myung. 1989. Takju ui gwanneungjeok pumjilyosowa ideul ui yeolcheorie uihan byeonhwa [Sensory quality attributes of *takju* and their changes during pasteurization]. *Hanguksik munhwahakhoeji* [Journal of the Korean Society of Dietary Culture] 4 (4): 405–410.

Lee, Cherl-Ho, and Kim Ki-Myung. 1993. Yaenmunheone uihan Hanguksul ui jongnyuwa jejogisul [Historical literature review on the processing technology of Korean rice wine]. *Saengmulsanoep* [Bioindustry] 6 (4): 6–23.

Lee, Cherl-Ho, and Kim Moonsil Lee. 2016. History of fermented foods in Northeast Asia. In *Ethnic Fermented Foods and Alcoholic Beverages of Asia*, ed. J.P. Tamang, 1–16. Gangtok: Springer.

Lee, Cherl-Ho, and Kwon Tai-Wan. 2003. *Hanguk sikpumhak immun* [Introduction to Korean Food Science]. Seoul: Korea University Press.

Lee, Cherl-Ho, Tae Won-Taek, Kim Ki-Myung, and Lee Hyun-Deok. 1991. Takju ui jeoon salgyunjogeone gwanhan yeongu [Studies on the pasteurization conditions of *takju*]. *Hanguksik munhwahakhoeji* [Journal of the Korean Society of Dietary Culture] 23 (1): 44.

Lee, Du-Young, and Bae Guk-Gyun. 1968. *Aspergillus kawachii Kitahara* ui saengtaehakjeok yeongu [Bionomic research on *Aspergillus kawachii kitahara*]. *Hanguk misaengmulhakhoeji* [Korean Journal of Microbiology] 6 (4): 113.

Lee, Hyo-Gee. 1981a. *Gyugon siuibang* ui jorihakjeok gochal [A gastronomic study of the book *Gyugon siuibang*]. *Gajeonghakhoeji* [Journal of the Korean Home Economics Association] 19 (2): 189.

———. 1981b. *Siuijeonseo* ui jorihakjeok gochal [A gastronomic study on the book *Siuijeonseo*]. *Gajeonghakhoeji* [Journal of the Korean Home Economics Association] 19 (3): 47.

Lee Hyo-Gee. 1983. Sumunsaseol Review, Korean Living Science Research (1), Hanyang University, 85.

Lee, Sung-Woo. 1981. *Hanguk sikgyeongdaejeon* [The Great Bibliography of Korean Food Classics]. Seoul: Hyangmunsa.

———. 1984. *Hanguk sikpumsahoesa* [Social History of Korean Food]. Paju: Kyomunsa.

———. 1992. *Dongasiasokui godae Hankuksiksaenghwalsa yeongu (A study on the history of ancient Korean food life in East Asia)*. Hyangmunsa.

Lee, Sung-Woo, and Lee Hyo-Gee. 1983. Gyugon yoram [Gyugon yoram review]. *Hanguk saenghwalgwahak yeongu* [Korean Living Science Research] 1: 27.

Lee, Sung-Woo, Jeon Jeon-Il, and Bae Sang-Myun. 1992. Gwahaju yangjoe gwanhan munheonjeok gochal [Literature review on *gwahaju* fermentation]. *Dongasia siksaenghwalhakhoeji* [Journal of the East Asian Society of Dietary Life] 2 (1): 17.

Lee, Sung-Woo, and Cho Jun-Ha. 1983a. Yeokjubangmun [Yeokjubangmun review]. *Hanguk saenghwalgwahak yeongu* [Korean Living Science Research] 1: 7.

———. 1983b. Yorok [Yorok review]. *Hanguk saenghwalgwahak yeongu* [Korean Living Science Research] 1: 35.

Rhee, Sook-Jong, Chung-Yung J. Lee, Kim Mi-Ryung, and Lee Cherl-Ho. 2004. Potential antioxidant peptide in rice wine. *Journal of Microbiology and Biotechnology* 14 (4): 715–721.

Yokotsuka, T., et al. 1998. Fermented protein foods in the orient: Shoyu and Miso in Japan. In *Microbiology of Fermented Foods*, ed. Brian J.B. Wood, 1st ed., 351–415. New York: Springer.

Yoon, Seo-Seock. 1991. *Hanguk ui eumsikyongeo* [Korean food terminology]. Daewoo haksulchongseo [Daewoo Foundation Academic Series], Sourcebook 3. Seoul: Minumsa.

Yoon, Seo-Seock et al., trans. 1993. *Jeminyosul* [Essential Skills to Benefit the People]. Seoul: Minumsa. Chinese edition: Jia Sixie. c. 550. *Qimin yaoshu.*

Chapter 10
The Development of Eastern Medicine (Donguihak) and the Traditional Korean Diet

Abstract Koreans share ancient culture with the Chinese, and within Korean philosophy one finds the Yin-yang and *Wuxing* (Five Agents, or Five Phases) theories of Chinese medicine blended with Daoism and Northeast Asian shamanism. This chapter elucidate the Korean folk beliefs and Daoist thought. Traditional Korean Medicine (TKM), as distinct from Traditional Chinese Medicine (TCM), refers to that which developed as a native practice on the Korean Peninsula. It grew out of the native Daoist ideas, to which TCM was added to create a medical practice with characteristic hues of Korea. The history of early development of traditional Korean medicine (*Donguihak*) and some important literatures, such as *Dongui Bogam* (Treasured Mirror of Eastern Medicine) and *Dongui Susebowon* (Longevity and Life Preservation in Eastern Medicine) together with the Great Bibliography of Korean Food Classics including *Sallim Gyeongje* (Farm Management) and *Imwon simnyukji* (Encyclopedia of rural life) were introduced in this chapter. The theory of nutrients in Eastern medicine and the development of dietary cures were discussed and the formation of the traditional diet, *cheopbansang* (meal settings), was introduced.

Throughout human history people have consistently sought to alleviate hunger and repel disease and sickness. As techniques for hunting, fishing, and agriculture developed, the volume of foodstuffs expanded, and fire, pottery, salt, and the use of containers provided means for supplying, fermenting, and storing food. Essential survival wisdom was borne of discovering which of nature's panoply of flora was edible and which was not, and those who excelled in this area were revered as gods. Shennong, the Divine Farmer, is the most well-known food deity in the East. The ability to cure illness was also a skill honored as divine. People particularly adroit in healing often became chiefs or kings. In the mythology of China's Sanhuang Wudi, or Three Sovereigns and Five Emperors, the Yellow Emperor (Huangdi) was esteemed as a god because he taught the people diagnostic methods and medicinal cures; the foundational Eastern medicine classic *Huangdi neijing* (The Yellow Emperor's classic of internal medicine) is attributed to him.

As descendants of the Dongyi tribes, who lived anciently in what is now northeastern China (Manchuria) and the Korean Peninsula, Koreans share ancient

C.-H. Lee, *Korean Food and Foodways*,
https://doi.org/10.1007/978-981-19-0023-5_10

culture with the Chinese, and within Korean philosophy one finds the Yin-yang and *Wuxing* (Five Agents, or Five Phases) theories of Eastern medicine blended with Daoism and Northeast Asian shamanism.

10.1 Folk Beliefs and Daoist Thought

10.1.1 Daoist Ideology

Musok is a native Korean tradition that incorporates various religious elements into shamanistic practices that may have originated as far north as Siberia. The prehistoric Bangudae Petroglyphs in Ulsan (5000–1500 BCE, southern Korean Peninsula; see Fig. 2.4) include a picture of a shaman dancing. Scholars concur that shamanism likely stemmed from rituals performed by clan and priest chiefs during the theocratic beginnings of state formation, after the advent of agriculture. Korean shamanism seems to begin during the Gojoseon period (2333–108 BCE). In the founding myth of Dangun Wanggeom, the term "Wanggeom" refers to the political and religious chief (Yoon 2015). Of particular interest in the Dangun Wanggeom state foundation story is the expression of Daoist elements inherited from earlier times. *Gii* (Wonders), the title of the first volume of *Samguk yusa* (Memorabilia of the Three Kingdoms, Ilyon 1285), records the following about the founding of the Gojoseon kingdom:

> In ancient times Hwanin (Heavenly King) had a young son whose name was Hwanung. The boy wished to descend from heaven and live in the human world. His father, after examining three great mountains, chose T'aebaek-san (the Baekdu Mountains in north Korea) as a suitable place for his heavenly son to bring happiness to human beings. He gave Hwanung three heavenly treasures, and commanded him to rule over his people. . . .
>
> Bear-woman could find no husband, so she prayed under the sandalwood tree to be blessed with a child. Hwanung heard her prayers and married her. She conceived and bore a son who was called Tangun Wanggom [Dangun Wanggeom]. . . .
>
> Later Tangun moved his capital to Asadal on T'aebaek-san and ruled 1500 years, until king Wu of Chou [Zhou—an ancient Chinese dynasty] placed Kija [Gija] on the throne [traditional date 1122 B.C.]. When Kija arrived, Tangun moved to Changtang-kyong [Jangdanggyeong] and then returned to Asadal, where he became a mountain god at the age of 1,908" (Ha Tae-Hung, trans., *Samguk Yusa: Legends and History of the Three Kingdoms of Ancient Korea*, 19).

This and other similar records provide the basis for the Three Gods ideology (*samsin sasang*) held by the Korean people: beginning in Gojoseon, a god of heaven (Hwanung), a goddess of earth (Ungnyeo), and a son of the gods (Dangun) comprised the divine trinity. In the Dangun myth the concept of *Hongik Ingan*, or Devotion to Human Welfare, is a key philosophy of the Three Gods ideology. This native philosophy provided fertile soil for the later acceptance of Daoism in Korea as it was introduced by China. The religious aspect of Daoism, based on a belief system of immortals (Chi. *shenxian*, or *xian*; Kor. *sinseon*), is generally understood to have originated in China. Some scholars suggest, however, that there is evidence pointing to the emergence of religious Daoism among the Han Korean peoples of Northeast Asia, including the appearance of Dangun as a mountain god in temple shrines, and the story of the first Qin emperor sending Xu Fu to search for the elixir of life in the sacred mountains of the east, that is, Mt. Geumgang, Mt. Jiri, and Mt. Halla, all three of which are found on the Korean Peninsula and Jeju Island (Lee 1984).

10.1.2 Formal Daoism in China

Daoism emerged from a native folk belief shared by the Dongyi tribes living in the Shandong Province (now part of China) region that the quintessential goals of living are good health and long life. Daoism emphasizes the need to harmonize the triumvirate of *jing*, *qi*, and *shen* (Kor. *jeong*, *gi*, and *sin*), or "life essence," "vital energy," and "spirit/mind," with the belief that the ultimate quest of existence is that of immortality. Daoists believe this state may be achieved through corporeal discipline, including adherence to such alchemical physical techniques as regulating breath, libido, and food.

The Daoist way of life draws from folk Daoism that emerged from ancient native beliefs, teachings of the legendary Yellow Emperor of China (themselves rooted in Northeast Asian indigenous customs), and the later philosophies of Laozi (604?–531 BCE, author of Dao De Jing), and Zhang Ling (c. 34–156 CE, a reform figure in Daoism). The increasing reverence of legendary beings as supernatural immortals developed into a formal Daoism distinct from folk beliefs. Formal Daoism grew out of the modification and expansion of methods and techniques employed to reach immortal status. Inheriting further modulation through the influence of the newly rising Buddhist religion, Daoism eventually transformed into a religious practice akin to the current form.

As the ultimate goals of Daoism are focused on long life and freedom from disease, medical techniques for the preservation of health proved a vital part of religious practice. In Daoist idiom, these include the following five principles: *byeokgok* (Chi. *bigu*, grain avoidance), *bogi* (Chi. *fuer*, medicinal diet), *josik* (Chi. *diaoxi*, breath regulation), *doin* (Chi. *daoyin*, energy work; precursor to *qigong*), and *bangjung* (Chi. *fangzhong*, bedchamber arts). Daoist philosophy posits that the spirit is fettered by the physical body, and the physical body is sustained by food materials, therefore, to live a long life, one should reduce the amount of food ingested. Longevity is also aided by avoiding cooked foods. This method is called "byeokgok." "Bogi" refers to the partaking of certain medicinal foods or chemicals to achieve immortality or long life. Medicines used for that purpose include ores, such as arsenic trisulfide and mercury sulfide, as well as plants, such as rehmannia and *yeongji* (Jap. *reishi*) mushroom. Medicines are divided according to their efficacy into upper, middle, and lower levels. Upper medicinals are counted as those which extend one's life toward immortality, middle medicinals nourish life, and lower medicinals treat illnesses and exorcise demons. Upper medicinals comprise remedies considered to be elixirs of life. Numerous types of elixirs exist, and the early fourth-century scholar Ge Hong describes them in detail in his Daoist classic, *Baopuzi*.

The mystery of breathwork, deliberately inhaling and exhaling in specified ways, aligns with the principles of yin and yang. It is often said that healthy individuals are full of vitality. The view that *gi* (Chi. *qi*) is the root of human vitality speaks to the Daoist notion that if gi is lost, life cannot continue, and therefore it must be preserved. "Josik," the term for Daoist breathwork, includes the forms *taesik*, *pyegi*, *tonap*, and *haenggi*, each of which represents a unique deep breathing method. The word "doin," along with josik, seeks to preserve gi within the body through a practice similar to massage. Particularly effective for prolonging life, doin methods have been practiced by many people seeking to improve their health.

"Bangjung" deals with the mystery of reproductive function and includes "methods of breathing for vitality" (*heupjeongbeop*) and "sexual technique" (*bangjungsul*), both of which involve absorption of the vital energy of the opposite sex. *Baopuzi* emphatically states, "Regardless of the number of remedies you take, you will not live a long life if you do not understand the secrets of the bedchamber. Those who seek immortality must strive to acquire these methods." This principle aims to harmonize the two energies within the body, yin and yang. The several physical restrictions involved in bangjung techniques figure collectively as an important part of the journey toward attaining a spiritual life.

10.1.3 Folk Daoism in Korea

According to *Samguk sagi* (History of the Three Kingdoms, Kim Bu-Sik, 1145), formal Daoism was introduced to Korea in the 7th year of the reign of King Yeongnyu of Goguryeo (618–642). At the time, it consisted of a devotional Daoism meant to be an official platform for prayers offered to prevent national calamities. *Haedong jeondorok* (Korean proselytizing record, anonymous early 1600s), a Daoist book, asserts that Daoism was brought to Korea by Choi Chi-Won, a Korean scholar who lived in Tang China (618–906) for several years before returning to the Silla kingdom.

During the Goryeo dynasty, the popularity of Daoism waned as the societal influence of Buddhism increased, but it continued to carry significant social import. In the 5th year of King Yejong's reign (1110), a Daoist adherent from the Northern Song dynasty (China) sent a chart detailing Daoist practices to the king, which influenced him to establish a Daoist temple, Bogwongwan, as an institutional place to pray for the safety of the nation. Also, during this era the practice of *sugyeongsin* (guarding oneself against destructive forces on the 57th day of the 60-day cycle), which was based on the Daoist theory of *samsi* (Chi. *sanshi*, "three corpses"), became widespread. The "three corpses" are demon spirits that reside within the human body; on the 57th day (gyeongsin) they leave the body while the host sleeps and ascend to heaven to relate to the gods every sin committed by their host during the previous 60 days, upon which the "Director of Destinies" decrees the number of days that will be reduced from that person's life, based on the severity of their sins. To prevent the demon spirits from leaving their bodies and reporting their offences, people began to stay awake all night on the 57th day. According to *Dongguk tonggam* (Comprehensive mirror of Korea, Seo Geo-Jeong et al. 1485), "In accordance with Daoist teachings, on the day to guard against gyeongsin people customarily gathered to drink together so they would not fall asleep during the night." A verse in *Yongbieocheonga* (Songs of the dragons flying to heaven, Jeong In-Ji et al. 1447) depicts an annual banquet prepared by the people on the final gyeongsin of each year. However, when criticism was raised against the vices of men and women drinking, singing, dancing, and gambling together all night, King Seongjong of Joseon (r. 1469–1495) abolished the ritual (Lee 1984).

Along with Daoism's promotion of techniques that support health and longevity come curing methods, or regimens. In his theoretical work, author Kim Si-Seup (a scholar turned monk, 1435–1493) rebuts the concept of attempting to achieve perennial youth and long life, but he nevertheless elucidates key points of Daoist training in the "Sujin" and "Yongho" sections of his work *Japjeo* (Miscellaneous jottings). Toegye Yi Hwang (1501–1570), one of the two most prominent Joseon statesmen and Confucian philosophers, strongly reflects Daoist thought in his theory of human nature, and culling from the Ming dynasty text *Jiuxian huorenxinfa* (The old way of living), he compiled *Hwalinsimbang* (Way of living) as a manual of techniques geared toward achieving longevity. These include life preservation (*hwalin*), life cultivation (*yangsaeng*), mind governance, life-force guidance, and healthy foods. Within life preservation, Yi Hwang emphasizes that the cause of all disease hangs on governance of the mind/heart, famously asserting that composed and patient mindset practices such as *junghwatang* (a "stew" of 30 mindsets) and *hwagihwan* (chewing slowly on a "pill" to quell one's anger) should be prescribed like medicine (Kim 1989).

Yi I (1536–1584), the other foremost Confucian scholar of the Joseon dynasty, wrote a medical book in which he considered the methods of Daoism. Although he did not subscribe to the Daoist tenet of immortality, he did accept, within reason, the notion that partaking of certain Daoist practices and medicines may be effective in prolonging life (Encyclopedia of Korean folk culture, 1991).

In his book *Bokchang bigyeol* (The secret teaching of Bokchang), also known as *Yongho bigyeol* (The secret teaching of dragon and tiger), Joseon-dynasty philosopher Jeong Ryeom (1506–1549) explains Daoist methods of transforming the body through inner work, or "inner alchemy" (*naedan*), including how to retain one's vital force while on the path of life and how to fortify oneself to prevent "wind diseases" (*pungsa*) from taking hold, thereby maintaining health and preserving life. As these life-preservation theories and practical health measures became increasingly refined, they greatly impacted the medical system of the Joseon dynasty.

Dongui bogam (Principles and practice of Eastern medicine, Heo Jun 1610) accepts many Daoist principles as part of the Korean medical system, including teachings that honor the promotion of health via practicum, and even Daoist alchemical techniques. Traditional Korean Medicine understands the human body as a complete microcosm, and thus health and life are to be approached with the premise that the mind and body are one (Hong 1990). Heo Jun was the most noted physician of the Joseon dynasty (1392–1897) and a scholar of positivism. Unlike traditional bibliographers, who mechanically edited Chinese literature, he systematically and exhaustively compiled medical literature from China and used his experiences to synthesize existing ethnopharmacology based on principles of Korean folk Daoism. This effort resulted in *Dongui bogam* (in 25 volumes), the bible of Traditional Korean Medicine. This classic is held in high esteem in China and Japan, and even in Europe and the United States.

10.1.4 The Nutritional Science and Famine Foods of Daoism

The familial standards espoused by Southern Song Neo-Confucian master Zhu Xi (1126–1271), in which the philosophies of filial piety and comfort in old age form the basis of human morality, were upheld throughout the Joseon dynasty. The study of comfort in old age became a field of philosophical pursuit, and Confucian scholars in Joseon pored over Chinese texts that treated the subject, including *Shanju siyao* (Four essentials for dwelling in the mountains) and *Shouqin yanglao xinshu* (New book on caring for parents and the elderly) from the Yuan dynasty (1279–1368), as well as *Shouyang congshu* (Collected works on longevity and maintaining life) from the Ming dynasty (1368–1644). In the 12th year of Crown Prince Gwanghae's reign (1620), Yi Chang-Jeong published *Suchin chongseoryujip* (Collected works on the care of one's health), a compilation of Chinese texts concerned with various aspects of health care, edited to exclude errors and geographical differences. This work was popular in Korea and China and was published in Japan, in 1669 (Lee 1984).

Regarding caring for the elderly, *Dongui bogam* posits that growing old arises from the decline of blood (flow), and that illnesses brought on by changeable weather should be avoided. Therefore, bitter or cold medicines, as well as medicines used for severe vomiting or diarrhea, should be prohibited in old age. Caring for the elderly also entails supplying foods that contain specific nutrients. The food, medicine, and dietary therapies recommended for the elderly are given considerable treatment in a number of Joseon texts, including *Imwonsimnyukji* (Encyclopedia of rural life), *Chisaeng yoram* (Necessary information on food and farming), *Sallim gyeongje* (Farm management), *Jeungbo sallim gyeongje* (Farm management supplement), and *Jukgyo pyeollam* (Handbook on planting in the Jukgyo region).

The introduction and application of the Daoist principle byeokgok (refraining from eating grain) was instrumental in the development of famine foods, that is, in times when grain was scarce. *Guhwang chwalyo* (Necessary items for famine relief, 1554) and *Guhwang boyubang* (Methods of supplementing food for famine relief, 1660) introduce a significant number of recipes to help people weather famine that either use no grain at all, or add only a handful of grain to a given dish. A few of these dishes are described below (Lee 1984).

Solip (Pine Needles)

In times of famine pine needles are best, but juice from elm bark can be taken to prevent constipation. Pine needles calm the five major organs and aid the stomach to feel less hungry. To prepare pine needles for consumption, first steam them, and then dry. Once dry, grind them into flour and put the flour in a sack. Set the sack in running water for 3–4 days, then pull it out and let the contents dry in the sun or on a heated floor. Grinding once more will prevent a bitter flavor from developing. Take 540 mL of pine needle flour prepared as above, mix with 180 mL of rice flour, and add 1.8 L of elm bark juice to make a porridge that will stave off hunger if you must skip a meal. This recipe will also bring you longevity.

Kong and *Daema* (Soybeans and Hemp)

Wash, steam, and dry 9 L of soybeans three times and then remove the hulls and grind into flour. Pour 5.4–9 L of hemp seeds into hot water and let rest overnight. Scoop out the seeds, dry them in the sun, then steam. Do this three times and then remove the hulls and grind into flour. Make glutinous rice porridge and mix evenly with the two flours to make dough balls about the size of a fist. Place these in a steamer in the evening and stoke the fire until midnight. At dawn remove from heat and place the food into an earthenware jar with a tight-fitting lid to keep moist. Eat one to two pieces at a time to fill the belly and do not eat the entirety of your other food. After partaking the first time, eat no rice for 7 days. After partaking the second time, fast from rice for 49 days. Your appearance will become more beautiful, no longer gaunt from want of food.

Kongnamul (Bean Sprouts)

If you grind bean sprouts into flour and eat, you will be able to endure your hunger, even without eating grains.

Millap (Beeswax)

Daoist scripture reveals that the best part of the *byeokgok* method (refraining from eating grain) is chewing beeswax because it keeps hunger at bay all day. If you chew yellow beeswax that has been steamed and mixed with roasted nonglutinous rice, it will beautify your skin and allow you to fast from grains. When you wish to eat rice again, eat walnuts instead.

***Songji* (Pine Resin)**

Pine resin holds no toxicity, calms the organs, and reduces fever. If you eat it regularly you will age well and live long. Make a fine powder of pure pine resin and mix 3.75–7.5 g once a day into rice porridge; if you make 375 g or more you will not go hungry, but if you are still hungry, eat more pine resin. After a year or more your eyesight will grow increasingly clear, to the point that you will be able to discern objects in the dark. If you take pine resin over a long period of time, it will lengthen your years and benefit your life.

Ironically, many "elixirs of immortality" ingested by adherents wishing to become Daoist immortals or to live an extraordinarily long life contained highly toxic ingredients, such as mercury or lead. The foods mentioned above, meant to be ingested when fasting or as substitutes in times of scarcity, are extremely dangerous from the viewpoint of modern science. The experience of "hippies" in 1970s Europe who followed a faddish diet of uncooked grains and vegetables, becoming severely malnourished as a result, reminds one of how group malnutrition can be a societal problem. However, insofar as Daoist practice and training emphasizes the importance of preventative measures for a long and healthy life, such as deep breathing, physical exercise, massage, and moderation in eating, it can be appreciated as beneficial to modern people.

10.2 Traditional Korean Medicine (*Donguihak*)

Traditional Korean Medicine (Eastern Medicine, *Donguihak*), as distinct from Traditional Chinese Medicine (TCM), refers to that which developed as a native practice on the Korean Peninsula. It grew out of the aforementioned native Daoist ideas, to which TCM was added to create a medical practice with characteristic hues of Korea.

10.2.1 Ancient Chinese Medicine

China's ancient medicinal practices originate in two major records. The first entails a question-and-answer dialogue the Yellow Emperor engages with his ministers Qi Bo (a physician who tested herbs for a *Materia medica*) and Sou Qu (astronomer and astrologist) regarding principles of human life such as lifespan, procreation, health, physiology, pathology, disease, and treatments, as recorded in *Huangdi neijing* (The Yellow Emperor's classic of internal medicine) (Ni 1995). The second is *Shennong ben cao jing* (The Divine Farmer's classic of herbal medicine), which relates the mythological Shennong's attempt to personally test all the plants, animals, and minerals in nature by ingesting them himself, thus encountering 70 poisons per day in the effort to discover the character, energy, flavor, and efficacy of each food item. It is unclear who wrote the original texts of these two works and when. It is surmised that during the Spring and Autumn period (c. 771–476 BCE) practitioners of alchemy called *fang shi* gathered all the medical knowledge available at the time, and, calling upon the authority of the Yellow Emperor and Shennong, committed oral traditions to paper. Later, during the Eastern Han dynasty (25–220 CE), TCM sage Zhang Zhongjing (150–219 CE) recorded practical clinical treatments for the first time in two books, *Shanghan lun* (Treatise on cold damage) and *Jin gui yao lue* (Essential prescriptions of the golden chamber). Soon thereafter the physician Mi Huangfu (215–282) wrote *Zhen jiu jia yi jing* (Systematic classic of acupuncture and moxibustion), which compiled and reclassified all of China's acupuncture theories to date, and in about 500 CE, the Daoist master Tao Hongjing (456–536) wrote *Ben cao ji zhu* (Collected commentaries on the *Materia medica*), the first systematic text on pharmacology.

From ancient times, TCM has been rooted in the Eastern cultural concepts of yin-yang and the Five Phases. The theory of yin-yang observes and infers that all of nature, including human beings, are subject to the relativity, complementarity, and contiguity of the principles of yin and yang. The yin-yang dichotomy consists of reciprocity in all things, for example, dark/light, woman/man, inside/outside, center/periphery, weak/strong, empty/full, cold/hot, rise/fall, plant/animal, death/life, wet/dry, large/small, sparse/packed, electron/proton, etc. Yin/yang is a relational concept hinging on the balanced interdependence between replenishment and transformation on the one hand, and suppression and refutation on the other; there is no absolute yin or yang, as yin is relative to yang and vice-versa.

The theory of the Five Phases proposes that the properties of all nature can be divided into five phases: wood, fire, earth, metal, and water, and that generalizing the interrelationship of these agents can explain or predict the method of their interactions. This concept differs from a seemingly similar philosophy from Ancient

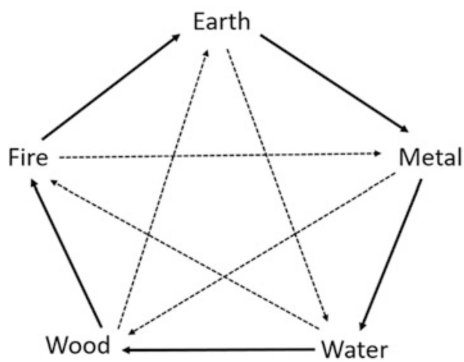


Fig. 10.1 Generation and suppression relationships between the Five Phases. The Five Phases are linked by the relationship between generation (—) and suppression (- - -). Generation: Water causes trees to grow, wood allows fire to burn, fire makes ash/earth, earth is the source of metal, when metal is heated, it flows like water. Suppression: Water douses fire, metal ax chops wood, wood plow churns the earth, earthen dam prevents water flow

Table 10.1 Classification of the qualities of matter according to Five Phases Theory

Phases	**Taste**	**Color**	**Weather**	**Season**	**Direction**
Wood	Sour	Bright blue	Windy	Spring	East
Fire	Bitter	Deep red	Hot	Summer	South
Earth	Sweet	Yellow	Humid	Late summer	Middle
Metal	Spicy	White	Dry	Fall	West
Water	Salty	Black	Cold	Winter	North
Phases	**Organ**	**Digestion**	**Sensory organs**	**Body**	**Emotions**
Wood	Liver	Bile	Eyes	Tendons	Anger
Fire	Heart	Small intestine	Tongue	Blood vessels	Joy
Earth	Spleen	Stomach	Mouth	Flesh	Love
Metal	Lung	Large intestine	Nose	Hide/skin	Sadness
Water	Kidney	Bladder	Ears	Bones	Fear

Greece, which proposes that all things are composed of the base material elements earth, air, fire, and water. In Traditional Chinese Medicine, the Five Phases do not refer to physical objects, but rather to phases of mutual interaction. Figure 10.1 diagrams the simultaneous layering of interactions between the Five Phases, which effects a relationship of generation and suppression (Magner 1992; Lee 2018). Table 10.1 organizes the categories within the Five Phases theory. According to the table, for example, sour taste, liver, bile, and eyes pertain to the wood phase. In terms of generation (*sangsaeng*) and suppression (*sanggeuk*), sour taste helps the function of the heart (fire), but suppresses the function of the spleen (earth).

Together, the theories of yin-yang and the Five Phases represent a creative philosophical system that explains the genesis and operation of all things through the inherent harmony of the yin-yang and Five Phases dualities. The first written record of this philosophy may be found in oracle bone script (shell and bone writing), proto-Chinese divination characters that hark back to the progenitor Bo Yi (c. 3000 BCE). Regardless of origin, ancient Chinese society utilized the theoretical system and medical techniques found in *Zhou yi* (Changes of the Zhou dynasty, also known as *Yi jing*, Book of changes, tenth to fourth centuries BCE) for centuries (Lee 2018). These ideas also form the philosophical backdrop of Traditional Korean Medicine.

The oldest medical text in China, *Huangdi neijing*, includes detailed descriptions of the theories of yin-yang, the Five Phases, the sexagenary cycle, and other ideas that explain the relationship between humans and the universe, and these are employed to diagnose and treat disease (Ni 1995). An application of the yin-yang theory included in *Su wen*, a version of *Huangdi neijing* edited and annotated in 762 CE, can be found in the following excerpt: “When chilled, make yourself warm; when cold, make yourself hot; when warm, cool yourself; when hot, make yourself cold.” These concepts informed the foundational medical treatments prescribed for chills, cold, warmth, and heat.

The introduction of *Huangdi neijing* to Korea in the third year of King Pyeongwon of Goguryeo (561 CE) piqued scholarly interest in Traditional Chinese Medicine. More books on the topic were imported from China during the Three Kingdoms period and the ensuing Goryeo dynasty. The medical knowledge flowing in from China also came to be applied in Korea. TCM was appreciably more scientific than the Korean shamanic and native Dao-based medical practices, and it exerted a huge influence on Korea's understanding of natural science and health care methods.

10.2.2 Early Development of Traditional Korean Medicine

Toward the end of Gojoseon (2333?–108 BCE) the closeness between the people of Korea and China, facilitated by frequent exchanges, allowed for ancient medical practices in the two countries to exert a measure of mutual influence. An example of this can be found in a line from *Huangdi neijing*, which reads, "The art of stone acupuncture comes from the East [Korea]." (Incidentally, this suggests that from the time of Gojoseon primitive medical techniques included stone and bone acupuncture).

A number of Korean herbs and their efficacy, along with medicines produced in Korea and their prescriptions, are listed in *Shennong ben cao jing* (Shennong *Materia medica*), a Chinese record from 200 to 250 CE. Medical prescriptions from *Silla beopsabang* (Healing protocols of Silla Buddhist monks) and *Baekje sinjipbang* (New collection of prescriptions from Baekje) (Silla and Baekje were two of the kingdoms during the Three Kingdoms of Korea period) appear in the Japanese medical text *Ishinpo*, the oldest medical text in Japan (Tamba Yasuyori 984 CE). Records such as these offer a glimpse of the spread of Korean medicinal practice in both China and Japan.

Ancient Korean medicine developed into pharmacological treatments through trial and error over time. Three texts on prescriptions appeared during the Three Kingdoms period: *Goguryeo nosabang* (Goguryeo medicinal remedies), *Baekje sinjipbang*, and *Silla beopsabang*; during the Goryeo dynasty similar texts included *Jejung iphyobang* (Efficacious remedies culled from many varieties), *Hyangyak sinjipbang* (Native prescriptions for emergency remedies) and *Dongin gyeongheombang* (Korean folk remedies) (Lee 1981).

King Sejong of the Joseon dynasty (r. 1418–1450) rallied his ministers, including No Jung-Rye and Pak Yun-Deok, to collect all published medical treatments from the Three Kingdoms period and the Goryeo dynasty, as well as all folk treatments, to ensure Korea was in step with the current medical reasoning in China. This massive work presents all known treatments employed throughout Korean history, from the royal palace to the lower class, to the tune of 1,000,706 prescriptions and 1476 methods of acupuncture and moxibustion. It was compiled over the course of 3 years, in 85 volumes, and published in 1433 as *Hyangyak jipseongbang* (Compilation of native prescriptions). It was the most exhaustive medical text in Korea to date. King Sejong was not satisfied with the limited scope of *Hyangyak jipseongbang*, however; his aim was to provide a firmer foundation for the development of Korean medicine by amassing all available medical knowledge in Korea and China, to begin with. To that end the king ordered 16 scholars, including Yu Seong-Won and Jeon Sun-Ui, to search for more Korean medical texts and all Chinese medical texts—153 published works in total—and further, to survey Indian Buddhist texts. The effort resulted in *Uibang yuchwi* (Classified collection of medical prescriptions), in 266 volumes. This work, a collection of all the known Eastern medical theories and prescriptions in one place, provides general summaries and categorizes disease symptoms into 80 topics in a stand-alone Korean medical system (*Donguihak*). This extensive work is a valuable resource for its full account of Traditional Korean Medicine at that time. In 1596 King Seonjo ordered Yang Ye-Su, Heo Jun, and others to establish a Bureau of Compilations at the Medical Center in order to compile yet another definitive medical book, *Dongui bogam*.

10.2.3 Dongui Bogam (Principles and Practice of Eastern Medicine)

The historical development of Korean medical techniques (*dongui*) and preventative health measures were compiled by Heo Jun in his seminal work, *Dongui bogam* (1610). Heo Jun emphasizes the tripartite conceptual philosophy underpinning TKM, that is, *jeong* (life essence), *gi* (vital energy), and *sin* (spirit/mind). These, paired with the physiological functions of the internal organs and their disease symptoms, consistently underscore the importance of treating the inner body, a singular approach not seen in other medical texts. The spirit of medical practice soon pivoted on health preservation, while taking medication as a cure came to play a secondary role. The primary method of preserving health involved replenishing the four elements composing the body—life essence, vital energy, spirit/mind, and *hyeol* (blood)—by eating constitutionally prescribed foods. The *Internal Body* section reads, "The foundational practices of Daoism are purity and cultivation of self, and the fundamentals of the medical world are herbal medicine, acupuncture, and moxibustion. In this manner, Daoism treats the whole body, while medicine treats specific parts of the body." Heo Jun's text succeeds in combining native Korean healing prescriptions with concepts from Traditional Chinese Medicine, which in turn led to the development of inventive medical techniques.

Dongui bogam consists of 25 books in 23 volumes, the content of which is divided into the following broad categories: *Internal body, External body, Various disorders, Herbal remedies,* and *Acupuncture*. Section 1 of *Internal body*, "The physical body," includes the following topics: The beginning of form and qi; The origin of conception; The four great elements of form: earth, water, fire, and wind; The rise and fall of human qi; The infertility of the elderly; Differences in lifespans; Lifespan is dependent on form and qi; The human body can be compared to a nation;

The three energy centers (*danjeon*); The three passages on the back of the body; The nurturing of essence (qi) and spirit; In antiquity there were true men, ultimate men, holy men, and wise men; Discussion of natural truth in antiquity; Living according to the four seasons; and Treating disease with the Dao. Additional ways of preserving one's health are also described. Sections 2–4 include the topics blood, dreams, voice, the five viscera and six bowels, and urine and feces, along with symptoms and treatment methods. *External body* discusses the body's outward appearance, with symptoms and treatments of various external systems. *Various disorders* elaborates on disorders and their treatment that are not covered in either *Internal body* or *External body*. *Herbal remedies* contains a depiction of native Korean and Chinese herbs used for treatments; the basis for each prescription is quoted from other medical literature. Difficult Chinese characters are annotated in Korean (hangeul).

Behind the systematic composition of *Dongui bogam* lies a complete rejection of fanciful and unreliable medical theories, which were not uncommon in Korea at the time. The project represented an effort to muster all the knowledge of the East Asian medical world, to present the underlying logic of medicine, and to promote an attitude of respect for the Daoist approach to preserving health. Through this process, the author of *Dongui bogam* established a unique and independent theory that became Traditional Korean Medicine. Accordingly, this text has since garnered global attention as an original work on Eastern medicine (Lee 1994).

10.2.4 Dongui susebowon (Longevity and Life Preservation in Eastern Medicine)

Traditional Korean Medicine continued to develop in the eighteenth to nineteenth centuries. In his treatise *Dongui susebowon*, published in the 31st year of Gojong's reign (1894) in Hamheung, South Hamgyong Province (North Korea), the physician Lee Je-Ma created a unique philosophy of medicine called *Sasang uihak* (literally, "four constitutions medicine," known in English as Sasang Constitutional Medicine, or SCM). This theory offers four constitutional types of human beings: greater yang (*taeyang*), lesser yang (*soyang*), greater eum (*taeeum*), and lesser eum (*soeum*) ("eum" is the Korean word for "yin"), and proposes that treatment of the same disease will differ depending on the physiological needs of a given patient. Lee Je-Ma emphasizes that dietary therapy can be successfully informed by SCM. The original text, consisting of two books in four volumes of woodblock print, is currently stored in the Korea University library. The seven chapters covered in this record discuss methods of medical treatment relevant to the following areas: life theory, four modalities theory, expansion theory, vitality theory, compatibility of medicine and herbology theory, preventative medicine theory, and four constitutions theory.

In the four modalities theory, the four constitutions are defined and classified according to the size of four organs: people with large lungs and small livers are deemed *taeyang*; those with large livers and small lungs are *taeeum*; those with large spleens and small kidneys are *soyang*; and those with large spleens and small kidneys are *soeum*. SCM branches away from Traditional Chinese Medicine's privileging of yin-yang and the Five Phases principles, offering instead an innovative approach to health care that emphasizes one's physical constitution and mind-body connection. (For more details on SCM, see Chap. 12.)

SCM focuses on preventative health care that is based on individual physiological characteristics. In the past in Korea, and frequently today, dietetics, medical science, and physical education have been divided into the separate fields of nutrition, medicine, and exercise. Engaging in any of these areas to excess leads to repeated health problems, such as obesity and metabolic disease, prescription drug addictions, and physical injuries. SCM's holistic approach to treating all areas of a person's life at once helps prevent such modern pitfalls, demonstrating that this theory was conceptually far ahead of its time (Lee 1994).

10.3 The Great Bibliography of Korean Food Classics (*Hanguk sikgyeongdaejeon*)

In 1981, Professor Lee Sung-Woo of Hanyang University published an opus on the history of Korean foodways called *Hanguk sikgyeongdaejeon*. Lee investigated every relevant Korean and Japanese book held in libraries, public or private, in search of source materials. A modern reference work specializing in Korea's traditional dietary life had not been published at the national level, and many of the texts he collected existed only as manuscripts held in private families, whom he visited as part of his extensive research. The bibliography contains the following sections: "A comprehensive synthesis of dietary life" (an encyclopedia of family foods; 30 books), "Food production" (general agriculture, seasonal farming, veterinary treatments and animal husbandry, marine products; 298 books), "Cooking and cuisine" (general cooking and food manufacture, alcoholic drinks, tea; 100 books), "Famine relief and potatoes" (39 books), "Nutrition and applied nutrition" (comprehensive medicine, medicinal herbs, folk cures, infectious diseases, gynecology and pediatrics, health care, ginseng, medicine; 327 books), "Dietary lifestyle" (customs, seasonality, local produce and economic geography, Joseon experiences and guides, conventions and manners, collected classifications, linguistics, poetry and prose, and other; 467 books), along with 12 supplementary books, for a total of 1273 books, including 1243 papers and articles of commentary on each field (Lee 1981).

Hanguk sikgyeongdaejeon is of great value in historical studies for its wealth of detailed bibliographic information, including the location of each original work. Individual entries are formatted to include profiles of the editors and compilers of a given work, the year or estimated year of completion, historical background of the era in which the work was written, the state of publication, and the influence the work has had on future generations. Lee Sung-Woo translates the forewords and postscripts into modern Korean, summarizes contents, and writes scholarly articles on the book topics. He also summarizes the content and book particulars of relevant Chinese and Japanese works. The bibliography is a tremendous resource for scholars of Korean food culture and production, food manufacture techniques, and theories of nutrition as health care. *Sallim gyeongje* (Farm management) and *Imwonsimnyukji* (Encyclopedia of rural life), two major texts recorded in this bibliography, are described in detail below (Lee 1994).

10.3.1 Sallim gyeongje *(Farm Management)*

Knowledge of the advantageous use of natural products and how the geography and climatic conditions of Korea could influence those materials accumulated in literature over the years. At the dawn of the seventeenth century, this knowledge began to be systematically recorded by Silhak (Practical Learning) scholars. In the 41st year of King Sukjong's reign (1715) Hong Man-Seon published *Sallim gyeongje*, Korea's first agriculture encyclopedia. Taking texts such as China's *Jujia biyong* (Household essentials) and the seventeenth-century Korean works *Nongsajikseol* (Straight talk on farming), *Sasichanyocho* (Necessities for four seasons), *Hanjeongnok* (The free lifestyle of seclusion), *Guhwang chwalyo* (Necessary items for famine relief), and *Dongui bogam*, Hong Man-Seon recorded all the skills needed for daily farm life, including agriculture, food manufacture and storage, cooking, and medical treatments, culling and editing the entirety of relevant knowledge to date. The author added explanations where necessary, along with local techniques, regional names, and hangeul (Korean) annotations of Chinese characters. He took particular care to specify the literature quoted in each article, making this a representative eighteenth-century work of scientific writing. Consisting of four books in four volumes, *Sallim gyeongje* is divided into the following 16 topics: *bokgeo* (methods for choosing a homesite), *seopsaeng* (health care), *chinong* (farming methods), *chipo* (vegetable cultivation), *jongsu* (forest management), *yanghwa* (flower cultivation), *yangjam* (silkworm breeding), *mogyang* (animal husbandry), *chiseon* (cooking and processing methods), *gugeup* (handling emergencies), *chiyak* (use of medicinal herbs), *guhwang* (methods for surviving famine), *pion* (methods for eradicating an epidemic), *pichung* (methods for eradicating harmful insects), *iyak* (use of medications), *taekgil* (methods for choosing auspicious days), and *japbang* (other).

The original *Sallim gyeongje* text was transcribed and distributed broadly, and later generations provided supplementary information or expunged outdated ideas from the text. *Jeungbo sallim gyeongje* (Farm management supplement), compiled by Yu Jung-Im, appeared in the 42nd year of King Yeongjo (1766). This work almost doubles the size of the original text with additional information, totaling 12 books in 16 volumes and expanding the number of topics to 28. Compared to *Sallim gyeongje*, however, the supplement suffers from a systemic lack of focus and omission of references.

10.3.2 Imwonsimnyukji *(Encyclopedia of Rural Life)*

After *Sallim gyeongje*, several works on agriculture, food, and hygiene were published, including *Jeungbo sallim gyeongje* and Seo Ho-Su's *Haedong nongseo* (Korean agriculture, 1799). These were synthesized into an 1827 publication by Seo Ho-Su's son, Seo Yu-Gu, in the work *Imwonsimnyukji*, a classic that compiles all nineteenth-century East Asian agriculture techniques. The author writes the following in the introduction of the book:

> Broadly speaking, the two main activities of life consist of going out and staying in: one ventures out as a public servant to do one's duty in the important work of helping to improve the world and bring relief to the people, and one returns home to the equally important work of eating to maintain strength and cultivating one's goals. Due to the critical and practical need for public service and religion, a multitude of literary production is devoted to those topics. Very few books treat the subject of home life, however, despite it being the place where refined persons nurture their life's purpose. *Sallim gyeongje* [Farm management] is the sole record in this country to discuss the topic in detail. Unfortunately, the content of *Sallim gyeongje* is disorganized and redundant, as well as too narrow in scope, which results in numerous critical omissions. In *Imwonsimnyukji*, however, anything related to home life from any source has been researched and categorized, which is why it has been given the name "imwon" [forest and garden], meaning rural life. As the name indicates, this book proffers all necessary information for home life, and nothing relating to the realm of public service.

The necessary knowledge for farming families is divided into 16 well-organized topics, each of which begins with a general introduction before going into detail. The agricultural techniques of Korea, China, and Japan, as well as those of the West that had been introduced in China, are included. Of further value to academics are the 900 disparate sources quoted. A brief summary of the topics found in *Imwonsimnyukji* follows.

1. Farming (*Bolliji*): Explains the scale and gauge methods of measuring land surface area in Korea and China, land survey methods, advantages of size, embankment repair, field dam methods of irrigation, soil and its management, and land quality in various regions of Korea. Diagrams the subdivisions of seasons as related to farming, delineating differences in agricultural seasonal subdivisions based on longitude and latitude. Also discusses farm development and cultivation practice, including fertilization methods, seed selection and storage, how to grow various kinds of grain, including rice, barley, and sorghum, the etymology of grain, and natural challenges to cultivation and how to contain them.
2. Edible plants and herbs (*Gwanhyuji*): Describes how to grow vegetables, cucurbits, and medicinal herbs, with an itemized discussion of 33 kinds of vegetables, 8 kinds of cucurbits, and 20 kinds of medicinal herbs; includes historical evidence.
3. Floriculture (*Yewonji*): Describes the general method of cultivating flowers and presents further details for 65 types of flowering plants, including premium plants, soil, cultivation seasons and methods, and varieties. Brings historical

research to bear on tree peonies, peonies, orchids, chrysanthemums, and other types of flowers.

4. Trees, shrubs, and vines (*Manhakji*): Describes 31 kinds of fruiting tree and their cultivation, 14 kinds of flowering vines, including *chamoe* (Korean melon), watermelon, and grape, 25 kinds of trees, such as pine and oak, and 13 kinds of shrubs and other plants, including tea and tobacco, and how to cultivate them.
5. Silk and fabrics (*Jeongongji*): Describes how to raise silkworms and cultivate cotton and hemp, along with thread-making and spinning techniques.
6. Weather and climate (*Wiseonji*): Discusses annual climate patterns month by month and the relationship between climate and farming, as well as divination techniques used to interpret the relationship between celestial bodies and weather conditions according to changes in natural systems.
7. Stock farming and fishery (*Jeoneoji*): Covers ranching, hunting, and fishing.
8. Pots and cutting boards (*Jeongjoji*): The topic of food manufacture and cooking methods covers food ingredients, prepared foods, drinks, treats, pickled vegetables, meat production, seasonings, brewing, and seasonal foods, all of which are described and categorized into nine fields. Of particular interest is that 11 kinds of water, 36 kinds of grain, 72 kinds of vegetables, 13 kinds of birds, 34 kinds of fish, and 8 kinds of seasonings are recorded as food ingredients. Recipes for 53 kinds of pickles and kimchi, as well as 36 kinds of soy sauce and doenjang (fermented soybean paste), are also described. Records of food production or cooking that specify different kinds of water for particular culinary uses are rare in the world. The first paragraph of the section on food substances lists different types of water and their functions.
9. Architecture and home goods (*Seomyongji*): Describes house-building methods and materials, including tools used for good fortune, stoneware, cooking implements, brewing crocks, and the making and usage of bedding, clothing, and other ornaments. The author laments that Korean techniques have not developed apace with other countries and strongly advocates progress be made in this field.
10. Well-being and health (*Boyangji*): Enumerates aspects of health care that merit attention, including nutritious foods, methods of caring for mind and body, food preparation, medicinal treatments, methods for helping the elderly convalesce, and infant care; presents a monthly calendar of personal health care suggestions specific to each season.
11. Medicine and famine relief foods (*Injeji*): This is the largest of the 16 topics, as the author reviews the entire pharmacopoeia of Eastern medicine. In the introduction to this topic, the author emphasizes that medical divination and shamanic rituals are fabrications, and that ailments can and should be cured using medicine.
12. Household ceremonies (*Hyangyeji*): Depicts the annual festivals and ceremonies held in rural communities.
13. Reading and hobbies (*Yuyeji*): Explains every kind of art learned by scholars, including reading, arithmetic, calligraphy, painting, and music.

14. Leisure time (*Iunji*): Describes tools used in daily life, such as writing supplies and incense burners, as well as hobbies, including antiques collecting, printing, décor, scenic touring, and playacting.
15. Geology (*Sangtaekji*): Discusses the geography of Korea, including mountains and water features, and methods for choosing a place to live.
16. Economy and business (*Yegyuji*): Covers economic issues, including the national economy, domestic economy, distribution issues, commercial economy, agricultural economy, and ways to practice frugality and moderation, such as conserving metal, clothing, and food.

10.4 The Theory of Nutrients in Eastern Medicine and the Development of Dietary Cures

According to the yin-yang and Five Phases theories, the nutrition and functionality of all foods can be divided by their qualities and taste. Yin-yang encompasses the qualities, or properties, of food. Cold food properties are categorized as yin, neutral and warm as yang. Yin foods provide nutrients and similar substances, whereas yang foods function as energy, like calories. The flavors of food are characterized by the Five Agents—sour, bitter, sweet, spicy, salty—and are connected by an interwoven relationship of suppression to and generation vis-à-vis the body's organs, feelings, and actions, and even the surrounding environment. A traditional Korean person's fundamental thoughts about nutrition and health care, then, involve a balanced, health-supporting diet comprised of the yin and yang qualities of food, balanced further by a harmonious blend of Five Phases flavors. A meal that is one-sided in terms of qualities or taste would not be acceptable for one's health (Lee and Kwon 2003).

Table 10.2 configures an example of a traditional meal from the perspective of yin-yang and the Five Phases. One bowl of rice and mugwort doenjang soup, cabbage kimchi, balloon flower greens, broiled fish, and garlic chive pancake together contain ingredients that combine in equal measure to create a balanced diet that adheres to the yin-yang and Five Phases theories (Kim 1995).

Table 10.2 Analysis of a Korean meal according to yin-yang and the Five Phases

	Wood (sour)	Fire (bitter)	Earth (sweet)	Metal (spicy)	Water (salty)
Yang	Chives	Mugwort	Shepherd's purse, flour	Leek, garlic, ginger, pepper, sesame seeds	Salt
Neutral			Water, rice, soybeans, croaker		
Yin	Vinegar	Balloon flower root, fern	Cabbage	Onion	Soy sauce, doenjang

If a person develops an ailment, medical treatment will entail adjusting that person's intake of energetically cold, cool, warm, or hot foods in order to balance the diet. If the disease is due to an abundance of cold, then warming foods will be prescribed; if the disease is due to an excess of heat, then cooling foods will be added to the diet. Such food-based remedies developed over time using Eastern philosophy's health-care principles, coupled with the yin-yang and Five Phases theories.

10.5 Formation of the Traditional Korean Diet

As Eastern theories of medicine developed and became a prevalent way of life in the eighteenth to nineteenth centuries, the standard Korean diet became systematized in the form of *cheopbansang* (table settings), the details of which can be found in a number of historical documents. *Siuijeonseo* (a nineteenth-century anonymous cookbook) provides a drawing of a standard table setting and its composition. The basic requirement of every table setting comprises rice, soup, and kimchi. The number of additional dishes placed on the table determines whether the setting will be called *samcheop bansang* (3-dish table; i.e., 3 dishes in addition to rice, soup, and kimchi), *ocheop bansang* (5-dish table), or *chilcheop bansang* (7-dish table), and so on (Yoon 1993). The extravagant 12-dish table setting was reserved for the king's table. Figure 10.2 shows an example of 5-dish table setting.

Many authors list the kinds of foods composing a table setting, but do not approach quantitative angles. In his book *Joseon singmul gaeron* (A review of Korean food, 1944), Professor Kim Ho-Jik presents the composition of a 7-dish table setting, but also discusses the amounts of each food item placed on the table. Table 10.3 offers an attempted nutritional evaluation of the traditional Korean diet based on the example of Kim Ho-Jik's 7-dish table setting (Lee and Ryu 1988). The basic setting of rice, soup, and kimchi provides 40% of the recommended daily allowance (RDA) for calories and 48.7% of RDA for protein for a Korean adult male. The 3-dish table setting typically adds standard side dishes such as seasoned spinach, roasted beef (bulgogi), and seasoned dried anchovy, which in this case provides 47.2% RDA for calories and 98.3% RDA for protein. From the perspective of the modern diet, the 3-dish table setting provides a remarkably balanced diet, supplying sufficient calories, vitamins, and minerals. Specifically, calories from carbohydrates in the basic table and 3-dish table setting are relatively high, at 77% and 64.4%, respectively. Calories from fat stand at 8.3% and 11.6%, respectively. Even at a feast table (5-dish table), the amount of fat calories comes to only 12% (Lee and Ryu 1988).

Table 10.4 displays the dietary goals of the traditional Korean diet for an adult male. With a daily energy intake of 2000–2500 kcal, including 80–90 g of protein, 73–77% of calories come from carbohydrates and 15–18% from protein, 20–30% of which comes from animal protein, and 10–12% from fat. This was considered to be

Fig. 10.2 Example of 5-dish table setting

an ideal diet for the Korean adult male in the late Joseon dynasty (Lee and Kwon 2003).

In his 1940 book *Joseon yorihak* (Korean gastronomy), Hong, Seon-Pyo recommends the following dietary guidelines:

1. Eat a little when you feel hungry.
2. Chew comparatively hard foods longer.
3. Stop eating before you feel full.
4. Eat many raw foods.

Added to the above are eighth principles for choosing healthy food ingredients:

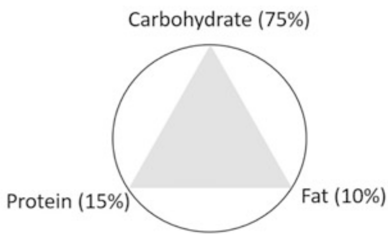
1. Fresh food.
2. Raw food.
3. Natural food.
4. Long-lived plants and animals.

Table 10.3 Analysis of the nutritional value of traditional Korean table settings

Type of table setting	Basic table setting	3-dish table setting	5-dish table setting	7-dish table setting
Typical foods	Rice, soup, kimchi	Basic table + seasoned spinach, bulgogi beef, dried anchovy	3-dish setting + stew, boiled meat slices, pollack roe	5-dish setting + oyster pancake and cubed radish kimchi
Total calories (kcal)	995 (40.0)	1181 (47.2)	1320 (52.8)	1672 (66.8)
Carbohydrates(%)	77.0	64.4	60.1	53.4
Protein (%)	14.7	24.0	28.0	27.7
Fat (%)	8.3	11.6	11.9	18.9
Total protein (g)	36.5 (48.7)	70.7 (94.3)	92.5 (123.3)	115.5 (154.0)
Animal protein (g)	28.7	59.5	69.0	72.3
Calcium (mg)	161.1 (26.9)	216.3 (36.1)	255 (42.5)	596 (99.3)
Iron (mg)	12.1 (121.9)	23 (230)	26.8 (268)	40.3 (403)
Vitamin A (IU)	426.6 (17.1)	8761.6 (350.5)	9129 (365.2)	9965 (398.6)
Vitamin B1 (mg)	0.62 (47.6)	0.86 (66.2)	1.08 (83.1)	2.16 (166.2)
Vitamin B2 (mg)	1.92 (127.9)	3.03 (202.2)	3.44 (229.3)	4.35 (290.4)
Niacin (mg)	11.6 (68.3)	28.9 (169.9)	37.1 (218.2)	45.8 (269.4)
Vitamin C (mg)	19.7 (35.9)	83.7 (152.2)	86.4 (157.2)	99.6 (181.2)

( ) Percentage of RDA for a Korean adult male

Table 10.4 Goals of the traditional Korean diet

Recommended daily allowance for adult males	
Calories: 2000–2500 kcal	
Protein: 80–90 g	
Calorie composition	
Carbohydrates: 73–77%	
Protein: 15–18%	
Fat: 10–12%	
Protein composition	
Animal protein: 20–30%	

5. Dense food.
6. Young plants and animals.
7. Local food.
8. Not too acrid.

Hong also advises using salt and refined sugar in moderation. The guidelines and principles written in the 1940s, when degenerative metabolic diseases and cancer were not widely known, suggested excellent principles for a dietary regimen compared to modern dietary guidelines in Korea, which have been adopted from those in Europe and the United States (Lee and Kwon 2003).

References

Hong, Mun-Hwa. 1990. *Tteuseuro suipge pulihan Heo Jun Dongui bogam* [Explanation of the Meaning of Dongui bogam (Principles and Practice of Eastern Medicine)]. Seoul: Dungji Publishing.

Hong, Seon-Pyo. 1940. *Joseon yorihak* [Korean Gastronomy]. Seoul: Jokwangsa.

Ilyon 1285. *Samguk yusa* [Memorabilia of the Three Kingdoms]. Modern Korean edition: Ilyon. *Samguk yusa* (trans: Lee, Min-Su 2013). Seoul: Eulyumunhwasa.

———. 1285. *Samguk yusa*. English edition: Ilyon. *Samguk Yusa: Legends and History of the Three Kingdoms of Ancient Korea* (trans: Ha, Tae-Hung and Mintz, G.K., 2016). Seoul: Yonsei University Press.

Kim, Bu-Sik. 1145. *Samguk sagi* [History of the Three Kingdoms]. Modern Korean edition: Bu-Sik, K. *Samguk sagi* (trans: Kim, Jong-Kwon, 2016) Seoul: Daeyang Publishing.

Kim, Ho-Eon. 1989. Hyeondaein ui geonganggwa *Hwalinsimbang* [Health and *way of living* for modern people]. In *Toegyehak yeongu* [Toegye Philosophical Studies], vol. 3, 157–208. Seoul: Danguk University Institute of Toegyehak.

Kim, Ho-Jik. 1944. *Joseon singmul gaeron* [A Review of Korean food]. Seoul: Saenghwalgwahaksa. (in Japanese).

Kim, Myong-Ho. 1995. *Jayeon, saram geurigo Hanuihak* [Nature, Man and Traditional Korean Medicine]. Seoul: Yoksabipyongsa.

Lee, Cherl-Ho. 1994. *Eumsik okeseuteura* [Food Orchestra]. Seoul: Yulim muhwasa.

———. 2018. Korean foods—history, culture and characteristics. In *Korean Functional Foods, Composition, Processing and Health Benefits*, ed. K.Y. Park, D.Y. Kwon, K.W. Lee, and S.M. Park, 1–22. New York: CRC Press.

Lee, Cherl-Ho, and Ryu Si-Saeng. 1988. Hanguk jeontongsikdan ui yeongyangga bunseok [Nutritional evaluation of the Korean traditional diet]. *Hanguk singmunhwahakhoeji* [Korean Journal of Dietary Culture] 3 (3): 275–280.

Lee, Cherl-Ho, and Kwon Tai-Wan. 2003. *Hanguk sikpumhak immun* [Introduction to Korean Food Science]. Seoul: Korea University Press.

Lee, Sung-Woo. 1981. *Hanguk sikgyeongdaejeon* [The Great Bibliography of Korean Food Classics]. Seoul: Hyangmunsa.

———. 1984. *Hanguk sikpumsahoesa* [History of Korean Food and Society]. Paju: Kyomunsa.

Magner, Lois N. 1992. *A History of Medicine*. New York: Marcel Dekker.

Ni, Maoshing. 1995. *The Yellow Emperor's Classic of Medicine*. Boston: Shambhala.

Yoon, Nae-Hyun. 2015. *Gojoseon yeongu I & II* [Gojoseon Research]. Seoul: Mankwondang.

Yoon, Seo-Seock. 1993. *Hanguk sikpumsayeongu* [Korean Food History Research]. Seoul: Sinkwang Publishing.

Chapter 11
Changes in the Food and Nutritional Status of Koreans over the Last Century

Abstract The dietary life of Koreans has undergone major changes in the last century due to the arrival of Western civilization on the Korean Peninsula. The post-liberation chaos that began in 1945 and the battles of the 3-year Korean War, followed by the division of North and South Korea, left most people on the edge of famine. Despite these hardships, South Korea has achieved remarkable economic growth over the past half-century, and due to its democratic free market economy, the nation transformed from a country in need of international food aid to one of the world's top ten economic powerhouses, now a donor itself in assisting developing countries. On the other hand, North Korea has been ruled by a Communist regime over three generations of inherited power, the economic policies of which have reduced the nation to becoming one of the world's poorest. Hunger refugees continue to escape from the North. In this historical dichotomy of the two Koreas, it is meaningful to examine in detail the changes in dietary habits their people experienced over the past century. This chapter reviewed the changes in Korean dietary life vis-à-vis major historical events; the last period of Joseon kingdom (1800–1910), Japanese occupation (1910–1945), the Initial Development Period (1945–1966), Mid-Term Development Period (1967–1976) and the Late Development Period (1977–1986). The food shortage and changes in the food supply of North Korea and its consequence in famine situation of the people were focused, and the optimum food and nutrition models for Koreans were elaborated in order to rescue the imbalanced food and nutrition situation in Korean Peninsula.

The dietary life of Koreans has undergone major changes in the last century due to the arrival of Western civilization on the Korean Peninsula. Looking back, the ancestors of the Korean people grew into a dominant Northeast Asian group by spearheading Primitive Pottery culture before the advent of Neolithic agriculture. Hongsan (Chi. Hongshan) culture and the overlapping Gojoseon civilization emerged during this early period of state formation and initiated fermented foodways centered on rice and soybeans. With the introduction of Buddhism in the fourth century, and its gradual spread across the Three Kingdoms of Korea, vegetarianism and the tradition of processing grains and ritual foods (rice cakes, Korean sweets, etc.) flourished. With the unification of Goguryeo, Baekje, and Silla, a single

C.-H. Lee, *Korean Food and Foodways*,
https://doi.org/10.1007/978-981-19-0023-5_11

political system was established on the Korean Peninsula, but most of the land of Goguryeo north of the Yalu River was lost, making it difficult to maintain equal relations with China. Goryeo, the ensuing dynasty, succumbed for 80 years to the control of Yuan, China, which had been established by Genghis Khan in the thirteenth century. During this period, the vegetarian culture of the Goryeo people declined as meat consumption increased significantly. The Joseon Kingdom, which came into power in 1392 and endured until 1897, advocated a policy of suppressing Buddhism and promoting Confucianism, which heralded the transition of Korean food culture to a more balanced diet of meat and vegetables.

During the Imjin War with Japan in the seventeenth century, a large number of Korean culinary practices were transmitted to Japan, and food exchange with Japan expanded. In the latter part of the Joseon dynasty, a dramatic weakening of national power occurred as conflict between opposing factions of Confucian scholar-officials increased, which eventually led to the downfall of the kingdom. In 1910, Joseon lost her sovereignty to Japan, who had accepted Western civilization with the Meiji Restoration (1868–1889), strengthening her power in the process. During the 36 years of Japanese colonial rule, the food situation deteriorated drastically for Koreans, and their traditional food culture was irreparably damaged. The post-liberation chaos that began in 1945 and led to the battles of the 3-year Korean War, followed by the division of North and South Korea, left most people on the edge of famine. Despite these hardships, South Korea has achieved remarkable economic growth over the past half-century, and due to its democratic free market economy, the nation transformed from a country in need of international food aid to one of the world's top ten economic powerhouses, now a donor itself in assisting developing countries. North Korea, by contrast, has been ruled by a Communist regime over three generations of inherited power, its economic policies having reduced the nation to one of the world's poorest. Hunger refugees continue to escape from the North. In light of the stark dichotomy of the two Koreas, it is meaningful to examine in detail the changes in dietary habits their people experienced over the past century.

Seven factors are seen as having transformed Korean food habits: (1) changes in religious beliefs or thought; (2) progress in the sciences of health and nutrition; (3) changes in economic status; (4) lifestyle changes; (5) long-term foreign infiltration and war; (6) the introduction of foreign culture; and (7) the availability of new food materials. The socioeconomic consequences of changes in food habits may be categorized into the following four areas: (1) the health status of the Korean people; (2) patterns of food supply and consumption; (3) the food industry; and (4) family and human relationships.

11.1 Changes in Korean Dietary Life Vis-à-Vis Major Historical Events

11.1.1 Last Period of the Joseon Kingdom (1800–1910)

Imwonsimnyukji (Encyclopedia of rural life, Seo Yu-Gu), a reference work published in 1827, provides insight into the dietary life of Koreans before the country opened to Western influence. Part 8 of the book, "Jeongjoji," is the equivalent of a modern food technology textbook. The first chapter, "Sikgam chwalyo," classifies the food materials available at the time in a manner similar to that of the current food balance sheets published by the Food and Agriculture Organization (FAO). "Sikgam chwalyo" lists 11 kinds of water as the most important food material and categorizes 36 distinct cereals, 72 vegetables, and 46 kinds of fruit, among other plant foods. It also describes seasonings as an important food category, but does not list milk, fat, or oil (Lee 1981).

Siuijeonseo (Compilation of correct cooking methods), a cookbook written by an anonymous noblewoman, appeared in the late 1800s. Volume 1 describes how to make soy sauce, kimchi, and salt-preserved vegetables and discusses cooked rice, cereal gruel, salted fish, persimmons, and honey drinks with shredded fruits. Volume 2 lists rice cookies, rice cakes, saccharified rice drinks, fruit jelly, candy, rice wine, dried fish and meat, soybean curd, acorn starch gel, rice jelly, fermented fish, sea plants, fish, and vegetables, and also describes table settings.

According to literature at the time, Korean dietary patterns during the late Joseon dynasty appear to have been made up of main dishes of cooked rice and cereal gruel, supplemented by side dishes of soup, stew, kimchi, fish and/or meat, and salad. Noodles, buns, and rice cakes (*tteok*) were eaten as snacks; and favorite foods generally consisted of sweets (*hangwa*), alcoholic drinks, and nonalcoholic beverages. Various cereals, vegetables, and fruits that are considered wild or famine foods today were common on late Joseon tables. Thus, the nutritional status of Koreans during this period cannot be estimated accurately by using today's food composition tables; the people supplemented substantial portions of their diets with nutrients from wild foods not listed in today's food classifications (Kim and Kim 1987).

11.1.2 Japanese Occupation (1910–1945)

Western food was introduced to Korea during the Japanese Occupation, which lasted from Japan's annexation of Korea in 1910 to the beginning of Korea's rehabilitation in 1945. This period was a time of hardship and food shortages for Koreans, as much of their food was extorted to be sent to Japan and, later, to the Sino-Japanese war field. Western concepts of nutrition were also introduced to Korea during this period, and Western-style bread and cookies were sold by Japanese bakers. The first bakeshop in Korea, Myeongchiok, opened in the 1920s in downtown Seoul. By the 1940s, 40 bakery companies and 140 bakeshops had been established in Seoul.

According to the Joseon Food Industry Directory, published in 1922 by the Korea-Manchuria Industry Survey Committee, there were 492 Japanese-owned food industries in total on the peninsula, including 208 rice milling plants, 8 flour mills, 44 cookie manufacturers, 3 agar manufacturers, 172 breweries, 6 soft drink makers, 2 ice makers, 21 salt producers, and 19 canneries. This list reflects a significant change in food processing technology during the Japanese Occupation. Certain processed foods—for example, flour, bread, noodles, cookies, soft drinks, and canned goods—were always available to some fraction of the people. On the other hand, the majority of people were still ignorant of Western foods and lived by their traditional dietary patterns, which were governed by East Asian rules of health.

Lists of the food materials available during this period can be found in *Joseon singmul gaeron* (A review of Korean food), written by Kim Hozik in 1944. This book lists 17 different cereals, a significant reduction from the 36 kinds listed in *Imwonsimnyukji*. Some of these, however, are classified under "wild plants" as famine foods. It also lists 25 vegetables, 304 wild plants, 7 kinds of seaweed, 81 kinds of mushroom, 11 kinds of fruit, and 204 kinds of fish and shellfish. In the category of meat and eggs, cattle, pig, dog, roe deer, poultry, pheasant, and eggs are listed, but milk does not appear, indicating that milk was not generally considered to be food for human consumption until the end of the Japanese Occupation.

The Colonial Statistical Yearbook (1912–1940) lists 15 cereals, 6 beans, 2 root crops, 13 vegetables, 5 kinds of fruit, 3 kinds of livestock, and several marine products. It is clear that these numbers are much smaller than the variety of food items actually used by the people. Based on the Statistical Yearbook, Table 11.1 records the daily per capita food supply, calculated in 3-year periods (Lee et al. 1988).

The supply of cereals in Korea diminished gradually during the colonial period and reached its nadir in the early 1930s. This change was largely due to the Japanese extortion of Korean rice, which amounted to nearly one-third of the total produced in Korea. The estimated daily per capita nutrient supply is shown in Table 11.2.

The average daily per capita energy supply in the 1913–1915 period was 2089 calories, 97.5% of which was plant-based. The total protein supply was 80.7 g per capita per day, 91.8% of which was also plant-based. These values indicate that Koreans were heavily dependent on plant food materials. The total energy supply was comprised of 74.1% from carbohydrates, 15.4% from proteins, and 10.5% from lipids. These values are similar to those calculated in Kim Hozik's standard meal composition (Lee and Ryu 1988). It appears that Korean dietary patterns did not change significantly during the 35 years of Japanese Occupation, despite a severe reduction in food supply.

Table 11.1 Korean daily per capita food supply during Japanese Occupation (unit: grams)

Food group	1913–1915	1922–1924	1930–1932	1937–1939
Cereals	454.2	414.4	372.0	436.5
Rice	248.9	196.1	162.4	222.0
Wheat flour	29.5	31.3	26.0	37.4
Barley	65.7	61.5	65.0	75.0
Other	110.1	125.5	118.6	102.1
Sugar	–	–	–	–
Root crops	36.4	70.3	70.5	90.1
Beans	94.6	76.8	65.7	52.0
Nuts	–	–	–	–
Seeds	–	–	–	–
Vegetables	95.3	102.7	134.7	127.4
Fruit	0.6	2.6	8.3	12.6
Meat	13.4	15.7	14.2	11.8
Eggs	–	–	–	–
Milk	–	–	–	–
Marine products	26.3	37.6	73.5	84.0
Fats and oils	–	–	–	–

Table 11.2 Korean daily per capita nutrient supply during the Japanese occupation

Nutrients	1913–1915	1922–1924	1930–1932	1937–1939
Total energy (kcal)	2089	1916	1775	1980
Plant origin (kcal)	2083	1849	1676	1874
Protein (g)	80.7	72.7	71.7	73.6
Animal origin (g)	6.6	8.9	14.3	15.6
Lipid (g)	24.3	20.4	19.5	18.5
Ca (mg)	314	310	325	311
Fe (mg)	23.5	21.4	20.8	22.7
Vitamin A (IU)	414	591	985	1076
B_1 (mg)	1.66	1.63	1.58	1.59
B_2 (mg)	0.74	0.72	0.78	0.80
Niacin (mg)	15.6	15.1	15.3	16.0
C (mg)	42	51	60	61

11.1.3 Initial Development Period (1945–1966)

Korea experienced tremendous change between 1945 and 1966, between international efforts to help with post-occupation rehabilitation, the Korean War, the division between North and South Korea, and a military coup. This tumultuous period saw profound changes in the food habits of the people. The food shortage caused by extortion during the Japanese Occupation was aggravated in the south by a massive movement of refugees from Communist North Korea before the border

Table 11.3 GNP and Engel's coefficient during the initial development period

Year	GNP/capita (US$)	Engel's coefficient Farmer (%)	City worker (%)
1954	72	73.6	41.2
1955	67	72.1	45.5
1956	68	69.5	44.6
1957	77	69.9	43.0
1958	83	58.8	41.6
1959	84	53.9	39.2
1960	82	55.9	38.9
1961	85	58.6	41.3
1962	90	55.9	43.2
1963	104	60.3	45.2
1964	107	59.0	56.7
1965	109	53.2	53.7
1966	130	50.2	49.5

closed. The number of refugees who fled south was estimated to be two million, almost 10% of the total population in South Korea at that time. However, the factor that induced the most radical changes in food habits was the Korean War.

Under the extreme conditions of wartime starvation, Koreans were fed with milk gruel made from nonfat dry milk donated by a United States aid program. Traditionally a non-milk-eating people, Koreans showed symptoms of lactose intolerance, but soon learned to tolerate the milk. The biscuits, cookies, chewing gum, and canned foods offered by United Nations forces attracted the starved people so strongly that they neglected their native foods. After the Korean War, many of the first food industries established were Western-style confectionery companies. The wheat flour donated by the US food aid program during the war became a staple food for low-income people, and after the war it was the only inexpensive program offering foodstuff still in place. Traditional foods, such as rice cookies, rice cakes, and rice wines, disappeared rapidly in the face of exorbitantly high rice prices. Rice-based foods were replaced by bread, sponge cakes, biscuits, and noodles.

The postwar decade in Korea was a period of extreme poverty. As shown in Table 11.3, the Gross National Product (GNP) of Korea during the period of 1955–1965 was in the range of 72–130 US dollars, and Engel's coefficient (the ratio of a household's food expenditures per total expenditure) was 50–74% for farmers and 41–50% for city workers (Lee et al. 1988).

The food intake of the Korean people was estimated using the daily menu examples suggested by Pang Sin-young in the 30th edition of her cookbook, which was published in 1957. The first menu example supplied 81.5 g of protein and 2065 calories of total energy, of which 73% came from carbohydrates, 15.5% from protein, and 11.5% from lipids. The second menu example contained 98 g of protein and 2084 calories of energy, of which 70% was from carbohydrates, 18% from protein, and 12% from lipids. Table 11.4 shows the estimated daily per capita food supply during the rehabilitation and Korean War periods, clearly demonstrating

Table 11.4 Daily per capita food supply during the initial development period (unit: grams)

Food group	1946–1948	1956	1962
Cereals	334.9	381.1	477.6
Rice	247.9	295.3	331.4
Wheat flour	15.6	23.8	34.0
Barley	51.0	48.5	104.3
Other	20.4	13.5	7.9
Sugar	–	–	4.7
Root crops	37.7	46.3	98.1
Beans	23.2	25.5	16.3
Nuts	–	–	0.2
Seeds	–	–	0.2
Vegetables	85.2	92.9	99.0
Fruit	7.0	12.0	15.1
Meat	5.6	9.8	12.9
Eggs	–	–	4.4
Milk	–	–	0.4
Marine products	22.6	31.4	40.2
Fats and oils	–	–	0.8

Table 11.5 Comparison of the amounts of nutrients supplied and consumed during the initial development period

	Per capita daily supply			Per capita daily consumption			
Nutrients	1946–1948	1956	1962	1948	1959	1961	1966
Number of samples (persons)				6054	70–100	340	112–165
Total energy (kcal)	1378	1579	1943	2438	2502	2353	2608
Plant origin (kcal)	1345	1529	1863	–	–	–	–
Protein (g)	41.3	48.3	53.2	88.6	77.7	39.1	73.4
Animal origin (g)	46	6.8	7.5	7.4	–	9.3	4.0
Lipid (g)	89	11.0	13.1	18.2	14.7	16.4	8.6
Ca (mg)	143	164	299	330	360	497	258
Fe (mg)	15	17.6	10.8	42	16.2	19.6	23.2
Vitamin A (IU)	574	662	957	5218	3709	3982	2269
B_1 (mg)	0.75	0.95	1.17	1.3	1.5	1.56	1.09
B_2 (mg)	0.47	0.54	0.49	1.0	0.98	0.91	0.80
Niacin (mg)	9.6	10.9	18.2	–	19	23	–
C (mg)	36	40	49	78	121	133	87

the food shortage at that time. The production of sugar, nuts, seeds, eggs, milk, and fats and oils was meager until the end of the 1950s, but rose in the early 1960s. In particular, sugar, milk, and fats and oils, which were introduced and frequently consumed during the Korean War, played a key role in changing dietary patterns, especially as these foods continued to be popular after the war.

Table 11.5 compares the nutrient supply, as estimated from the national food balance sheet, with the actual intake, as determined by food consumption surveys

(Chae 1948; Lee et al. 1962, Lee et al. 1988). The estimated nutrient supply was very low compared to real intake. The per capita daily energy supply in this period was estimated to be 1380–1940 calories and 41–53 g of protein, but the intake level was almost 1.5–2.0 times the supplied amounts. Discrepancies may arise from inaccurate statistical data and skewed sampling of the survey; more likely, however, they result from the fact that official statistics did not take into account the substantial amount of wild and famine foods that were consumed during this period of extreme poverty. In addition, food availability and consumption fluctuated dramatically with the seasons. Lee and Lee (1977) report that a significant reduction in nutrient intake in the 1950s and 1960s was observed every spring, when annual food shortages were most severe. This condition was known as *bori goge* (barley hill): when rice was scarce, Koreans resorted to eating barley.

A tentative nutritional standard for Koreans was established in 1960 by the Republic of Korea's Ministry of Health and Welfare, and the first official recommended nutrient intake for Korea was prepared by the FAO Korea Association in 1962. This recommended intake greatly overestimated the requirements, however, by duplicating European standards. The recommended daily intake for Korean adult males was set at 2900 calories of energy and 70 g of protein.

According to a biochemical study of the nutritional status of Koreans conducted in 1962 by Yoo and Chae (1962), the average blood composition and concentrations of vitamins B_1 (thiamine) and B_2 (riboflavin) in urine were normal, but at the lowest limits of the range. Another clinical survey pointed out that diseases caused by deficiencies in vitamins A and B_2, protein, and calcium were observed to be significant during this period (Ju 1968).

11.1.4 Middle Development Period (1967–1976)

The successful implementation of the first Five-Year Economic Development Plan in Korea spurred rapid economic growth, as well as rural flight, from 1967 to 1976, as people sought jobs that were opening up in industrial centers. Table 11.6 lays out important indexes for the agricultural economy in this period (Lee et al. 1988). GNP increased from $100 to $800, the farm population decreased from 55 to 36%, and food self-sufficiency dropped to 75% (Economic Planning Board, Republic of Korea 1982). During the Initial Development Period, food deficiencies were supplemented mainly through a foreign aid program, but in the Middle Development Period, economic growth meant that a greater percentage of food could be, and was, imported.

Small-scale food producers grew into large-scale food industries. In particular, the factories producing bulky and sweet-tasting energy foods, such as flour, starch, glucose, fine sugar, and instant noodles, expanded and became industrial. Seasoning industries, such as those producing soy sauce and monosodium glutamate, also expanded rapidly. Powdered milk, chewing gum, cider, and soft drink industries also appeared during this period.

Table 11.6 Per capita GNP, Engel's coefficient, farm population, and food self-sufficiency, 1967–1976

Year	Per capita GNP ($)	Engel's coefficient (%)		Farm population (%)	Food self-sufficiency (%)
		Farmer	City worker		
1965	109	53.0	53.7	55.2	93.9
1966	130	50.2	49.5	54.0	94.7
1967	147	49.1	45.0	53.5	86.7
1968	175	47.4	43.1	51.7	91.3
1969	218	46.4	40.9	49.6	43.6
1970	252	48.2	40.6	45	80.5
1971	288	47.3	41.4	44.7	69.4
1972	318	48.3	38.9	43.8	70.8
1973	395	47.3	39.4	42.9	69.4
1974	540	48.3	43.4	38.8	70.3
1975	590	47.3	49.5	38.2	76.3
1976	797	45.7	49.4	35.7	74.8

According to a survey by Chae and Shin (1972) of the changes in Korean food consumption patterns between 1965 and 1970, consumption of seasonings increased 2.4 times, processed foods 3.8 times, sweets 6 times, and soft drinks 6 times. The sharp increase in the consumption of meat, fish and shellfish, noodles and pastries, processed foods, coffee, and margarine reflects the first significant adoption of Western dietary elements into the Korean culinary lifestyle.

Table 11.7 shows changes in the food supply from 1967–1976. The per capita cereal supply exceeded 500 g per day; in particular, the supply of flour and barley increased remarkably. The supply of root crops increased at the beginning of the period, but rapidly decreased during the later stages. The era of food shortage in South Korea ended during this period, and the harsh periods of "barley hills" disappeared. The supply of sugar, vegetables, fruit, meat, eggs, milk, marine products, and fats and oils rose substantially during this decade.

A food consumption survey has been conducted every year since 1969 by the Republic of Korea's Ministry of Health and Welfare. Table 11.8 compares the amounts of per capita nutrients supplied with the amounts of nutrients ingested, as determined by food consumption surveys (Lee et al. 1988). The amounts of supplied nutrients, as estimated from the national food balance sheet, were 10–20% higher than those of intake nutrients measured by the food consumption surveys. This trend marked the exact opposite of the period of absolute poverty, 1945–1966, in which the national food balance sheet underestimated the people's nutrient intake.

Supplying sufficient nutrients to the populace was a national priority in the 1960s, and the first amendment to the recommended daily intake for Koreans was made in 1967, raising the intake to 3000 calories of energy and 80 g of protein for an adult male per day. However, this recommendation was soon found to be unrealistic, and the second amendment, in 1975, reduced the energy intake to 2700 calories per adult male per day.

Table 11.7 Changes in the daily per capita food supply of Koreans, 1967–1976 (unit: grams)

Food group	1968	1974	1976
Cereals	526.5	543.7	530.4
Rice	322.7	341.4	330.6
Wheat flour	76.1	70.3	83.7
Barley	117.1	100.5	107.5
Other	10.7	11.6	8.7
Sugar	12.0	15.8	99.3
Root crops	147.6	81.6	16.4
Beans	17.6	19.0	26.4
Nuts	0.2	0.3	0.5
Seeds	0.2	0.9	3.8
Vegetables	146.3	178.6	186.4
Fruit	24.4	35.6	35.9
Meat	22.2	25.2	26.4
Eggs	5.6	10.6	11.2
Milk	3.8	10.2	14.5
Marine products	45.3	76.2	81.4
Fats and oils	3.4	6.2	8.4

Table 11.8 Comparison of supplied nutrients and intake nutrients, measured by food consumption surveys, 1967–1976

	Supplied nutrients			Intake nutrients		
Nutrients	1968	1974	1976	1969	1974	1976
Total energy (kcal)	2276	2370	2414	2105	2054	1926
Plant origin (kcal)	2165	2215	2220	–	–	1819
Protein (g)	62.1	69.4	73.5	65.6	68.0	68.4
Animal origin (g)	9.7	14.1	17.1	6.8	12.2	12.2
Lipids (g)	18.4	24.0	27.9	16.9	15.5	20.5
Ca (mg)	373	529	509	444	444	401
Fe (mg)	13.5	16.0	18.6	24.8	14.1	12.3
Vitamin A (IU)	1602	3561	2976	4076	5213	3689
B_1 (mg)	1.52	1.41	1.56	1.76	1.3	1.2
B_2 (mg)	0.65	0.79	0.89	1.28	0.9	0.8
Niacin (mg)	22.1	23.9	23.5	27.8	15.0	16.1
C (mg)	71	71	83	89.0	100.6	75.5

11.1.5 Late Development Period (1977–1986)

The Late Development Period accompanied a boom in the Korean economy, in which the per capita GNP grew to over $2000, while food self-sufficiency decreased to below 50%. Table 11.9 shows that between 1977 and 1986, the per capita GNP increased from $1008 to $2296, the farm population decreased from 33.8 to 19.7% of the total population, and food self-sufficiency decreased from 64.3 to 44.5%

Table 11.9 Changes in per capita GNP, Engel's coefficient, farm population, and food self-sufficiency, 1977–1986

Year	Per capita GNP ($)	Engel's coefficient (%)		Farm population (%)	Food self-sufficiency (%)
		Farmer	City worker		
1977	1008	42.8	47.6	33.8	64.3
1978	1392	38.3	44.6	31.3	74.2
1979	1640	37.8	41.6	30.0	59.9
1980	1589	36.8	42.1	28.9	54.3
1981	1719	37.7	41.5	25.8	43.2
1982	1773	33.3	39.2	24.6	53.0
1983	1914	30.4	37.5	23.7	50.2
1984	2044	29.4	36.4	22.2	48.7
1985	2047	–	–	21.1	48.4
1986	2296	–	–	19.7	44.5

(Economic Planning Board, Republic of Korea 1985; Lee et al. 1988). Engel's coefficient for farmers decreased significantly compared to that of city workers, indicating that the living standard of farmers improved during this period.

Food self-sufficiency decreased to 44.5% by 1986, mainly due to a steep increase in demand for imported feed grains for animal husbandry. Food industries achieved brisk growth both in quantity and quality during this period, and various processed foods became available in amounts sufficient to meet demand. The per capita supply of processed foods from 1977 to 1986 increased by the following amounts: sausage 8 times, powdered milk 2 times, ice cream 1.5 times, city milk 6 times, fermented milk beverages 18 times, canned marine products 3.5 times, soybean oil 21 times, instant noodles 1.5 times, starch 3 times, coffee 8 times, cider 2 times, cola drinks 4 times, fruit juice 1.5 times, and beer 3 times. The production of high-calorie and high-protein animal foods, such as milk products, meat products, and fat products, and of non-nutritious beverages, such as coffee and soft drinks, surged. This escalation in production suggests that the tendency toward adopting Western food habits, which began in earnest during the Middle Developmental Period, accelerated and became widespread in the Late Development Period.

The per capita daily consumption of cereals decreased from 500 to 400 g during this period, whereas the consumption of soybeans increased 3 times, meat 2 times, eggs 2 times, milk 3 times, and fish 2 times. Table 11.10 compares the amounts of supplied nutrients, estimated from the national food balance sheet, to intake nutrients, measured by the national food consumption survey. As in the previous period, the supplied amounts were higher than the intake amounts. The 20–30% difference between energy supply and consumption indicates that the now-affluent society provided an excessive supply, the result of which was food waste.

The increased demand for meat products and the excessive food supply, with its tendency toward food waste, caused new problems for national health and the environment. As shown in Table 11.11, the total number of clinical treatments under the nationwide medical insurance program increased 1.8 times during the

Table 11.10 Comparison of supplied nutrients and intake nutrients during the late development period

Nutrients	Supplied nutrients		Intake nutrients	
	1980	1986	1980	1986
Total energy (kcal)	2485	2786	2052	1930
Plant origin (kcal)	2257	2446	–	–
Protein (g)	73.6	89.4	67.2	74.2
Animal origin (g)	20.1	30.4	–	–
Lipid (g)	36.6	53.9	21.8	28.1
Ca (mg)	511	466	598	593
Fe (mg)	12.6	27.2	13.5	17.0
Vitamin A (IU)	3037	3550	1688	2226
B_1 (mg)	1.92	1.29	1.13	1.24
B_2 (mg)	1.03	1.75	1.08	1.19
Niacin (mg)	23.4	19.3	19.1	27.2
C (mg)	125	112	87.9	84.3

Table 11.11 Change in the number of degenerative disease patients in hospitals covered by medical insurance

	1980	1981	1982	1983	1984	1985	1986
Total patients (thousands)	6795 (100)	7595 (111.8)	9069 (133.5)	9843 (144.8)	11,133 (163.8)	12,315 (181.2)	12,538 (184.5)
Cancer (hundreds)	25.3 (100)	27.1 (107.3)	33.1 (130.9)	35.7 (141.0)	40.7 (161.0)	54.0 (213.4)	74.6 (227.5)
Diabetes (hundreds)	14.0 (100)	15.5 (110.8)	24.6 (176.1)	33.3 (238.2)	43.6 (311.8)	56.9 (406.2)	74.6 (532.8)
Hypertension (hundreds)	65.5 (100)	71.5 (109.1)	99.1 (151.1)	107.9 (164.2)	128.1 (195.2)	153.7 (234.4)	169.9 (259.0)
Heart disease (hundreds)	16.13 (100)	19.5 (121.1)	24.4 (157.7)	31.3 (194.0)	37.5 (232.5)	48.4 (300.3)	53.9 (334.4)
Cerebral blood vessel disease (hundreds)	7.2 (100)	7.6 (106.0)	8.5 (118.0)	10.1 (141.5)	13.0 (181.9)	16.4 (228.3)	19.5 (271.7)
Liver disease (hundreds)	29.9 (100)	27.80 (92.8)	38.2 (127.5)	42.5 (141.9)	49.0 (163.8)	56.1 (187.6)	65.9 (220.3)

7 years from 1980 to 1986. The number of cases of diabetes increased 5.3 times and hypertension 2.6 times, clearly demonstrating a leap in food-related degenerative diseases (Korea Health Insurance Administration, 1987). People began to suffer from health problems caused by overeating and obesity, and the new prevalence of imbalanced nutrition became an acknowledged issue.

Reflecting the nutritional problems of Korea in the mid- to late 1980s, the fourth amendment to the recommended daily intake for Koreans prepared in 1985 called for a substantial reduction, suggesting 2500 calories of energy and 75 g of protein for an adult male per day. From the perspective of the present day, it has become clear that the health problems and economic losses caused by the trend toward Western-style food habits and an increasing desire for animal products will not be alleviated until nutritional education in Korea corrects its emphasis on the superiority of Western food culture.

11.2 Changes in Korean Food Habits: Trends and Characteristics

Korea experienced foreign occupation, war, and Western culture shock during the century that stretched from the end of the Joseon Kingdom to the 2000s. These political and societal changes altered Korean food habits. Until the end of the Joseon dynasty, a substantial portion of the food consumed by the large number of poor families in the country consisted of famine foods, such as wild plants and animals.

Figure 11.1 shows that Korean dietary habits started to deteriorate during the Japanese Occupation because of the extortion of rice and soybeans for shipment to Japan (Lee et al. 1988). The per capita supply of cereals and soybeans declined drastically during the Japanese Occupation, sinking to its twentieth-century nadir during the Korean War. Further, the amount of per capita food energy supply in the 1950s was only two-thirds of that found in standard meals of the Joseon Kingdom, as shown in Fig. 11.2. It is not surprising, then, to find symptoms of malnutrition in the nutritional surveys conducted in the 1950s. This fact is supported by the finding that the average body weight of a 15-year-old Korean boy, as surveyed between 1940 and 1960, was 6 kg (13 lb) less, or 12% less, than that measured in early 1900 (Park et al. 1987). The Proportional Mortality Indicator (PMI, the proportion of deaths of

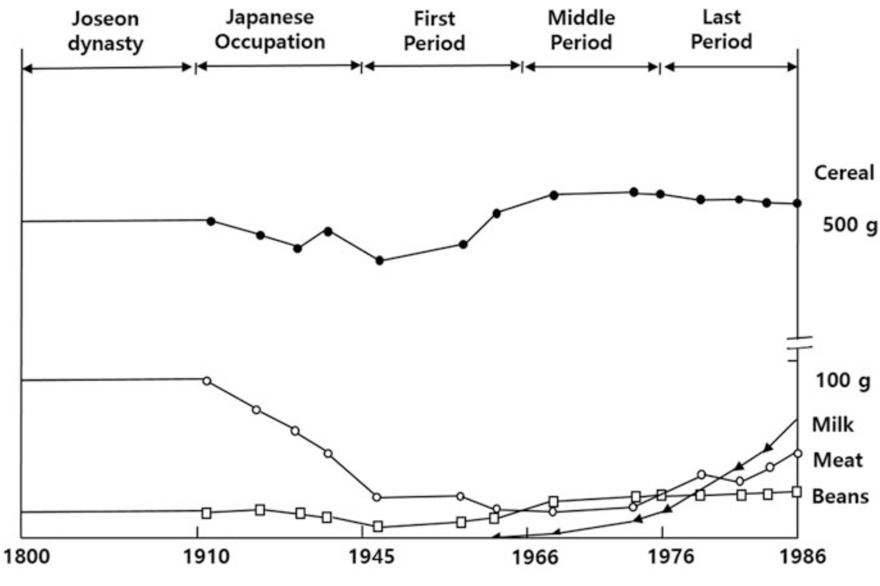


Fig. 11.1 Changes in per capita food supply in Korea during the twentieth century

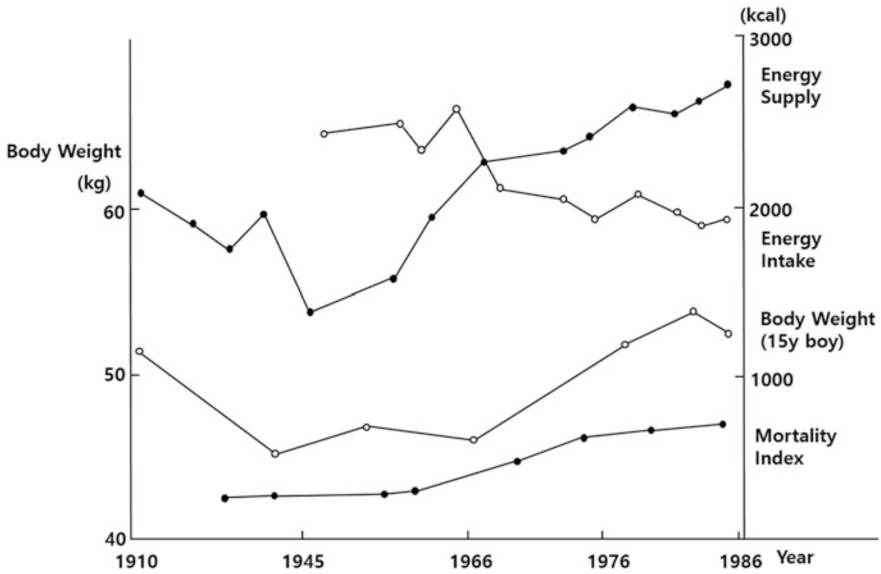


Fig. 11.2 Changes in supplied energy, intake energy, average body weight and relative mortality index in Korea during the twentieth century

persons aged 50 and over to total number of deaths) stood at the very low ratio of 30% during WWII and the Korean War, but was restored to 70% in the 1980s.

The malnutrition symptoms that appeared in the nutrition surveys conducted in the 1950s and 1960s were to be expected since people suffered from serious food shortages and extreme poverty and therefore could not maintain their traditional food patterns. However, contemporary nutritionists concluded that the poor health of the populace was caused by inadequacies in the standard Korean diet, and advocated prioritizing Western food habits and nutritional concepts. This misinterpretation of the cause of malnutrition drove the nutritional education of Korea toward the Western model and accelerated the Westernization of Korean food choices, with drastic results.

During the Korean War, as mentioned above, Koreans depended on the wheat flour and nonfat dry milk provided as food aid from the United States in order to avoid starvation. The largely non-milk-drinking population learned to consume milk products and became acquainted with Western processed foods. This historical circumstance helps explain the accelerating consumption of milk during the economic growth of the late 1970s and the Westernization of Korean food habits. As the Korean demand for more animal food products and refined sugars increased, a steep decline in national food self-sufficiency occurred in the 1980s.

This study indicates that under food shortage conditions the amount of nutrients supplied to the people, as estimated from the national food balance sheet, was less than the amount of intake, as measured by the national food consumption survey;

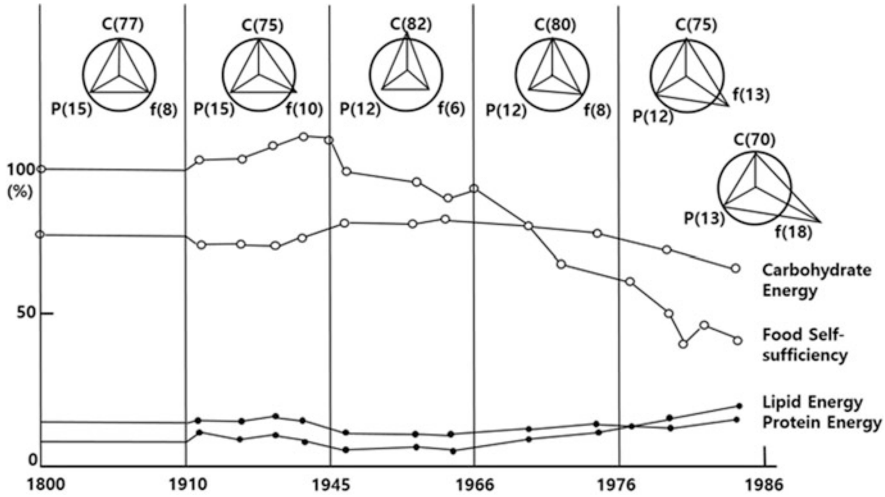


Fig. 11.3 Changes in the composition of energy supplied and food self-sufficiency

under food surplus conditions, however, the ratio is reversed. Again, late 1980s Korea is characterized as reflecting a condition of food surplus and food waste (Lee et al. 1988).

Figure 11.3 shows that the traditional standard meal of the Joseon dynasty took 77% of its energy from carbohydrates, 15% from proteins, and 8% from lipids, so that the CPL (Carbohydrate-Protein-Lipid) ratio was 77:15:8. During the twentieth century, the Korean CPL ratio dropped to 82:12:6 during World War II and the Korean War, but rose to the traditional standard meal levels by the end of the 1970s. The energy composition in the 1970s, however, did not reflect that of the standard meal because more energy was derived from lipids, the CPL ratio being 75:12:13. The tendency toward high fat consumption continued, increasing further after the 1970s. The CPL ratio in 1986 was 69:13:18. These dietary changes are considered to be tied to the wide propagation of degenerative diseases among the Korean people. From this viewpoint, it appears that the dietary guidelines built around the standard traditional meals of the Joseon dynasty resulted in better health outcomes than did those of the average Korean diet during the late twentieth century.

11.3 Changes in the Food and Nutritional Status of North Koreans

Organizations that understand the food situation in North Korea include the World Food Program (WFP), the United Nations Food and Agriculture Organization (FAO), and the Korea Rural Development Administration, but unfortunately, their data suffer from low reliability and do not correlate. In 1996, North Korea began to receive global attention due to extreme food shortages. North Korea's food demand stood at 5.34 million tons per year, but its output did not reach 3 million tons. Despite of the addition of 500,000 tons of imported grain and 660,000 tons of food aid, there was a net food shortage of 1.2 million tons, which resulted in severe starvation across the country. Starvation continued until 2003, since which time food production has increased to the level of four million tons, yet the country continues to suffer from an absolute shortage. In 2007, the food situation in North Korea took a turn for the worse when 400,000 tons of rice per year from South Korea was cut off (Lee et al. 2015). In recent years, North Korea's economic hardships have intensified due to UN sanctions against North Korea's nuclear weapons development.

11.3.1 Food Shortages and Changes in the Food Supply of North Korea

It is understood that North Korea normalized food rations until 1972 by achieving food self-sufficiency relatively quickly in the wake of the peninsula's division following the Korean War. The daily food ration of grain was 700 g for adult office workers, 900 g for laborers, and 1000 g for pregnant women. Although North Korea focused on cultivation, reclamation, and terracing to expand arable land in the 1970s and 1980s, the nation suffered disastrous crop failures and water shortages due to repeated landslides caused by the removal and damaging of forest lands (Lee 2004).

When North Korean food shortages were first noticed in the early 1970s, the food ration standard of 700 g of grain per day per adult office worker (256 kg grain per year), which had been maintained for 20 years, was reduced to 608 g per day (222 kg per year). The 13% decrease took effect in 1973 in the name of "wartime rice reserves." In 1987 the standard was again reduced, this time by 10%, in the name of "patriotic rice," which brought the total to 547 g per day (200 kg per year). In 1992, the food ration for non-military residents was again diminished by 10%, resulting in a ration of 492 g per day (179 kg per year). However, since 1994, the regime has failed to meet even this low standard and faces the collapse of their food rationing system (see Table 11.12) (Lee 2004).

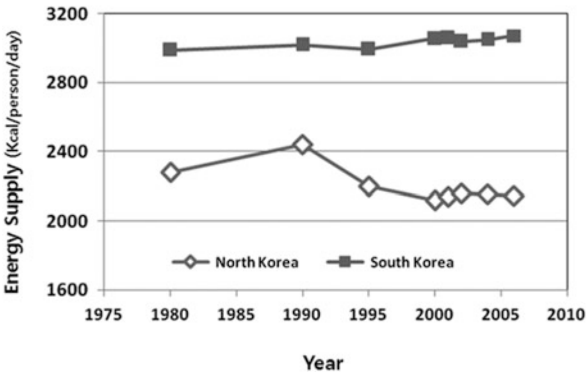
By comparing the food energy supplies of the North and South from the 1980s to today, based on FAO Statistical Yearbooks (1980–2010), it becomes clear that the North Korean food energy supply has amounted to 2200–2300 kcal per person per day, only two-thirds that of South Korea (Lee et al. 2015). Moreover, the food balance sheet of North Korea is likely to be inflated, given that other statistics released internationally by the North Korean regime are typically exaggerated; in addition, their balance sheets record energy supply only, which is likely to differ from real energy intake. According to their food balance sheets, the energy consumption per person in North Korea continued to grow until peaking in 1988, then

Table 11.12 Changes in daily food supply and intake per person in North Korea (Lee 2004)

Period		Food rations for adult office workers
1955–1972	Normal food ration: from max 900 g/day (laborers) to 1000 g/day (infants)	700 g/day, 256 kg/year
1973	Deduction of 4 days' rations from 30 days' rations under "wartime rice reserve" (average 13% decrease)	608 g/day, 222 kg/year
1987	10% deduction in the name of "patriotic rice"	547 g/day, 200 kg/year
1992	10% deduction for non-military residents	492 g/day, 179 kg/year
After 1994	No change in the standard of rations, but actual amount of rations always below the standard	–

Source: NBN News, "Sourcebook on Reality of North Korea" (1995), 241; Oh Gyeong-chan, "North Korean Food Crisis Can be Resolved" (Seoul: Daewangsa, 1997), 145

Fig. 11.4 Changes in daily food energy supply per person in North and South Korea



dropped from 1994 to 1996 to 2326 kcal, although again, these statistics are considered to have been inflated (Fig. 11.4).

According to an FAO/WFP special assessment mission report published in 1998, the food energy supply of North Korea was estimated at 1578 kcal, based on daily food rations of 406 g. Interviews and evaluations of the physiques of North Korean defectors led to estimates of the average daily energy intake of North Koreans at around 1600 kcal (Lim and Chang 2003). The protein supply in North Korea has decreased since 1990 and is estimated at 60 g per person per day today, the fat supply falling short of even 40 g (Lee et al. 2015) (Fig. 11.5).

11.3.2 Food Requirements of North Korea

In 2010, FAO estimated the total grain requirement of North Korea to be approximately 5.22 million tons for 24.3 million people, consisting of 4.05 million tons for food, 300,000 tons for feed, 170,000 tons for seed, 120,000 tons for processing, and

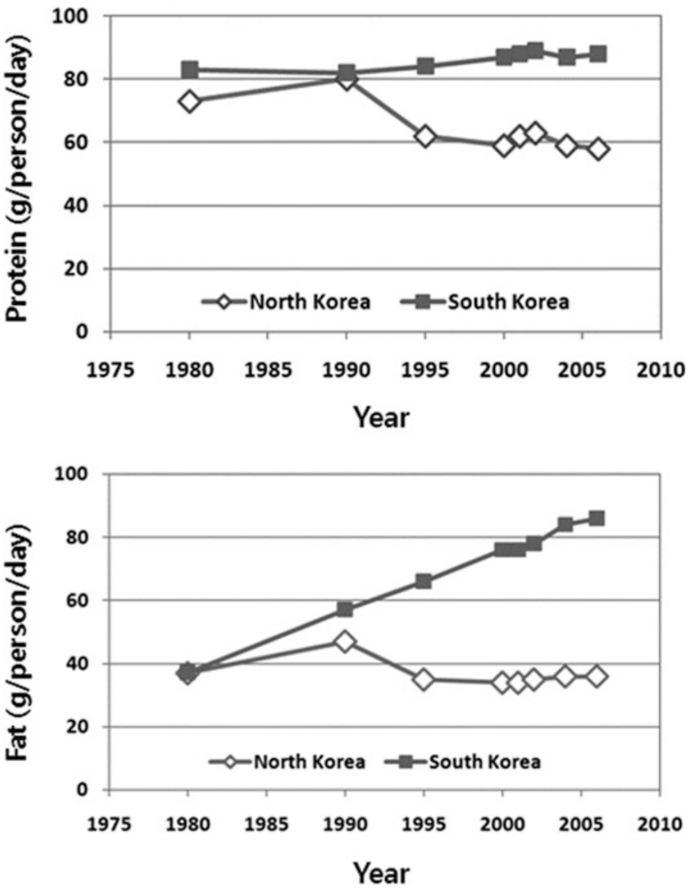


Fig. 11.5 Changes in daily protein and fat supply per person in North and South Korea

570,000 tons for other (FAO Statistical Yearbook, 2010). In 2011, a special report by WFP/FAO/UNICEF indicated a 20% shortage in food, based on the daily caloric consumption per person of 1640 kcal (the minimum calorie intake calculated by WFP—75% of 2310 kcal with added food calories other than grain); for a population of 24.42 million, the total food requirement was estimated at 5.33 million tons, with a deficiency of about 1.06 million tons against the domestic production of 4.25 million tons (Table 11.13). The food shortages by category include about 280,000 tons of rice, which is one of the top two staple grains, about one million tons of maize, and 30,000 tons of soybeans. Given the commercial importation of about 200,000 tons of grain, the absolute deficiency is estimated at 880,000 tons (Lee et al. 2015).

Based on the WFP recommended calorie consumption of 2130 kcal/person/day, the annual food consumption was estimated to be 222 kg/person/year, and the total demand was estimated at 6.16 million tons in the 1993/1994 crop year and 6.68

Table 11.13 Trends in food supply and demand in North Korea (2010/2011) (unit: 1000 tons)

	Total	Rice	Maize	Barley	Other grains	Potato	Soybean
Total supply	4252	1577	1683	180	19	414	154
– Production	4252	1577	1683	180	19	414	154
Total consumption	5338	1858	2680	180	19	414	186
– Food	4250	1466	2253	141	15	230	147
– Feed	150	0	75	0	0	55	20
– Seed	219	56	23	21	3	113	5
– Loss	541	237	252	18	2	113	15
Stock	177	100	77	0	0	0	0
Surplus or deficiency	−1086	−281	−997	0	0	0	−32
– Imports	200	66	110	12	–	–	12
Absolute deficiency	886						
– Expected aid	44						

Source: "Rapid Food Security Assessment Mission to the DPRK" (2011.3.24), WFP/FAO/UNICEF

Notes: Estimate grounds

(1) Post-harvest loss: Maize 15%, Grain 10%, Potato 4%

(2) Population estimate in 2010: 24.42 million (24.05 million in 2008, increase rate 0.6%)

(3) Food consumption per capita: 174 kg (grain 168 kg, beans 6 kg); consumption refers to 1640 kcal daily calorie intake per person; other meat, fish, vegetable, and fruit consumption needs to be added

(4) Seed consumption 220,000 tons: rice 85,000 tons (570,000 ha × 150 kg/ha), maize 22,000 tons (500,000 ha × 45 kg/ha)

(5) Feed requirement: 150,000 tons (180,000 tons in 2008)

(6) Milling rate: 65%

million tons in the 2005/2006 crop year. The North Korean food production estimates released by the Rural Development Administration, Republic of Korea, recorded a shortage of about 2.44 million tons of grain annually, equaling about 60% of the annual grain production of 3.963 million tons in North Korea. Due to this deficiency, North Korea has been heavily dependent on food imports and foreign aid each year. This shows that North Korea has suffered from an absolute shortage of 1.27 million tons of food (grains) annually.

In South Korea, by contrast, total grain supply in 2017 was 23.14 million tons, to which domestic production contributed 4.68 million tons and imports 15.2nine million tons, with a low self-sufficiency rate of 23.4% (Lee et al. 2019) (Table 11.14). The majority of domestic grain production is rice, and the self-sufficiency rate of rice is 94.5%. However, grains for livestock feed (wheat and corn) needed for the production of meat, eggs, and milk depend almost entirely on imports, so grain self-sufficiency is low. The self-sufficiency rate of food grains, excluding feed, is 48.9%. Compared to the level of food supply in South Korea, the food situation in North Korea has long been dire.

Table 11.14 2017 Grain supply and demand in South Korea (unit: 1000 tons)

	Total	Rice	Barley	Wheat	Corn	Soybeans	Tubers	Other
(Supply)	23,148	6326	344	4618	9841	1457	208	354
Carried over	3166	1747	41	547	726	88	–	17
Production	4687	4197	75	37	74	75	198	31
Imports	15,294	382	228	4034	9041	1294	10	305
– Food	5341	382	216	2155	2070	279	10	229
– Feed	9879	–	12	1879	6937	1014	–	37
– Other	74	–	–	–	35	–	–	39
(Demand)	20,009	4439	301	4136	9205	1388	208	332
Food	4684	3199	67	1117	70	98	124	9
Processing	4742	708	218	1029	2272	237	31	247
– Food	2171	492	–	1029	101	237	31	247
– Spirits	434	216	218	–	–	–	–	–
– Other	2171	–	–	–	2171	–	–	–
Feed	10,425	378	12	1955	6978	1045	20	37
Overseas aid	1	1	–	–	–	–	–	–
Seeds	56	33	3	1	–	2	13	4
Exports	3	3	–	–	–	–	–	–
Depletion	96	117	–	34	Δ114	5	20	34
Stock	3139	1888	43	482	635	69	–	22
Annual consumption per capita (kg)	113.2	61.8	1.3	32.4	3.3	6.5	3.0	4.9
Self-sufficiency rate (%)	23.4	94.5	24.9	0.9	0.8	5.4	95.2	9.3
Food use (except feed)	9581	4058	289	2181	2227	343	188	295
Food self-sufficiency (%)	48.9	103.4	26.0	1.7	3.3	22.0	105.3	10.5

Source: Ministry of Agriculture, Food and Rural Affairs, Republic of Korea, Statistics 2019

11.3.3 The Nutritional Status of North Koreans

According to a report on the nutritional status of North Koreans, based on a survey of food consumption by household (North Korean Agriculture Trends, KREI 2004), the severely vulnerable have been identified as 70,000 malnourished children, 980,000 pregnant or breast-feeding women, and 2.3 million children under 5 years old, totaling 3.35 million. A total of 7,668,400 people is included in the vulnerable group, which consists of 3400 orphans, 4.3 million school-age children, 2.6 million seniors, 665,000 physically or mentally disabled, and 100,000 tuberculosis patients (see Table 11.15). The assessment by FAO and WFP of the North Korean food situation in 2003 showed that 70% of households depending on public food rations were undernourished and failed to consume the calories necessary for normal activity (Lee et al. 2015).

Table 11.15 Survey of the nutritional condition of North Koreans

	(unit: persons)	
Severely vulnerable group		
Malnourished children	70,000	
Pregnant or breast-feeding women	980,000	
Children under 5 years	2300,000	**Total 3,350,000**
Vulnerable group		
Orphans	3400	
School-age children	4,300,000	
Seniors	2,600,000	
Disabled persons	665,000	
Tuberculosis patients	100,000	**Total 7,668,400**

Source: North Korean Agriculture Trends, KREI, 2004

The joint survey on the nutritional status of North Korean children by WFP, UNICEF and the EU in September and October of 1998 showed similar results. Two-thirds of North Korean children between 6 months to 7 years of age were in a state of chronic malnutrition, and 16% of them were reported to be dangerously malnourished. In addition, 1 in 3 orphans of 1–2 years old were in a state of severe malnutrition (Lee et al. 2015).

UNICEF, WFP, and the North Korean regime jointly conducted a survey on the nutritional condition on children under 7 years old and their mothers from 6000 randomly selected households in 10 out of 12 cities across North Korea in October 2002. The survey found that the nutritional condition of children had improved considerably over the preceding 4 years (FAO/WFP 2004) (Table 11.16).

Table 11.16 shows that malnutrition decreased significantly by 2002. Among the 6000 subject children, those noticeably underweight compared to children of the same age group accounted for 21%; children wasting, or those noticeably underweight for their height, made up 9%; and children stunting, or those of noticeably short height compared to children of the same age group, comprised 42% of the total. The UNICEF, WFP, and EU survey on the nutritional status of 3984 North Korean children under 7 in 1998 records the ratio of each category as 61%, 16%, and 62%. The proportion of overall severely malnourished children was 2.7% in the 2002 survey, showing a great improvement from 16% in 1998. However, the proportion of stunted or underweight children for their age still amounted to more than 20%. In this regard, experts argue that the nutritional status of North Korean children remains in a fearful state.

Although the nutritional status of children has improved, the condition of mothers remains dire. Almost one-third of North Korean mothers were identified as suffering from malnutrition and anemia. Moreover, the survey found a huge gap in child nutrition status by region. The proportion of underweight children was 15% in Nampo and Pyongyang, but 25% in North and South Hamgyong Provinces and Ryanggang Province. The proportion of children stunting was less than 30% in 2 of the 10 target cities, Nampo and Pyongyang, but 48% in South Hamgyong Province,

Table 11.16 Nutritional condition of North Korean children

	1998 (3984 persons) (%)	2002 (6000 houses) (%)
Underweight	61	21
Wasted	16	9
Stunted	62	42

Source: UNICEF, WFP, North Korea Joint Research Report, 2002

and more than 40% in other regions. The proportion of children wasting was only 4% in Nampo and Pyongyang, but 12% in South Hamgyong Province. Broadly speaking, children in mountainous areas were reported to be in much worse condition than children in urban areas (UNICEF, WFP, North Korea Joint Research Report 2002).

11.3.4 The Physical and Health Conditions of North Koreans

Height can be used as a marker to reflect health and nutritional conditions during a growth period. As quality of life improves, the average height of the populace increases. The cases of North and South Korea provide a particularly good example of this phenomenon. Research on the physiques of Koreans in the 1930s indicates that the average height of residents in northern provinces (North Hamgyong, South Hamgyong, North Pyongan) was 166 cm, significantly taller than that of southern provinces (Jeolla, Gyeongsang, Chungcheong), which was measured at 162.5 cm (Keijo Imperial University 1938). However, in 2005, the average height of North Koreans (men, 165.6 cm; women, 154.9 cm) was much shorter than that of South Koreans (men, 172.5 cm; women, 159.1 cm). Since 1930, the average height of North Koreans has changed very little (Table 11.17) (Korea Center for Disease Control and Prevention 2005).

The occurrence rate of tuberculosis in North Korea was 344 per 100,000 persons in 1997, and remains the same today. This figure is 3.8 times higher than that of South Korea (90 per 100,000 persons). The death rate from tuberculosis in North Korea decreased to 25 per 100,000 in 2009 from 115 in 1998, but it is still twice the level of that of South Korea (Lee et al. 2015) (Fig. 11.6).

Based on the data, it is clear that the gap in food and nutritional conditions between the two Koreas mirrors the gap in economic power. Since the 1970s, South Korea has achieved remarkable economic development, with a GDP per capita of 20,000 dollars in 2010, whereas the GDP of North Korea has remained at the level of the 1980s—1000 dollars—until very recently.

Table 11.17 Changes in the average height of North and South Koreans (unit: cm)

Category	1930	2005	
Area/ gender	Northern Provinces (North Hamgyong, South Hamgyong, North Pyongan) 166	South Korea	North Korea
	Middle Provinces (South Pyonggan, Gyeonggi, Hwanghae, Gangwon) 163.37	Male 172.5	Male 165.6
	Southern Provinces (Jeolla, Gyeongsang, Chungcheong) 162.51	Female 159.1	Female 154.9

Sources: Keijo Imperial University, "Biometry of Koreans, 1528 persons" (1938); Korea Centers for Disease Control and Prevention, North Korean Defector Survey 2005; Ministry of Health and Welfare, National Nutrition Survey Report 2005

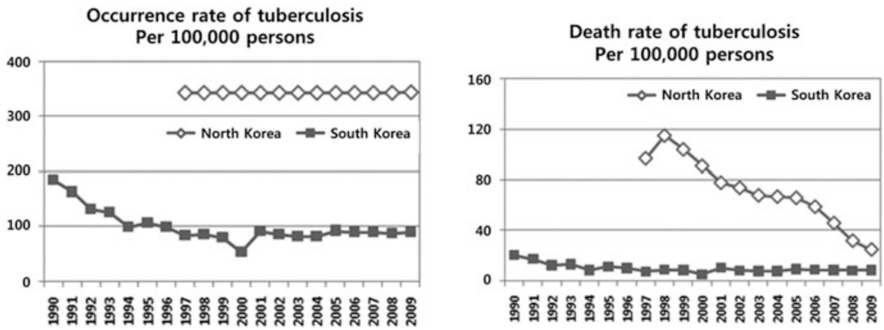


Fig. 11.6 Occurrence and death rate of tuberculosis in North and South Korea

11.4 Optimal Food and Nutrition Models for Koreans

The Korean people lived united for thousands of years, but in the 75 years since liberation from Japanese rule, they have inhabited two vastly different environments in the North and South. To recap, South Korea developed into an advanced nation, with more than $30,000 per capita income by 2018, spurred by rapid economic growth that began in the 1970s; in contrast, North Korea has suffered severe economic difficulties since the 1980s that have impelled the country to rely on international emergency relief foods and rationing, and still the amount of their food intake continues to fall short of basal metabolic requirements. This extreme difference in the food situations between the two Koreas, while unwanted, has led to important research from the perspective of nutritional anthropology.

As mentioned above, the daily food intake of South Koreans averages 1.3 kg, and 20% of that amount, or 270 g, consists of animal products: meat, milk, fish, and eggs. Food energy intake comprises 2000 kcal, and fat intake is increased by animal food consumption. Food energy intake is composed of 65% carbohydrates, 15% protein, and 20% fat. An increase in the obese population due to overeating and over-nutrition, particularly child obesity, has emerged as a social issue, and metabolic

Table 11.18 Nutritional anthropological assessment of 65 years of Korean division

	South Korea	North Korea
Population 2012	50.0 million	24.4 million
Population 1945	16 million	9 million
Population growth rate 1945–2012	312%	271%
Population density (person/km^2)	497.1	197.4
Farm population (1000 persons)	2962 (2011)	8573 (2008)
Farm/total population (%)	6.0% (2011)	36.8 (2008)
Daily food intake (g/person)	1300	500 (+)
Daily energy intake (kcal/person)	2000	1600
Energy composition (carbohydrates: protein: lipids)	65:15:20	80:12:8
Self-sufficiency in grains (%)	26	63
Average height (cm, male/female)	173/159	166/155
Obesity ratio (%)	33 (adult)	–
Malnutrition (%)	–	42 (children)
Tuberculosis/death ratio (1000 persons)	90/8	344/25
GDP (US$/person)	20,000	1000
Political system	Open democracy	Closed communism

syndromes and degenerative diseases, including cancer, diabetes, hypertension, and heart disease, have become widespread. With almost unlimited importation of shortage foods, self-sufficiency in total food energy has fallen below 40%, with self-sufficiency in grain a mere 23% in 2018. Society has stumbled into a structure of wanton waste, in which 30% of food is thrown away.

On the other hand, North Koreans are dependent on 500 g of daily food rations (primarily maize) and consume almost no animal products. Per capita daily calorie intake is estimated at 1600 kcal per day, and the people are assessed to be chronically undernourished. Under such circumstances, diseases linked to lack of nutrition, such as tuberculosis, are prevalent, and the physique of North Koreans is much smaller than that of South Koreans, with an obvious trend towards stunting (see Table 11.18) (Lee et al. 2015).

To simultaneously solve the problems of surplus and deficiency in North and South Korea, a food and nutrition optimization model must be implemented on the peninsula. The data suggested in this study indicate a rapid increase in South Korea's foreign dependency on food since 1980, which has resulted in grain self-sufficiency plunging from 73% in 1980 to 43% in 1990 to 23% in 2018. The annual per capita rice consumption decreased from 132 kg in 1980 to 120 kg in 1990, 94 kg in 2000, 74 kg in 2010, and 61 kg in 2019 (Lee et al. 2021). The daily per capita intake of animal products doubled over 5 years in the South, from 98 g in 1980 to 183 g in 1985. During this period, the number of patients with metabolic syndromes such as cancer, diabetes, hypertension, and heart disease rose alarmingly. The South Korean issue of overeating is a social ill that must be addressed. Korean unification could provide an opportunity to solve the twin problems of nutritional deficiency in the North and food surplus in the South.

The nutrient intake of South Koreans shown in the 1981 National Food Consumption Survey Report was 2040 kcal of energy, including 69.9 g of protein, 20.3 g of fat, and 394.2 g of carbohydrates. The calorie composition of protein, fat, and carbohydrates stood at 13.7%, 8.9%, and 77.3%, respectively, similar to that of the traditional Korean standard meal. In 1986, energy intake stood at 1983 kcal and was composed of 15.4% protein, 13.2% fat, and 71.4% carbohydrates. It has been assessed that from 1981–1986 the consumption of fat energy increased significantly, from 8.9% to 13.2%.

The nutritional status of the people of South Korea improved remarkably by 1981, compared to the 1970s. In 1981, the nutrient intake of South Koreans reached the recommended levels except for calcium. Therefore, it is deemed desirable to set the optimum food intake of Koreans to the level recorded in 1981. To reach to this optimum level, South Koreans would be required to double their rice consumption, reduce by half their consumption of animal products, and reduce their per capita daily food intake to 1 kg.

References

Chae, Beom-Seok, and Shin Yeong-Mu. 1972. Urinara sikpumsobi byeonhwae gwanhan gochal, 1960-1970 nyeoneul jungsimeuro [Changes in the food consumption patterns of Koreans between 1960 and 1970]. *Hanguk yeongyanghakhoeji* [Journal of Nutrition and Health] 5 (4): 161.

Chae, Ye-Seok. 1948. Gyeongseongeul jungsimeuro han sikpum mit yeongyangseopchwi siltaejosa bogo [Report on the food and nutrient intake of Koreans in Seoul]. *Gungniphwahak yeonguso bogo* [Korean National Institute of Chemistry Report] 1: 65.

Economic Planning Board, Republic of Korea. 1982, 1985. Annual report of industrial production. Seoul.

FAO Korea Association. 1962. *Hangugin yeongyanggwonjangnyang* [Recommended daily allowances for Koreans]. Seoul.

FAO/WFP (World Food Programme). 2004. Special report: FAO/WFP crop and food supply assessment mission to the Democratic People's Republic of Korea, 1996-2003.

Food and Agricultural Organization (FAO). 1980–2010. Statistical yearbook.

Ju, Jin-Sun. 1968. Hangugin ui yeongyanghyeonhwang [Nutritional status of Koreans]. *Hanguk yeongyanghakhoeji* [Journal of Nutrition and Health] 1 (1): 1.

Seonmansileopjosahoe [Joseon Food Industry]. 1922. *Joseon singnyopum baldalji* [The development of Joseon food products]. Seoul.

Kim, Hozik. 1944. *Joseon singmul gaeron* [A Review of Korean Food]. Seoul: Saenghwal gwahaksa.

Kim, Hui-Seon, and Kim Suk-Hui. 1987. Joseonhugi gigeun manseonghwahwa guhwangsikpum gaebal ui sahoe- gyeongjejeok gochal [Socioeconomic considerations on the famine and famine food development in late Joseon]. *Hanguk singmunhwahakhoeji* [Korean Journal of Dietary Culture] 2 (1): 81–92.

Korea Centers for Disease Control and Prevention. 2005. Survey of North Korean defectors. Cheongju.

Korea Health Insurance Administration. 1987. [Statistical yearbook]. Seoul.

Korea Rural Economic Institute (KREI). 1986. National food balance sheet. Seoul.

Korea Rural Economic Institute [KREI]. 2004. *Bukhan nongeopdonghyang* North Korean agriculture trends. Seoul.

Lee, Cherl-Ho, Moon Heon-Pal, Kim Yong-Taek, Kim Se-Kwon, Park Tae-Kyun, and Kwon Ik-Bu. 2015. *Hanbando tongilgwa singnyanganbo* [Korean Unification and Food Security]. Seoul: Sikanyeon Publishing.

Lee, Cherl-Ho, Choi Ji-Hyeon, Park Seong-Jin, Lee Nam-Taek, Song Seong-Wan, and Park Tae-Kyun. 2021. *Gukgabisangsi signyanganbo gyehoek* [Food Security Plan for National Crisis]. Seoul: Sikanyeon Publishing.

Lee, Cherl-Ho, Wi Nam-Ryang, Choi Ji-Hyeon, Lim Jeong-Byeon, and Ahn Byeong-Il. 2019. *Yosep ui jihye, Hanbando singnyangbichukgyehoek* [The Wisdom of Joseph: Food Stockpile Program on the Korean Peninsula]. Seoul: Sikanyeon Publishing.

Lee, Cherl-Ho, and Ryu Si-Saeng. 1988. Hanguk jeontongsikdan ui yeongyangga bunseok [Nutritional evaluation of the Korean traditional diet]. *Hanguk singmunhwahakhoeji* [Korean Journal of Dietary Culture] 3 (3): 275–280.

Lee, Cherl-Ho, Joo Yong-Jae, Ahn Ki-Ok, and Ryu Si-Saeng. 1988. Jinan ilsegi dongan ui Hangugin sikseupgwan ui byeonhwawa bogeonyeongyangsangtae ui chui bunseok [Changes in the dietary patterns and health and nutritional status of Koreans during the last century]. *Hanguk singmunhwahakhoeji* [Korean Journal of Dietary Culture] 3 (4): 397–406.

Lee, Ki-Yull, Song Chung-Suck, Yang Jae-Mo, Kim Myung-Ho, Soh Chin-Thack, and James Claude Thomson. 1962. Dietary survey of Korean famers. *Journal of Home Economics* 54 (3): 205–211.

Lee, Ki-Yull, and Lee Yang-Ja. 1977. Hangugin ui gyunhyeongsik gwonjange gwanhan yeongu [Studies on the recommended balanced meal for Koreans]. *Hanguk singmunhwahakhoeji* [Korean Journal of Dietary Culture] 10 (2): 59.

Lee, Seok. 2004. 1980 nyeondae Bukhan ui singnyangsaengsan, baegeup, muyeok mit sobi: singnyangwigi ui giwon [Food production, rationing, trade, and consumption in North Korea in the 1980s: origins of a food crisis]. *Hyeondae Bukhan yeongu* [Review of North Korean studies] 7 (1).

Lee, Sung-Woo. 1981. *Hanguk sikgyeongdaejeon* [The Great Bibliography of Korean Food Classics]. Seoul: Hyangmunsa.

Lim, Gill-Chin, and Chang Nam-Soo. 2003. *Food Problems in North Korea: Current Situation and Possible Solutions*. Seoul: ORUEM Publishing House.

Pang, Sin-Young. 1957. *Urinara eumsik mandeuneun beop* [How to Cook Korean Food]. Seoul: Changchon toso.

Park, Sun-Yeong, Park Yang-Won, and Koo Su-So. 1987. Hangugin ui chegyeok byeonhwae gwanhan yeongu [Studies on the changes in Korean physiques]. *Kyung Hee University Thesis Collection* 11 (1): 303.

Yoo, Jeong-Yeol, and Chae Ye-Seok. 1962. Gugmin yeongyangjosa (je 2 bo) [Report of food consumption survey (report 2)]. *Gungniphwahak yeonguso* [National Institute of Chemistry] 10: 82.

Chapter 12
Harmony of Eastern and Western Food Culture in the Twenty-First Century

Abstract Korean food culture which has developed for 1000 of years in Northeast Asia may provide solutions for alleviating the world food problems in the twenty-first century. Korean people have developed Jjigae culture and fermentation technology to expand the use of plant food materials and explored health functional foods for everyday meals under the thought of "food is medicine." They are educated to practice eating foods aligned and suitable for their body constitution directed by the Sasang constitutional typology. In this chapter, the origin of constitutional diet and the recent research in Sasang typology were introduced. The relationship between Sasang typology and nutrigenomics was elaborated and the possibility of collaboration of these two systems was suggested in order to elevate the functional food R&D capability. This would greatly reduce experimental error in functional food research and reduce the cost of building and validating scientific substantiation in other ways. Sasang medicine is a useful tool for the development of customized foods for healthy 100-year longevity and will be a powerful and exciting practical approach allowing Korean food-based longevity concepts to contribute to the other regions of the world.

People's perception of food changes with the times. Looking back on human history, food has nearly always been scarce, and much of human activity has been focused on obtaining it. For most people, food was often acquired strictly for survival at least until the nineteenth century, only achieving the status of a substance that could satisfy and bestow happiness once persistent hunger was assuaged. In contrast, industrialization and the green revolution of the twentieth century heralded an era of mass production and mass consumption of food. In economically wealthy countries, overweight and obesity are recognized as national diseases due to excessive food consumption, whereas in poorer countries, most people still struggle with hunger. General trends show the polarization of food accessibility intensifying. In low-income countries in Asia, Africa, and South America, more than 900 million people are undernourished, while the world's overweight and obese population, mainly in the United States and Europe, has reached 1.9 billion and 670 million, respectively (Lee 2019). Metabolic disease syndromes such as diabetes, high blood

C.-H. Lee, *Korean Food and Foodways*,
https://doi.org/10.1007/978-981-19-0023-5_12

pressure, and cardiovascular disease caused by excessive food intake are ushering in an era in which human health and quality of life are threatened all around the globe.

The food culture developed by the Korean people over 1000 of years has recently been highlighted in the international community as a viable option for resolving the food problems of the twenty-first century. Through the discovery of fermentation and the making of *jjigae* (stew) to maximize the use of plant materials for their food supply, ancestral Koreans were able to secure nutrients when meat and seasonal produce were lacking. These foodways continued to improve and become more varied over the centuries. By virtue of the broadly accepted Eastern medicinal philosophy that "food is medicine," the preparation of functional health food has long been common practice in Korea (Lee 2018). With the development of Sasang Constitutional Medicine (SCM) in particular, the tradition of matching specific foods to one's physical constitution has begun to come to fruition.

12.1 Origin of the Constitutional Diet

Attempts to systematically categorize and define individual differences in body constitution and to apply the differences to the diagnosis and curing of diseases originated on the Korean Peninsula in the late nineteenth century. In the 31st year of King Gojong (1894), a medical practitioner in Hamgyong Province, Lee Je-Ma, developed a unique theory called *Sasang* Constitutional Medicine (SCM). He classified human beings into four physical types: *Taeyang*, *Soyang*, *Taeeum*, and *Soeum*, according to individual constitution, and applied different treatments and diet therapies to each group. SCM has been accepted socially as a common-sense approach to health, and it continues to influence individual food choices for many Koreans. According to a survey conducted several years ago at Korea University, 90% of respondents (839 males and females, 20–60 years old) were familiar with Sasang typology, and 88.4% believed that they should eat foods suitable to their individual body type for the prevention and treatment of disease. About 45.5% of the respondents said they were familiar with their constitution, whether by way of personal judgment, the evaluation of doctors practicing Traditional Korean Medicine (23%), or an SCM questionnaire (12%) (Lee 2007).

In Western countries, the humors (sanguine, phlegmatic, melancholy, and choleric) of Hippocrates (460–377 BCE) and the four humors (black bile, yellow bile, blood, and phlegm) of Galen (131–201 CE) had long been used as important diagnostic criteria for medical treatment, but in modern medicine such concepts became obsolete (Magner 1992). In Asia, the Five Phases theory of physiological classification and its 25 subtypes based on Traditional Chinese Medicine are rarely applied in diagnosis or dietary therapy. Ayurvedic medicine in India divides physical constitutions into three types (*vata*, *pitta*, and *kapha*), which differs from SCM in that one's constitution may change according to environment and circumstance.

Korea's Sasang Constitutional Medicine is an original cure-based theory that provides specific guidelines for food choices in the service of the prevention and treatment of disease. It is a uniquely Korean, health-targeted medical theory that cannot be found in Chinese medicine or other traditional medicinal practices. This theory has been deployed in the development of various diets in modern times, and more detailed classification systems have been proposed within its framework.

12.2 Recent Research in Sasang Constitutional Typology

As mentioned in Chap. 10, Sasang Constitutional Medicine is a representative theory that characterizes Korean medicine and has since been studied and applied by many people. The most difficult aspect of Sasang typology is that, it is not easy to determine the classification of an individual's constitution accurately and reproducibly. Lee Je-Ma mainly relied on feeling the pulse (pulse diagnosis), but this technique was not properly transmitted to ensuing generations. Figure 12.1 diagrams the classification of constitutions according to physique, personality, and inclination. The Taeyang person is muscular, progressive, and creative. The Taeeum person, on the other hand, is large, feminine, quiet, and conservative. The Soyang person is small, active and outgoing, while the Soeum person is small, quiet and introverted.

Diagnosis for Sasang constitution types includes the use of a diagnostic device and a questionnaire. The device detects and analyzes pulse waves, morphological features of a face, fingerprints, and video and audio signals, but none of these methods has produced reliably satisfactory results.

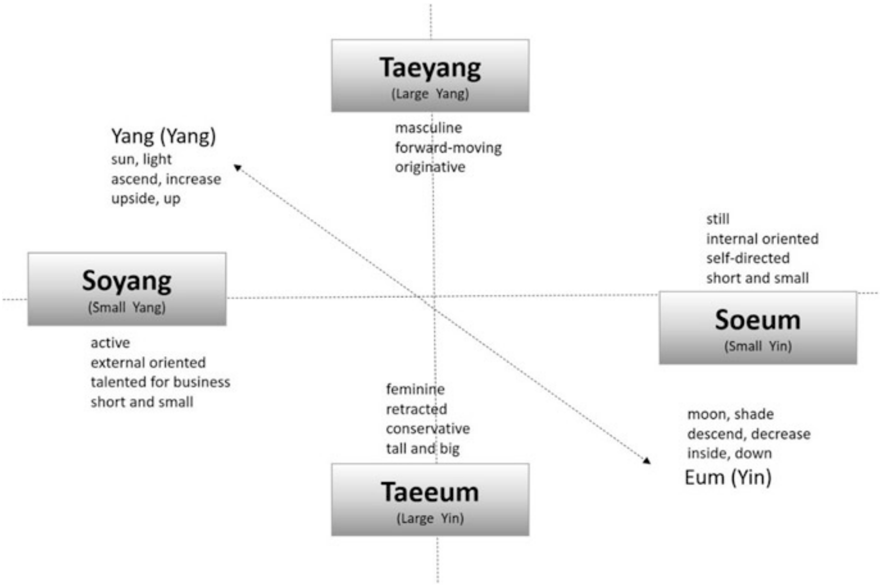


Fig. 12.1 Schematic diagram of Sasang types from a biopsychologic perspective (Chae et al. 2003)

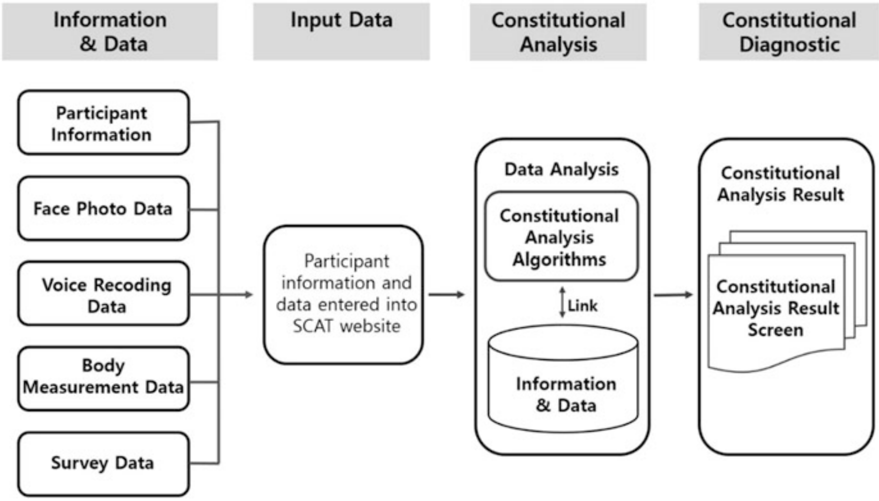


Fig. 12.2 Internet web-based SCAT developed by Korea Institute of Oriental Medicine

A questionnaire method containing 105 questions (QSCC) was developed by Kyung Hee University, College of Traditional Korean Medicine in 1993, followed in 1995 by QSCC (II), which consisted of 121 questions, and QSCC (II)+, consisting of 54 questions, in 2001. However, the number of questions was still too high, and reproducibility/reliability still not satisfactory (Chae et al. 2003). In 2006, a method containing 50 questions (TS-QSCD) was developed by dividing yin and yang constitutions first, and then classifying the four constitutions.

Recently, the Korea Institute of Oriental Medicine (KIOM) developed a 15-item short-term Sasang Constitution Diagnosis Questionnaire (KS-15) based on body type, personality, and micro-symptoms (Baek et al. 2015) and has increased effective utilization by creating a web-based constitution diagnosis system (Park et al. 2017). However, the test confidence of these questionnaires does not exceed 70%. The Institute of Oriental Medicine has recently developed and executed an integrated constitution diagnosis system (SCAT) to conduct objective and comprehensive constitution diagnosis by inputting facial photos, voice recordings, body shape information, and questionnaires on the web (Fig. 12.2) (So et al. 2016).

Confidence in Sasang constitution diagnosis devices and analytical methods is mainly based on the judgment of Sasang constitution experts, but agreement and validity of diagnosis among experts confirming the types reach only 60% (Baek et al. 2014). Therefore, there is an urgent need for the development of biochemical markers that can objectively discriminate between the four constitutions to overcome differences in the observational judgments of constitution experts.

Recently, attempts have been made to use marker genes to classify constitutions. Korean medical students who received the same constitution diagnosis through KIOM's clinic and questionnaire (QSCC II) had their blood tested for association with genes involved in antioxidant activity, immune response, ATP synthesis, and protein degradation. Genes p450 2D6, 2C9, IA2, and SOD2 were reported to be associated with Sasang constitution (Park 2006). In particular, it was confirmed that the single-nucleotide polymorphism (SNP) distribution pattern varies depending on the constitution. Of course, these findings are just the beginning, and more research is needed to classify people into the four constitutions using genetic analysis (Lee 2007).

12.3 Sasang Constitutional Diet

Despite the inaccuracies and low reproducibility of constitution classification, many studies on food classification by Sasang constitution have been conducted, and many people are eating foods suited to their constitution. Table 12.1 presents a list of foods suggested for each constitution by a research team at Kyung Hee University, College

Table 12.1 An example of Sasang foods per constitution (Kim et al. 1995)

	Taeyang	*Soyang*	*Taeeum*	*Soeum*
Cereals	Buckwheat	Barley, red beans, mung beans, barn-yard millet, sesame	Soybeans, Job's tears, sugar, wheat, wheat flour, great millet, perilla, sweet potato, common millet, peanut	Glutinous rice, hulled millet, glu-tinous millet, potato
Fruit	Kiwifruit, grapes, per-simmon, cherries, Chi-nese quince	Watermelon, Korean melon, strawberries, banana, pineapple	Chestnuts, pear, wal-nuts, gingko nuts, pine nuts, apricot, plum	Apple, mandarin, orange, peach, jujube
Vegetables	Watershield, pine needles	Cucumber, Chinese cabbage, pumpkin, lettuce, eggplant, sow thistle, edible burdock, bamboo shoot, Asian plantain	Radish, bellflower root, Indian lotus, taro, hemp, bracken, lanceolate root, shii-take mushroom, ear mushroom, matsutake mushroom, *Umbilicariaesculenta* (rock tripe)	Water dropwort, Welsh onion, gar-lic, black pepper, ginger, spinach, carrot, red pepper, crown daisy, onion, mustard
Seafood	Oysters, aba-lone, conch, shrimp, crucian carp, crab, sea slug, mussels	Flatfish, puffer, turtle, crawfish, carp, snapping tur-tle, snakehead fish	Freshwater snail, cod-fish, yellow corvina, small octopus, brown croaker, herring, squid, brown sea-weed, laver, kelp	Alaska Pollack, loach, eel, snake, catfish
Meat products		Pork, eggs, duck	Beef, milk	Chicken, lamb, dog meat, pheas-ant, goat, sparrow meat

of Traditional Korean Medicine (Kim et al. 1995). The reliability of this classification is not scientifically confirmed, but it represents a characteristic food regimen derived from the tradition of Sasang medicine.

Further data has led to increased variety in constitutional foods. Dr. Lee Myung-Bok, an honorary professor at Seoul National University School of Medicine, developed an O-Ring test to classify an individual's body constitution and then created a list of foods suitable or unsuitable to each constitution, as shown in Table 12.2 (Lee 1989). According to Table 12.2, while foods such as rice and corn are suitable for everyone, glutinous rice is suitable for yin but not yang constitutions, for example, and cabbage is suitable for yang constitutions.

Heo (2005) divides the constitution into yin and yang and proposes a diet following his unique theory of the yin and yang classification, in which yang people eat yin foods and yin people eat yang foods. The constitution of individuals is discerned by the O-Ring test and a questionnaire about one's psychological, physiological, and morphological characteristics. An example of foods suitable for people of the two constitutions follows (Heo 2000).

Food suitable for yang constitutions: green beans, wheat, barley, legumes, cabbage, lettuce, sweet potato, eggplant, spinach, pumpkin, burdock, perilla leaves, cucumber, duck, seaweed, banana, persimmon, jujube, pear, tangerine, grape, strawberry, melon, tuna, pork, dog meat, seafood, salted fish, soybean oil, perilla oil, rapeseed oil, green tea, black tea, beer, wine, etc.

Food suitable for yin constitutions: rice, glutinous rice, sorghum, millet, corn, radish, potatoes, carrots, onions, leeks, tomatoes, pineapples, peaches, watermelons, apples, plums, chestnuts, pine nuts, walnuts, sesame oil, corn oil, garlic, pepper, ginger, curry, beef, milk, chicken, duck, lamb, eggs, freshwater fish, Ganoderma lucidum (reishi mushroom), ginseng, deer antler, corn tea, ginger tea, rice wine, and makgeolli (Korean turbid rice wine).

Heo Bongsu's food classification is similar to that of Kyung Hee College of Korean Medicine (see Table 12.1). He opened a comprehensive medical center and hired doctors to diagnose patients' diseases and cure them with diet. He also inaugurated a restaurant that provides food tailored to each constitution.

There is a tendency among providers to further subdivide the four constitutions in an effort to improve the low accuracy and reproducibility rates of the classification system. For this reason, few people in the scientific community, including food scientists in Korea, conduct research on diets based on Sasang typology. In the 1980s, however, Kwon Dowon, a Traditional Korean Medicine physician in Seoul, created an eight-constitution framework for his medical practice (*Mogyang*, *Mogeum*, *Toyang*, *Toeum*, *Geumyang*, *Geumeum*, *Suyang* and *Sueum*). In addition, Baek (2000) further divided the fourfold Sasang typology constitutions into 28 types, and recommended diets suitable for each constitution.

Table 12.2 Suitable (O) and unsuitable (X) foods for different constitution types, as determined by the O-ring test (Lee 1989)

	TY	SY	TE	SE		TY	SY	TE	SE		TY	SY	TE	SE		TY	SY	TE	**SE**
Polished rice	○	○	○	○	Sugar	X	X	X	X	Tomato	○	○	○	○	Walnut	X	X	○	X
Brown rice	○	○	○	○	Glucose	○	○	X	○	Mustard	X	X	○	○	Gingko nut	X	X	○	X
Glutinous rice	X	X	○	○	Chocolate	○	○	X	X	Pepper	X	X	○	○	Pine nut	X	X	○	X
Barley	○	○	○	X	Korean cabbage	○	○	X	X	Curry	X	X	○	○	Peach	○	○	○	○
Wheat	X	○	○	X	Cabbage	○	○	X	X	Radish	X	○	○	○	Sea mustard	○	X	○	○
Buckwheat	○	○	X	X	Kale	○	○	X	X	Carrot	X	X	○	X	Laver	○	X	○	○
White soybeans	X	X	○	○	Lettuce	○	○	○	○	Lotus root	○	○	○	○	Sea tangle	○	X	○	○
Black soybeans	○	○	X	X	Young radish	X	○	○	○	Bellflower root	X	X	○	X					
Colored beans	○	○	○	○	Spinach	○	○	○	○	Deodeok root	X	X	○	X	Beef	X	○	○	○
Kidney beans	○	○	○	○	Crown daisy	○	○	○	○	Burdock	○	○	○	○	Pork	X	○	○	X
Peanuts	X	○	○	X	Celery	X	○	X	X	Hemp	X	X	○	X	Chicken	X	X	○	○
Gray redbeans	○	○	○	X	Parsley	○	○	○	○	Musk melon	X	○		X	Dog meat	X	X	○	○
Red beans	○	○	○	X	Watercress	X	○	X	X	Watermelon	X	○	○	X	Milk	X	○	○	○
Adlay	X	X	○	X	Green onion	○	X	○	○	Strawberry	○	○	○	○	Egg	X	○	○	○
Italian millet	○	○	○	○	Onion	○	X	○	○	Persimmon	○	○	X	X	Shellfish	○	○	X	X
Indian sorghum	X	X	○	○	Leek	○	X	○	○	Pear	○	○	X	X	Shrimp	○	○	X	X
Sugar cane	X	X	○	X	Red pepper	○	○	○	○	Apple	X	X	○	○	Crab	○	○	X	X
Corn	○	○	○	○	Ginger	○	X	○	○	Mandarin	○	X	○	○	Oyster	○	○	X	X
Mung beans	○	○	X	X	Garlic	○	○	○	○	Orange	○	X	○	○	Squid	○	○	X	X

(continued)

Table 12.2 (continued)

	TY	SY	TE	SE		TY	SY	TE	SE		TY	SY	TE	SE		TY	SY	TE	**SE**
White sesame	X	X	○	○	Perilla leaf	○	○	X	X	Lemon	○	X	○	○	Hairtail	○	○	X	X
Black sesame	○	○	X	X	Pumpkin	○	○	○	○	Grape	○	○	X	X	Mackerel	○	○	X	X
Perilla seed	○	○	X	X	Eggplant	○	○	○	○	Banana	○	○	○	X	Herring	○	○	X	X
Potato	○	X	○	○	Cucumber	○	○	○	X	Jujube	X	X	X	○	Yellow Corvina	○	X	○	○
Sweet potato	○	X	○	○	Young antler	X	X	○	○	Chestnut	X	X	○	X					
Honey	X	X	○	○	Youngji	X	○	X	X	Siberian ginseng	○	X	X	X	Vit. E	X	○	X	X
Ginseng	X	X	○	○						Vit. B	X	X	○	○	Vit. C	○	○	○	○

TY Taeyang, *SY* Soyang, *TE* Taeeum, *SE* Soeum

12.4 Sasang Typology and Nutrigenomics

Recent advances in molecular biology have led researchers to recognize that individual genetic differences can alter the body's response to ingredients ingested (Milner 2004). It is not unusual to see one person obese and the other at the recommend weight for their height among siblings in a family consuming the same foods. This phenomenon drew the attention of scientists, who began to study the relationship between nutrition and genes, attributing differences in outcome to individual gene composition (Ordovas and Mooser 2004; Kaput 2004). Although SNPs found in the human genome are estimated to comprise 3×10^6, less than 0.1%, of the total number of a person's genes (3.2×10^9 base pairs), they cause different responses to foods eaten and to various diseases. This field of study is called nutrigenetics. The concept of nutritional genetics has close conceptual parallels to SCM (Lee 2007).

Food can also affect the genetic traits of the human body by creating epigenetic responses to the substances one ingests, the study of which is called nutrigenomics. The nutrients we eat cause changes in our genotype that alter the associated protein activity (proteomic effects), metabolites (metabolomic effects), and disease and health outcomes (phenotype). Epigenetic changes occur, for example, with the repeated ingestion of specific non-nutritional components, which tends to result in the development of hyperlipidemia, obesity, and/or diabetes. One can also prevent or treat these diseases by avoiding or eating certain foods. In particular, many studies have been conducted on the relationship between heart disease and food intake (such as the physiological response to fat and sugar). However, the exact mechanism of specific nutritional and epigenetic variations is not yet known. This is due to the complexity of changes in the genome, and the as yet incomplete investigation of the function of many human genes. Human responses and symptoms are affected by innumerable variables, and the method of applying individual differences according to constitution as a variable has yet to be developed.

The health effects of food components are related to specific interactions on a molecular level: SNPs in gene regulation, translational control of RNA, enzyme regulation (proteomics), and metabolite modulation (metabolomics), which occur as *genotypes*. On the other hand, in traditional Eastern medicine numerous *phenotypic* data on diet response to health have been gathered and systematically classified using the Sasang body constitution theory (Lee 2007). Thus, it is possible to relate molecular-level genetic studies to body constitution typology.

An attempt to develop marker genes for the classification of Sasang body constitutions is described below (Park 2006). Thirty-four TKM students in Korea classified as having identical constitutions by QSCC and three TKM doctors were selected to have their blood samples assayed using microarray analysis. Through this process, specific Sasang genes were identified. About 145 genes were differentially expressed in microarray, clustered into three groups: Taeeum, Soyang, and Soeum. Genes expressed differentially depending on Sasang constitution types were related

Table 12.3 Genes expressed differentially in microarray with Sasang constitution types (Park 2006)

Category	Locus ID	Mean of Taeeum	Mean of Soeum	Mean of Soyang	*F*-value	*P*-value
Anti-oxidation	SOD2	0.532	0.44	0.526	5.587	0.029
ATP synthesis	ATP5D	0.396	0.58	0.388	4.006	0.057
	ATP5H	0.479	0.529	0.441	3.602	0.071
Cell cycle, growth and differentiation, apoptosis	DAPK1	0.535	0.443	0.477	53.999	0
	S100A9	0.431	0.546	0.448	33.52	0
	BCL2A1	0.529	0.458	0.468	7.938	0.01
DNA or RNA binding protein	HNRPA2B1	0.541	0.433	0.459	49.855	0
	CHD3	0.516	0.44	0.482	21.464	0
Immune response	FCGR3A	0.538	0.437	0.494	204.969	0
	GZMA	0.493	0.477	0.542	30.029	0
	IGHG3	0.485	0.48	0.537	18.592	0.001
	GZMB	0.547	0.444	0.459	8.712	0.008
	PF4	0.54	0.433	0.494	68.165	0
Metabolism	B4GALT6	0.483	0.458	0.515	21.643	0
Transport	ABCB1	0.56	0.39	0.051	14.43	0
Protein degradation	PSMC4	0.476	0.46	0.518	23.459	0
	PSMC5	0.565	0.437	0.404	8.438	0.009
	UBC	0.557	0.437	0.378	4.359	0.048
Signal transduction	TM4SF4	0.521	0.459	0.473	7.332	0.013
	GNAI3	0.42	0.533	0.487	56.048	0

to signal transduction, transport, and immune response (Table 12.3). Among these, Cytochrome p450 2D6, 2C9, 1A2, and SOD2 genes were related to Sasang types. SOD2 showed higher expression in Taeeum types than in Soyang and Soeum types. Three SNPs, −455C/A, −257T/C, and -247A/G, were found in 5′ UTR (leader RNA) of the SOD2 gene. The SNP distribution pattern of Soeum types was different from that of the other two types. A total of six haplotypes were obtained with the three SNPs. The distribution pattern of each haplotype varied with Sasang constitution types. However, the SNP analysis of single SOD2 genes was not sufficient to determine the Sasang constitution type, since diverse genes were involved in the phenotypic expression of the constitution. Although this is not conclusive in terms of classification of the constitution types, it suggests the possibility of using microarray and SNP analyses of specific genes for the objective determination of body constitution types (Lee 2007).

As mentioned earlier, if genetic analysis enables reproducible constitutional classification, then constitution-specific (Sasang) food lists accumulated through human experience for 1000 of years will be able to be used with scientific reliability (Fig. 12.3). This would greatly reduce experimental error in functional food research and reduce the cost of building and validating scientific proof in other ways. Sasang medicine is indispensable for the development of customized foods for healthy

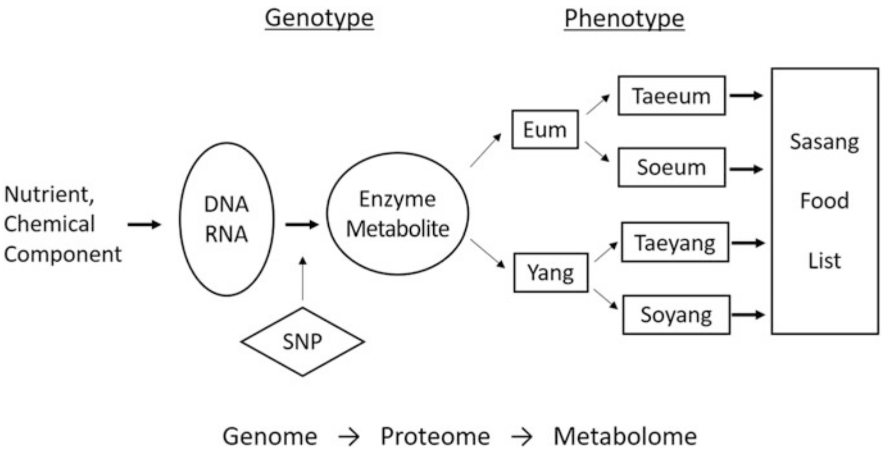


Fig. 12.3 The relationship between nutrigenetic studies and Sasang body constitution studies (Lee 2007)

100-year longevity and will be a powerful and exciting practical approach allowing Korean food-based longevity concepts to lead the world in this field (Lee 2004).

Figure 12.4 illustrates the relationship between Sasang typology and nutrigenetic studies, two systems that have developed in opposite directions in the East and the West. Discovering a channel through which the Western analytical approach and the Eastern holistic approach can connect would instigate great advancements in the fields of human nutrition and biomedical research. It would allow for utilization of the data accumulated in Eastern medicine for predicting the health effectiveness of foods. If the SNPs responsible for Sasang typology can be identified, then foods

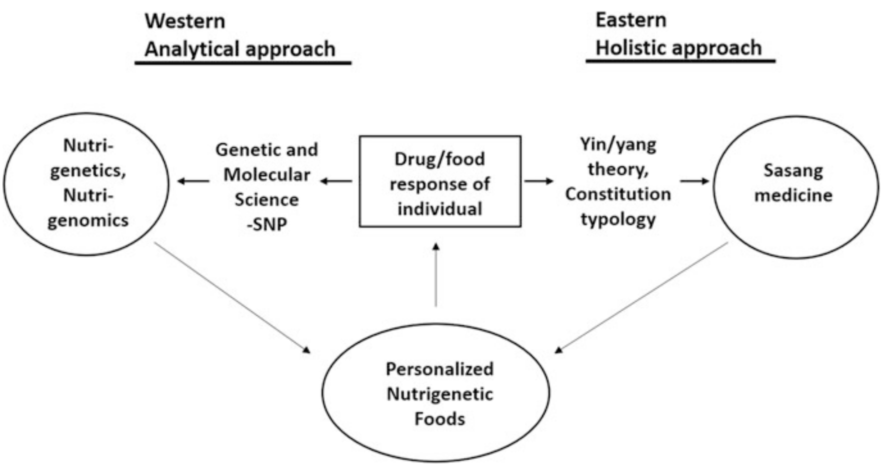


Fig. 12.4 Collaboration between the western analytical approach and eastern holistic approach in the field of functional food research

useful for a person having specific SNPs could be selected from the Sasang food list. Such an advancement would bring together Western analytical researchers and Eastern medical doctors for discussions on scientific substantiation of traditional functional foods in the East (Lee and Lee 2003).

12.5 Era of Customized Constitutional Diets

South Korea is rapidly becoming an aging society. The average life expectancy of Koreans is 82.2 years (female 85.4 years, male 79.3 years, as of 2016), the tenth highest among 138 countries. *The New York Times* (February 27, 2017) cited a paper published in *The Lancet* (Kontis et al. 2017) predicting that by 2030 Koreans will be the longest-lived people in the world. This is thought to be in part the result of the historical conception of health held by Koreans and the adherence to customized diets for each type of constitution, coupled with modern health care and sanitation systems that emerged in tandem with successful industrial growth. Even with modern advances, traditional concepts such as Sasang typology have become an inherent element of quality living.

On the other hand, the birth rate of Koreans is 1.05 per childbearing woman (as of 2017), which belongs to the ultra-low bracket of global birth rates. As a result of this demographic shift, the dietary life of Koreans is changing dramatically. The age of nuclear families represented by four-person households has passed. One-person households comprise 27.9% of total households (as of 2016), and the average number of persons in a household is now 2.5. Many people are eating out or taking home meal replacements (HMR) rather than preparing food at home, a trend that is steadily increasing. As eating and drinking alone has become the norm in urban life, the HMR market has increased by 60.7%, from 476 billion won (ca. USD 400 million) in 2015 to 730 billion won (ca. USD 650 million) in 2017. Processed cooked rice accounts for half of all HMR sales (Park et al. 2019).

For people moving towards their centenarian years, the desire to maintain health is pushing a high demand for dietary supplements. According to data from the Korea Health Functional Food Association, the size of the domestic health functional food market in 2017 was 3800 billion won (ca. USD 3400 million), an increase of 17.2% over the previous year. The average annual purchase of dietary supplements per household is USD 260, an increase of more than 10% year-on-year. It can be said, then, that the Korean diet is entering an era of personalized (or customized) food.

Looking back at the global developmental history of the food industry, scarcity was a common problem until the nineteenth century, and the early food-procurement infrastructure was built to meet the survival needs of the population based on calories and protein requirements. As the second industrial revolution in the early twentieth century advanced, the use of electric power and the development of automated systems enabled the mass production of foods, by which standardized convenience foods became popular. Awareness and understanding of the physiological function of food began to expand in the 1980s, and functional foods beyond the existing

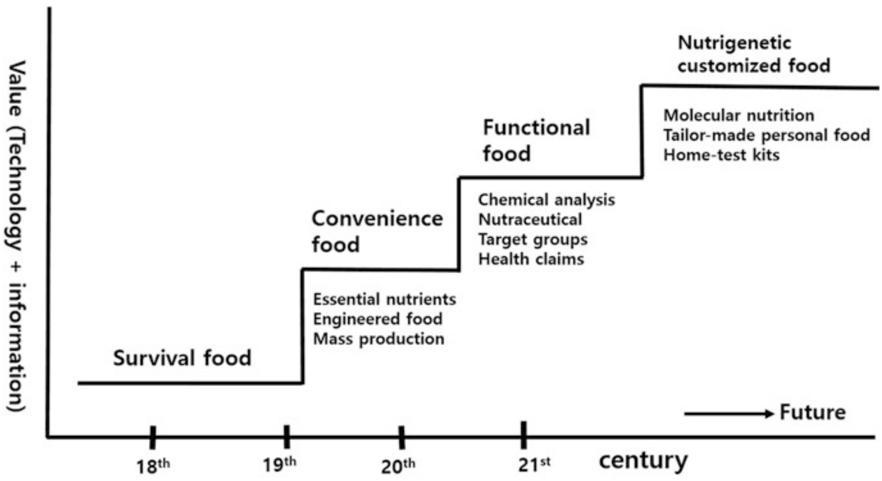


Fig. 12.5 Development of personalized nutrigenetic foods in the history of the food industry

macro and micro nutritional ingredients led the growth of the food market (Fig. 12.5). Recently, techniques for analyzing the properties of food for physiological function have been developed, ushering in a functional food age in which the distinction between nutritional foods and medicine has blurred and begun to merge, even in the West.

We are now entering the era of the fourth industrial revolution, in which artificial intelligence (AI) and biotechnology are being integrated into cyber-physical systems, following the third industrial revolution, which was earmarked by information and communications technology (ICT) and robots (Korea Food Security Research Foundation 2018). The future of the food industry will be characterized by the production and distribution of personalized functional foods. Foods tailored to the health needs of each individual will be prescribed and could be ordered through the Internet as customized foods with specific ingredients suggested by constitutional (Sasang) diets and nutritional genome studies. Traditional Korean Sasang Constitution Medicine will be an important tool for this era, in Korea and across the globe, to advance healthy living and longevity.

References

Baek, Seung-Hyeon. 2000. *Nae chejile manneun sikpumeuro byeongeul gochinda* [Healing Diseases with Food Suitable for the Individual Constitution]. Seoul: Taeung Publisher.

Baek, Yeong-Hwa, Jang Eun-Su, and Lee Si-Wu. 2014. Sasangchejil jeonmunga ui chejiljindan ilchido mit tadangdo pyeongga [Evaluation of the consistency and validity of the classification of constitutions by Sasang medical experts]. *Sasang chejil ui hakhoeji* [Journal of Sasang Constitutional Medicine] 26: 295–303.

Baek, Yeong-Hwa, Jang Eun-Su, Lee Si-Wu, Park Gi-Hyeon, Ryu Jong-Hyang, and Chin Hui-Jeong. 2015. Chehyeong, seonggyeok, sojeung giban danchukhyeong sasangchejil jindanseolmunji (KS-15) gaebal mit tadangdo yeongu [Development and validity of a simplified Sasang constitution questionnaire (KS-15) based on the physical, personality and diseases characteristics of individuals]. *Sasang chejil ui hakhoeji* [Journal of Constitutional Medicine] 27: 211–221.

Chae, Han, Lyoo In-Kyoon, Lee Soo-Jin, Cho Sonhae, Bae Hyunsu, Hong Moochang, and Shin Minkyu. 2003. An alternative way to individualized medicine: psychological and physical traits of Sasang typology. *Journal of Alternative and Complementary Medicine* 9 (4): 519–528.

Heo, Bong-Su. 2000. *Naemome manneun eumsikgunghap* [Food Horoscopes Suitable for my Body]. Seoul: KBS Film.

———. 2005. *Bapeuro byeongeul gochinda* [Healing Diseases with Diet]. Seoul: Garim Publishing.

Kaput, J. 2004. Diet-disease gene interactions. *Nutrition* 20: 26–31.

Kim, Ji-Yeong, Kim Chong-Won, Koh Byeong-Hui, and Song Il-Byeong. 1995. Chejilbyeol sikpumbullyu ui tadangseonggwa hwalyonge gwanhan sogo [Justification and usage of food classification according to body constitution]. *Journal of Sasang Constitutional Medicine* 7 (1): 263–279.

Kontis, V., J.E. Bennett, C.D. Mathers, G. Li, K. Foreman, and E. Ezzari. 2017. Future life expectancy in 35 industrialized countries: projections with a Bayesian model ensemble. *The Lancet* 389 (10076): 1323–1335. https://doi.org/10.1016/S0140-6736(16)32381-9.

Korea Food Security Research Foundation. 2018. Fourth Industrial Revolution and the Food Industry. Seoul: Sikanyeon.

Lee, Cherl-Ho. 2004. Functional food of interest to ASEAN: from traditional experience to modern production and trading. *Food Science and Biotechnology* 13 (3): 390–395.

———. 2007. Harmonization of eastern and western health knowledge: nutrigenetics and Sasang typology. *Food Science and Technology Research* 13 (2): 85–95.

———. 2018. *Hanguk sikpumsa yeongu* [A History of Korean Food]. Seoul: Jayu Academy.

———. 2019. *Bimangwa ui jeongjaeng* [War Against Obesity]. Seoul: Sikanyeon Publishing.

Lee, Cherl-Ho, and Chang Y. Lee. 2003. Paradigm shift: harmonization of eastern and western food systems. In *Bioprocesses and Biotechnology for Functional Foods and Nutraceuticals*, ed. Fereidoon Shahidi, Jean-Richard Neeser, and J. Bruce German, 415–425. New York: Marcel Dekker.

Lee, Myeong-Bok. 1989. *Jayeonsik, chejilgwa eumsik* [Natural Foods, Body Constitution and Food]. Seoul: Medical Insurance Corp.

Magner, Lois N. 1992. *A History of Medicine*. New York: Marcel Dekker.

Milner, J.A. 2004. Molecular targets for bioactive food components. *Journal of Nutrition* 9: 134.

Ordovas, J.M., and V. Mooser. 2004. Nutrigenomics and nutrigenetics. *Current Opinion in Lipidology* 15: 101–108.

Park, Dae-Il, Jin Hui-Jeong, and Park Ki-Hyeon. 2017. Sasangchejil jindan seolmyeong hwalyongdoruel nopigi wihan wep giban chejiljindan siseutem-KS-15 [Korean Sasang constitutional diagnostic questionnaire (KS-15) based on the web to improve validity]. *Sasangchejil ui hakhoeji* [Journal of Constitutional Medicine] 29: 224–231.

Park, Sang-Cheol, Lee Mi-Suk, Lee Cherl-Ho, Kim Gyeong-Cheol, Shin Dong-Hwa, Park Hyeon-Jin, Kwon Dae-Yeong, and Chae Su-Wan. 2019. *Geongang 100se jangsusikpum iyagi* [Longevity Foods in the Age of Centenarians]. Seoul: Sikanyeon.

Park, Seong-Su. 2006. Scientific rationale for Sasang constitution: development of marker genes for the classification of the constitution. In *Proceedings on KICST-2006 Nutrigenomics: New Perspectives and Applications*, July 20-22, Muju, Korea.

So, Ji-Ho, Kim Jang-Eung, Nam Ji-Ho, Lee Beom-Ju, Kim Yeong-Su, Kim Jong-Yeol, and Do Jun-Hyeong. 2016. Wep giban tonghapchejiljindan siseutem–SCAT (Sasang Constitution Analysis Tool) [Sasang Constitution Analysis Tool (SCAT)]. *Sasang chejil ui hakhoeji* [Journal of Sasang Constitutional Medicine] 28: 1–10.

Index

C.-H. Lee, *Korean Food and Foodways*,
https://doi.org/10.1007/978-981-19-0023-5

H