Chapter 15
Ayurveda and Traditional Foods to Supplement Nutrition in India

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15.1 Introduction

Traditional food knowledge (TFK) is the cultural heritage of sharing food, recipes, cooking skills through generations. These traditional food resources are supply essential nutrients to human and also can be regarded as biocultural attribute. To promote biocultural variety and increase food production, we need to focus on the importance of traditional food knowledge that directly improve the health of individuals and community ecosystems (Hancock 1985). Loss of cultural heritage is the primary issue of the community including lack of traditional food expertise and proper explanation of traditional knowledge. So this thrust area has recently attracted the academic research to explore the in-depth mechanism. Exploring the knowledge associated with traditional foods can be a method to express ethnic identity and help individuals to feel more connected to nature which could be a possible solution to reduce mortality and morbidity due to malnutrition or chronic diseases. To improve individual health, to facilitate eco-friendly living as well as ecological health, it is crucial to explore this information (Kuhnlein and Receveur 1996; Berkes 2012).

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Worldwide, many nations are facing a severe problem of food crisis and therefore, nutrition insecurity. About two billion people are suffering from micronutrient deficiencies, often known as hidden hunger, which make them more susceptible to several diseases (Ritchie et al. 2018). Food insecurity is more severe in many African and south Asian countries though these regions are affluent in plant diversity which often playa as the key sources of functional food. Many communities around the world depend on wild species as a source of food and medicines to eradicate their hunger and to treat various diseases (Duguma 2020). However, securing the food is insufficient to ensure ideal nutritional status which might end up with malnutrition.

Traditional foods are an essential source of bioactive substances, which boost our immune system and help to achieve the criteria of food and nutrition security. While trying to achieve food and nutrition security, many obstacles are coming, but possibilities exist. That requires only the availability and consumption variety of meals and access to food for all people, which can provide the key needed nutrients. The average daily calorie needed to consume is 2280 calories in India (Venugopal 1999). Since nutrition and food security are the two sides of a coin, consuming essential nutrients is more important than just taking calories. In many developing nations, undernutrition, malnutrition, and increasingly overnutrition are the serious issues they face. Several options exist to promote economic development through the promotion of nutrition security. Additionally, diets and health can be improved while having less of an impact on the environment by addressing food and production systems and gathering, storing, transporting, transforming, and distributing foods. Publications that emphasize initiatives supporting nutrition security in developing and underdeveloped nations and rising economies are covered by this Portal topic (Ingram 2020).

Food has always been essential to human biology and socio-culture since it gives us energy and nutrients. Millions of humans have been closely associated with traditional food sources, giving them access to a wide variety of meals and food products made from plants and animals and the ability to develop sophisticated environmental knowledge. Thousands of underutilized edible plant species are wild, semi-wild, or left out during domestication (Ray et al. 2020). Indigenous people commonly eat various uncultivated plants and their parts, such as green shoots, fruits, seeds, edible subterranean sections, and flowers.

Food supplements, which primarily consist of proteins, minerals, micronutrients, and numerous vitamins, improve the nutritional quality and offer rural and semi-urban people across all cultures and continents a cheap source of nutrition. The main reasons for recommending diverse diets are optimum nutrition, health, and general well-being. Tribal tribes and non-tribal populations living in rural and semi-urban areas worldwide have a long heritage of using traditional foods as a source of nutrition and medicine (Mahapatra et al. 2012).

A large part of the world population depends on forest and forest products for their livelihood and food security (Sunderland 2011). Functional food is a vital supplementary source of nutrition, medicine, and fiber; in addition to these values, some food sources are commercialized and offered as an income to the tribal

generation part of the rural community (Feyssa et al. 2011; Sardeshpande and Shackleton 2019). In due course of time, functional food has become economically and therapeutically important. Now many nutritionally rich food sources have been identified and domesticated by the cultivators. Considering these facts, researchers worldwide have started intensive research on functional food sources to investigate their potential in the treatment of various diseases and to be documented these sources and their sustainable exploration for human welfare. Although ensuring enough nutrition and preventing hunger is crucial, there is a difference between the terms "food security," "optimal nutrition," and "absence of hunger and undernutrition."

Globally, the food and dietary system of developing and low-income countries (especially in Asian and African countries) are not in a position to deliver a balanced diet across society leading to micronutrient deficiency in more than two billion people, especially pregnant women and children (Mkambula et al. 2020). The deficiency of micronutrients is the most common contributor to unhealthy development, low mental ability, and increased mortality rate (Bailey et al. 2015). The process of food fortification can overcome this situation. Food Fortification or Food Enrichment is the additive process of one or more essential micronutrients in food. The most common staple food is used as a vehicle food, fortified with food sources with immense micronutrients such as iodine, iron, calcium, magnesium, zinc, folate, and various vitamins. It is to notify that food fortification practices to save the population from health risks such as iodine deficiency, vitamin deficiency, anemia, and neural tube defects (Liyanage and Hettiarachchi 2011). The primary goal of this review was to investigate the Traditional food knowledge and its values in the Indian Subcontinent and to determine the nutritional and therapeutic value followed by food-to-food fortification.

A fundamental human right is access to food. In fact, it's possible to consider having access to at least an acceptable quantity of wholesome food to be the most fundamental of all human rights. The ability of a person to obtain an adequate supply of wholesome food is known as their level of food security. The four fundamental parts that make up the idea of food security are referred to as the "*four pillars of food security*" depicted in Fig. 15.1.

(i) *Availability*: simply means that food is present in a community. The effectiveness of food production is closely related to this.
(ii) *Access*: Even if there is enough food available in a town, it won't matter much if people can't get to it. True food security is the ability to access sufficient quantities of nutrient-rich food.
(iii) *Utilization*: Not all food is created equally or in sufficient quantities. A high standard of food must be accessed in order to maintain food security.
(iv) *Stability*: Good food stability is the continuity of access, availability, and consumption of food over time. Any threats to this stability should be minimised, it is crucial to remember.

Fig. 15.1 Conceptual diagram illustrates the food security

15.2 Traditional Food Knowledge System – Approaches Towards Combating Nutritional Insecurity

The use of functional food as herbal medicine in Indian Ayurveda medicine may have employed herbs to treat various chronic diseases. The ancient Greeks and Romans also used functional food as a nutraceutical source. Galen established the model for subsequent western medicine, although Hippocrates' writings mainly include the preserved Greek and Roman medical traditions. Hippocrates recommended using a few raw herbs-based medications with exercise, rest, and a functional food-enriched diet. Traditional medicine is practiced by individuals in countries worldwide, including Chile (71%), India (65%), Columbia (40%), Australia (48%), France (75%), Canada (70%), United States (42%), Belgium (38%), China (40%), and 80% in African countries (Azmi et al. 2017).

Traditional foods are a valuable source of bio-resources and bioactive components, which help to maintain food as well as nutrition security; additionally, they boost the immune system. However, global agriculture has steadily become less diversified more intensified with only high yielding varieties of a few crop varieties. Only nine known plant species contributes more than 75% of the world's plant-derived energy (https://www.huc-hkh.org/webinar/traditional-foods-and-their-role-in-health-and-nutrition-security-in-the-hkh accessed 24 October 2022). Three crops such as wheat, rice, and maize contributes half of the dietary energy. Due to several factors such as changes in the landscape, urbanization, migration, and unanticipated

climate change indigenous knowledge associated with traditional foods, cooking techniques and preservation strategies are gradually declining (Ghosh-Jerath et al. 2021). The promotion of traditional food crops has now received attention, and they are now referred to as "future-smart foods" due to their high potential for nutrition security, climate resilience, and agrobiodiversity.

Increasing dietary quality and lowering the prevalence of non-communicable diseases are two mottoes in the communities across the Pacific region's focus on achieving food and nutrition security goals. To address these issues, it takes context-specific research that considers links between change drivers, food systems, and how they affect diets and health (Hidalgo et al. 2020). In all its manifestations, malnutrition is a problem, while there has been a considerable improvement in child stunting, low birth weight, and exclusive breastfeeding. However, the world is still not on track to ending Hunger by 2030 or satisfying the world's nutrition goals. Diet quality is being highlighted as a vital relationship between nutrition and food security.To provide cheap healthy diets as part of the necessary efforts to eliminate all forms of malnutrition and Hunger, a new study of the price and affordability of healthy meals around the world has been introduced (FAO, IFAD, UNICEF, WFP and WHO 2018, 2020). According to the FAO 2020 data, 14.5% of Indians and roughly 11% of the world's population are undernourished. According to a report published by the Indian Council of Medical Research (ICMR 2020), malnutrition frequently occurs in rural and tribal communities and is a major cause of death for children under five (Narayan et al. 2019). The primary cause of malnutrition is a lack of suitable quantities of fresh fruits, vegetables, grains, legumes, milk, and meat. Fortunately, a large population's dietary needs may be supplied using a variety of traditional crops and food production techniques that have been around for a while (Adhikari et al. 2019).

Numerous studies have examined a variety of faces of malnutrition, including its relationship to food production and food security, efforts to reduce poverty, and socioeconomic issues like access to health care and women's educational status (Schultink 2015). SDG 2's goals are to end hunger, achieve food security and improvement nutritional value, develop sustainable agricultural crop production and recognize the connections between food and nutrition security (Bhavani and Rampal 2018). The production of food, which is necessary for nutrition security, makes agriculture an essential factor in ensuring appropriate nutrition (Pinstrup-Andersen 2006; Hoddinott et al. 2014). Numerous studies have empirically calculated that increased agricultural production significantly lowers malnutrition (Gulati et al. 2012; Headey et al. 2011). The most significant connection between agricultural growth and nutrition appears to be increased food production (Bhagowalia et al. 2012). According to the framework developed by UNICEF, the primary causes of child malnutrition can be divided into fundamental, underlying, and urgent issues. Malnutrition is primarily a result of a lack of access to health care, insufficient care, unhealthy living conditions, and household food instability. These causes are in turn influenced by fundamental variables such as socio-political, environmental, and economical factors. Poverty has a significant impact on each of these factors. According to the framework developed by UNICEF, illnesses and insufficient

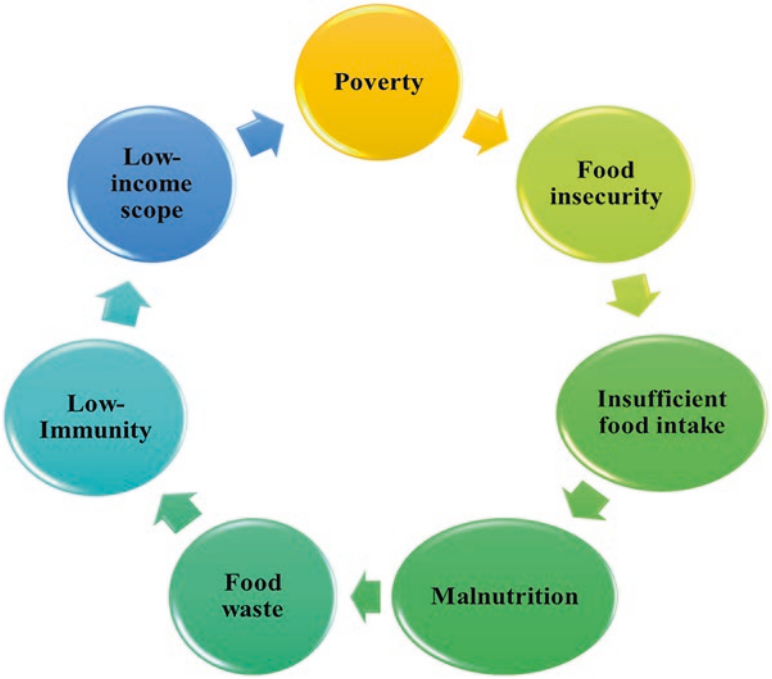

Fig. 15.2 Conceptual framework for undernutrition origins

nutritional intake can be categorized as the immediate causes of undernutrition. The interplay of these direct causes is what leads to the high morbidity and mortality rates in underdeveloped nations (Tontisirin and Gillespie 1999; UNICEF 1998). Inadequate nutrition throughout childhood causes long-term physical underdevelopment, raising the risk of developing chronic illness. The short-term effects of undernutrition in underdeveloped nations are nutrition-related health issues that cause maternal and child mortality due to recurrent infectious illnesses (Tarozzi and Mahajan 2007). This vicious cycle has been depicted in Fig. 15.2.

15.2.1 Functional Roles of Indian Traditional Foods

Traditional food systems around the world help to preserve crucial indigenous food as well as cultural food (Gibbon 2012). India is not an exception. Besides, it helps with a few health conditions like stomach upset, obesity, allergies, cardiovascular diseases, asthma, and diabetes, serving as a bridge between indigenous food and natural products as medicine. It guarantees marginal populations access to sufficient food, especially in low-income communities in the Himalayan region, where a large portion of the population—especially women—remains engaged in agriculture (Bisht et al. 2018).

Traditional functional foods are in line with the idea that food can serve purposes beyond just being a source of nutrition. The regular use of traditional functional foods serves as a fantastic illness prevention strategy. Functional properties of traditional foods of different regions of India have been represented in Tables 15.1, 15.2 and 15.3. Numerous health benefits associated with the consumption of functional foods have been shown by epidemiological randomised clinical trials conducted in various nations, including a improved heart health, decreased risk of cancer, a decrease in menopause symptoms, maintenance of urinary tract health, immune system stimulation, anti-inflammatory effects, improved gastrointestinal health, lowered blood pressure, preservation of vision, antiviral efficacy and antibacterial effect. Traditional functional food helps to maintain the health of the individual by preventing the major illness and thereby reducing the cost of health care. The Indian tradition has a long history of using spices in food as medicines to prevent and treat illnesses. Spices play a very essential role in digestive function (Weiss 2009). Another epidemiological study hypothesised that curcumin, the bioactive component of turmeric, one of the most common dietary and therapeutic substances used by the Indian population, was responsible for the significantly lower prevalence of neurodegenerative diseases, cancer, metabolic disease and, cardiovascular disease in India compared to the United States (Calabrese et al. 2010). Additionally, it is predicted that an adult in India consumes 50 g of garlic in a week and 80–200 mg of curcumin each day. Therefore, it is plausible to obtain a therapeutic dose by daily dietary consumption (Tapsell et al. 2006; Sainani et al. 1979). Accordingly the whole world realized the benefits of functional food during twentieth century and it is evidenced from ancient texts of Ayurveda that the India has realized this facts thousands of years back.

Nutritional problems remain a critical barrier to our nation's healthy and disease-free culture. Here traditional diets provide us a proper food containing a higher content of nutrients. Sadly, due to improvements in technology and food preparation, our civilization no longer consumes many of these ancient dishes. Health is being affected in the modern day due to rapidly changing eating patterns, the usage of canned food, chemical preservatives, and junk food. People who ate a natural diet of unprocessed foods were mainly free of ailments including obesity, infertility, mental illness, heart disease, autoimmune disease, and diabetes. Whole health is facilitated by traditional foods (Goel 2018). The variety of traditional and ethnic foods exhibits their positive health effects. Applying the combinatorial theory of food ingredients and combining traditional meals to attain higher health advantages will lead to sophisticated food habits during food processing. Most traditional food is prepared by the fermentation process, which is good for health due to the absence of sugar or gluten; for instance, it is free of gluten, caffeine, lactose, and antibiotics. Nutraceuticals could play a crucial role in nutritional biochemistry when examining them through the lens of nutra-epidemiology. The life cycle approach to nutrition vital to human health and well-being—becomes incredibly evident (Prakash 2016).

Table 15.1 Functions of some North-east Indian traditional foods

S. no.	Traditional foods	Ingredients	Direction of use	Treatment and benefits	Reference
1.	Rakthashali red rice (with red husk and grain)	Red puffed rice, rice ganja, Manni, and parched red rice, rice soup in addition to sugar, cow milk, or jaggery.	During the full moon, rice soup is kept for the absorption of radiation in the full moon and immediately have to take, resulting in it will activate of antibiotics and immunoglobulins present in milk	Allergies, skin conditions, issues with the uterus, neurological conditions, gastrointestinal issues, liver and kidney abnormalities, fever, infections, and in aiding lactation.	Hegde et al. (2013)
2.	The pulp of pumpkin with seeds	Mixed with herbal extracts such as mint, coriander, black pepper, ginger, and jaggery.	Ground to a paste with fresh red rice gruel and pulp of pumpkin with seeds in addition to black paper and jaggery	Cold, neurodegenerative disease, and fever	Hegde et al. (2013)
3.	Jaljeera-cumin seeds	Cumin seed powder with Jaggery, Black salt, lemon juice, mint leaves with water	Traditional Indian drinks, which was used to be stored in matkas wrapped with a wet cloth to keep it cool	Helps in digestion, keeps us hydrated, prevents anemia, improves vitamin C deficiency, burns calories	Pushpangadan et al. (2012)
4.	Root extract of *Decalepis hamiltonii* (Nannari sharbat)	Root powder, sugar, and water	Traditional beverage mixed with sugar and dried powder kept for soak for 12 h and boiled for 2 h	Stomach coolant, relief provider from constipation and acidity, also shows hepatoprotective and antioxidant activity	Aluri (2011); Srivastava et al. (2006); Srivastava and Shivanandappa (2010)
5.	Tambuli-soothing, healthy curd-based traditional dish	Mixed with udupi (Centella Asiatica, commonly known as Indian pennywort), Doddapatre (Borage leaves), Garlic, Ginger, Menthe (Fenugreek seeds)	Often served with rice before having sambar or rasam	Enhance skin health, detoxify the body, protect against colds, lessen arthritis pain, reduce stress and anxiety, treat some types of cancer, and improve digestion.	–

(continued)

Table 15.1 (continued)

S. no.	Traditional foods	Ingredients	Direction of use	Treatment and benefits	Reference
6.	Ondelaga pickle – Centella Asiatica Urb.	C. Asiatica leaf with N. arborists with onion bulb	Leaf and flower infusion prepared with onion bulb	Reduce blood pressure and for cardiac disease treatment and maintenance Kapha and pitta ratio	Prakasha et al. (2010); Shivakumar and Parashurama (2014)
7.	Fermented bamboo shoots- eup, curry, ushoi, rep, Gulai rebung, soibum, chutney, mesu, and ekhung	Bamboo shoots with thick coconut milk and fermented bamboo shoots with potato	Contains higher content of nutrition	Anti-cancer, antioxidant, anti-aging, antidiabetic, cardioprotective, weight loss, probiotics	Behera and Balaji (2021); Nongdam and Tikendra (2014); Chongtham et al. (2011)
8.	Tikhur sweets- Curcuma angustifolia rhizome or Indian arrowroot	Sugary delicacies like Jalebi, Halwa, and Barfi	Khoa, ghee, and arrowroot mixed and cooked sugar and water	For bone fracture, stomach-ache, fever, indigestion, renal stone, joint pain, peptic ulcer, leucorrhoea, and inflammatory conditions,	Shukla (2021); Shankar et al. (2014)

15.3 Ayurveda: The Indian Philosophy Behind Balance Diet

According to the ancient Indian medical system, Ayurveda, the management of nutrition in our body is crucial, and the entire human body is viewed as a product of food. According to Ayurveda, there is a connection between the body, food, and life factors which demonstrates how any disease can be cured, the treatment procedure, and the detailed mechanism of the healing process. Ayurvedic theories are that our body's physical, temperamental, and mental states all are influenced by the foods we consume. Therefore, a balanced diet must be followed daily to stay healthy. According to the Ayurveda, nutrients from the foods are absorbed by the body by digestion into rasa (plasma), and thereafter into blood, muscle, fat, bone marrow, reproductive organs, and bodily fluids. Traditionally, any kind of sickness is defined as an unbalanced state of the mind, body, and soul. Ayurvedic science offers a variety of well-researched, time-tested therapies for various ailments and employs various medicinal techniques, including Rasayana, Satvajaya, Shodhana, Shamana, Pathya vyavastha, and Nidan Parivarjan (Hotz and Gibson 2007; Ravishankar and Shukla 2008) (Table 15.4).

Ayurvedic medical experts usually treat any disease by combining various natural products or their own patented formulation with food and exercise. The balance

Table 15.2 Functions of some South Indian traditional foods

S. no.	Traditional foods	Ingredients	Direction of use	Treatment and benefits	Reference
1.	Rasam	Traditional South Indian cuisine includes a spicy soup called rasam.	Tamarind juice is typically used as the base, and then other ingredients such as Indian sesame oil, turmeric, tomato, chili pepper, pepper, garlic, cumin, curry leaves, mustard, coriander, asafoetida, sea salt, and water are added. Can have it with rice or soup	Appetizer, antipyretic, Anaemia, better lactation, Hypoglycaemic, laxative	Devarajan and Mohanmarugaraja (2017)
2.	Virgin coconut oil	Coconut milk	Can use as toppings in curries and frying also	Anticancer activity due to the presence of lauric acid	Famurewa et al. (2017)
3.	Idli	Rice and black gram dal	Fermented Black gram dhal and rice at the ratio of 1:2, used as batter which contains naturally occurring fermentation microorganisms obtained from sour buttermilk.	Healthy to heart and intestinal, abundant in prebiotics as a antibacterial, anticancer agents, antioxidant, anti-inflammatory, and reduced cholesterol	Reddy et al. (1982)
4.	Ambali	Finger millet-based fermented semi-liquid product	The preparation process involves combining finger millet flour with water to create a thick batter, which is then cooked and fermented.	Low resistant starch and high calcium	Ramakrishnan (1980)
5.	Ragi hurihittu	The flour of popped finger millet	Components of ragi hurihittu that take a while to degrade the cell wall are important for making foods high in fibre.	High in minerals and dietary fibres	Nirmala et al. (2000)

(continued)

Table 15.2 (continued)

S. no.	Traditional foods	Ingredients	Direction of use	Treatment and benefits	Reference
6.	Bale dandu palya	Banana stems	The stem is divided into bits, formed into cubes, and cooked before being seasoned with turmeric powder, chilli powder, salt, coriander, curry leaves, and these herbs.	Hypoglycaemic and weight reduction.	Bhaskar et al. (2010)
7.	Vazhai poo poriyal	Banana florets	Cut into small bits, the florets are boiled in water while being seasoned with green chile, mustard, and onion. Grated coconut is afterwards used as a garnish.	Diabetes and heart burn	Kumar et al. (2012)
8.	Jackfruit seed chutney	Jackfruit seed	The ingredients for this dish are grated coconut, chilli, onion, and cooked jackfruit seeds. For flavour, salt and lemon juice are also added and served with roti.	Intestinal microbial balance	Swami et al. (2012)
9.	Mango peel chutney	Mango peels whether ripe or unripe, are used to make chutney.	Mango peels, clove, mustard, chile, fenugreek seed, black pepper, curry leaves, and turmeric powder are used.	Rich sources of bioactive dietary fibers, carotenoids, vitamin C, and vitamin E	Ajila et al. (2007)
10.	Cheera thoran	Amaranthus leaves	Amaranth leaf-based dish eaten as a breakfast food. Boiling of chopped green leafy vegetables then salt and spices are added while cooking. After cooking can add grated coconut.	Good sources of oxalic acid, hence it should be avoided by patients suffering from kidney stones	Guil et al. (1996)

Table 15.3 Functions of some North-Indian traditional foods

S. no.	Traditional foods	Ingredients	Direction of use	Treatment and benefits	Reference
1.	Kadha	Black pepper, Saunf, Ginger, Mint leaves, Corriander, Rock candy, Tulsi, Bay leaf, Clove, and Cinnamon	Kadha prepared by decoction method after adding all of ingredients.	Helps to boost immune system, reduce weight, inflammation, fever, cold, cough, and blood pressure.	Maurya and Sharma (2020)
2.	Shrikhand	Traditional cool dessert	Dryfruits, saffron, flavouring agents, and hung curd with condensed milk.	Diarrhoea, inflammatory bowel illness, colon cancer, helicobacter, and pylori infection	–
3.	Ginna	Indian sweet dish prepared with colostrum, jaggery	Colostrum, a nutrient-rich fluid secreted by female mammals soon after giving birth	A natural anti-microbial substances that actively promote an infant's immune system's maturity	Uruakpa et al. (2002)
4.	Rabdi	Sugar, Saffron, condensed milk, cardamom, and dry fruits.	Sweet dessert made with condensed milk originated from Mathura, Uttar Pradesh and Varanashi state.	Useful in bones, teeth, helps to boostup immune system and lower blood sugar level.	Tiwari (2021)
5.	Panjiri	Sooji, wheat flour, melon seeds, ghee, powdered edible natural gum, ajwain, fig, coconut, and dryfruits.	Traditional northern Indian sweet dish "Laddoo" prepared by deep fried and grinded dryfruits and coconut with fried sooji, fig, wheat flour and powdered gum.	For diabetic patients, helps to reduce blood sugar, assist new mothers rebuild strength and also give them nutrients that are necessary for breastfeeding.	Brien (2013)

of the three "doshas" is typically considered before starting or in treatment. In living things, these three doshas are the physiological component. Ayurveda seeks to maintain a condition of equilibrium between the structural and physiological components, which denotes good health. The disease may result from any imbalance brought on by internal or external sources (Gordon et al. 2019). For example, according to Ayurveda, the treatment of diabetes (Fig. 15.3) will be like this- there are 20 different varieties of diabetes (prameha): 4 caused by Vata, 6 by Pitta, and 10 by Kapha (Gordon et al. 2019; Sridharan et al. 2011). However, Kapha doshaja is primarily responsible for diabetes (Prameha). Therefore, you can treat diabetes with Ayurveda in four different ways:

Depending on which body element predominates, *doshas* are split into three groups: *Kapha* (composed of earth and water, which is the sources of the greasing and structural energy), *pitta* (composed of fire and water, which is the sources of the strength of metabolism or digestion), and *vatta* (composed of space and air, which

Table 15.4 Ayurvedic knowledge of processes of functional foods

S. no.	Names of therapy	Treatment principle	Types of the technique used	Treatment impact on the body	References
1.	*Sodhana*.	A method of purification process where hazardous elements are eliminated from foodstuffs by the application of several unit operations	Virecana, Svedana, Nirvapana, Shoshana, Adhahpatana, Dhalana, Bharjana, Urdhvapatana, Bhavana, Sthapana.	Enhances the nutritious value of foods while also removing contaminants, also for the treatment of loss of appetite, infection, diabetes, nausea, skin disease, and epilepsy.	Belge and Belge (2012)
2.	*Nidan Parivarjan*-	Focuses mainly on avoiding identified disease-causing agents	*Aharatmaka* – dietary including heavy food, unhealthy food or overeating, *Viharatmaka* – regimens like lack of physical exercise, excessive sleep, or taking a bath after the meal, *Manasvyaparatmaka* – psychological issues like lack of anxiety, relaxation from tension and *Anya Nidana* such as sweet enema or heredity	Treatment of obesity and causative factors like heart disease, loss of appetite, breathlessness, snoring, joint pain, and difficulty sleeping.	Mawale and Pajai (2014)
3.	*Shamana*-	A palliative approach entails bringing imbalanced doshas (humor) back to equilibrium without compromising or hurting other doshas.	Starters, physical activity, digestive aids, exposure to sunlight, fresh air, and fasting are all used to balance the doshas.	Slows the signs of aging, boosts immune system strength, improves mental clarity and vigor, builds up the digestive system	Ravishankar and Shukla (2008)

(continued)

Table 15.4 (continued)

S. no.	Names of therapy	Treatment principle	Types of the technique used	Treatment impact on the body	References
4.	*Rasayana*	A rejuvenation medicine-based immunomodulator therapy. This treatment tries to increase the body's resistance to certain illnesses. Rasayanas, in general, function through three main pathways to enhance nutrition.	Srotas, Agni, and Rasa boosters. Rasa enhancers directly affect nutrients, Agni enhancers increase the capacity of digestion, and Srotas increase the flow of nutrients. Rasayana therapy involves the use of ashwagandha, curcumin, garlic, ginger, and neem, among other ingredients.	Exhibits anti-stress, adaptogenic, and memory-enhancing effects; these compounds delay brain aging and aid in neural tissue regeneration. Shows a significant effect on the heart, brain, skin, and eyes.	Chopra and Doiphode (2002); Singh et al. (2008)
5.	*Pathya vyavastha*	Dietary regulation plays a crucial role in maintaining biological activity and regulating emotional status and habits.	According to Ayurveda, the three pillars of life—food, sleep, and brahmacharya—are in order of importance. Therefore, a healthy diet should be considered, as it is necessary for excellent health and normal body functions.	Pathya Vyavastha primarily imparts information on the role of meals in various illnesses and stimulates digestion.	Tiwari et al. (2013); Masram et al. (2022)

is the sources of the movement's intensity). The three ayurvedic diet pillars are *Kedari Kulya Nyaya*, *Khale Kapota Nyaya*, and *Kshira Dadhi Nyaya*. These three concepts describe various aspects of digestion and how food is metabolized within the body (Nadkarni and Nadkarni 1954). The first rule of the ayurvedic diet is *Kedara Kulya Nyaya* which clarifies the first phases of digestion, in the presence of nature's components named fire, resulting in food converted into biological elements (nutrients), and finally will be circulated throughout the body in the *ahara rasa*. Now at the second step, named *Khale Kapota Nyaya*, the nutrient will be selected by Sapta Dhatus, which include Rasa, Rakta, Mamsa, Meda, Asthi, Majja, and Sukhra, and each dhatu decides on a particular nutrient as its substitute. For instance, *rasa Agni* selects plasma cells, mamsa cells (muscle cells), and protein molecules while *rakta Agni* selects iron molecules. Furthermore, at the third stage named *Kshira Dadhi Nyaya, the asthayi dhatu* (immature tissues) turns into *sthayi dhatu* (mature tissues), and immature blood cells called *rasa asthayi dhatu* convert into *sthayi dhatu* under the influence of *Rasa Agni* (matured blood cells) (Nadkarni and Nadkarni 1954). These three *doshas* regulate all physio-pathological, psychological, and biological processes of the body, mind, and awareness. Disease or disturbances in the body may result from an imbalance in these tri-*doshas*. For instance,

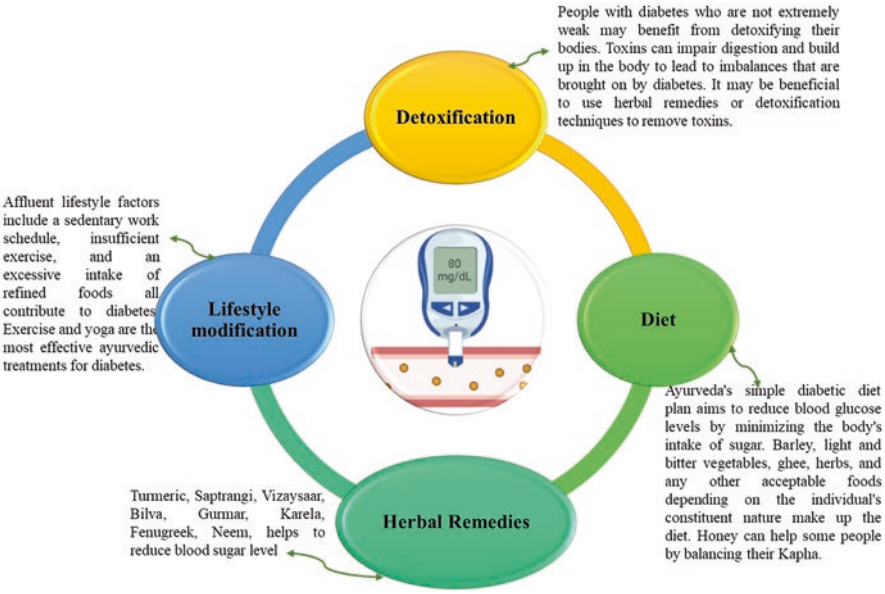

Fig. 15.3 Treatment of diabetes according to Indian traditional knowledge

though the fire element is encouraged in the body, the air element is encouraged, but the water element is required to manage the fire element. Here, the consumption of an adequate diet helps to restore equilibrium (*vatta*, *pitta*, or *kapha*) (Guha 2006).

15.4 Traditional Food and Knowledge Systems in the Treatment of Various Diseases

Indigenous people in rural and tribal groups have extensive ethnomedical knowledge of functional food (Mallick et al. 2020). The indigenous community relies on local plant resources directly or indirectly and is more aware of their medicinal, dietary, and food benefits. However, local health practitioners only transmit this information from one generation to the next; therefore, in the absence of proper documented knowledge, is often difficult to preserve the valuable knowledge and to pass down to the succeeding generations (Junsongduang et al. 2020). Now, it is essential to enlighten and spread the existing knowledge worldwide to ensure their best use, conservation, and scientific confirmation purposes; therefore, necessary to document the folk's knowledge of functional food.

Most functional food has nutritional benefits and is frequently used as medicine to treat various illnesses, including fever, colds, diarrhea, coughs, headaches, and stomachaches. In addition, they are also widely utilized as immune modulators and supplements for physical fitness (Sharma et al. 2017). Table 15.5 provides a

Table 15.5 Some traditional plants parts and their therapeutic uses in India

S. no.	Botanical name	Local name	Parts used	Uses	References
1.	*Achyranthes bidentata*, Blume Amaranthaceae	Dansh	Whole plant	Cough, fever, asthma, fistula, renal dropsy, skin rash, diabetes, diarrhea, tumor, indigestion, toothache, antifertility, pyorrhea, piles, anti-inflammatory, immune stimulant, snake bites and also used as Laxative	Hossain et al. (2013)
2.	*Protium serratum* (Burseraceae)	Indian red pear	Fruit	Mouth ulcer, antioxidant and anti-inflammatory	Hazarika et al. (2012)
3.	*Artemisia sacrorum*, Ladeb.	Kaparpatti & Jholpatti	Leaf & bud	Hair fall control	Prakash (2014)
4.	*Stixis suaveolens* (Capparacea)	Fragrant caper vine	Fruit	Heart disease, asthma, anti-inflammatory, fever, headache, and anti-arthritic properties	Islam et al. (2020); Konyak and Konyak (2020)
5.	*Adina cordifolia*, Hook. (Rubiaceae)	Haldu	Leaf, stem, bark & root	Antioxidant, anti-cancer, anti-diabetes, hepatoprotective, cytotoxic, antiamoebic, anti-inflammatory, anti-ulcer, and analgesic	Dalu et al. (2021)
6.	*Garcinia gummi-gutta* (Clusiaceae)	Malabar tamarind, Gambooge	Fruit	Diarrhea and anti-obesity	Bohra and Waman (2019)
7.	*Achyranthes aspera*, Linn. Amaranthaceae	Chinchilla	Whole plant	Gonorrhea and dog bite	Goyal et al. (2007)
8.	*Gnetum gnemon* (Gnetaceae)	Melinjo	Fruits	Dysentery of several types	Barua et al. (2015)
9.	*Crescentia cujeta* (Bignoniaceae)	Mexican Calabash, Morrito, Winged Calabash Jicaro, Kamandal	Fruits	Skin diseases, laxative, and cough.	Rahmatullah et al. (2010)
10.	*Adiantum venusthum*, G. Don. Adiantaceae	Hanshraj	Seed	Scorpion stings, headaches, wounds, cuts, and in hair fall control	Mubashir and Shah (2011)
11.	*Citrus macroptera* (Rutaceae)	Shatkora, hat- Khora	Fruit	Gastritis and kidney stone. Antihypertensive, antipyretic, and appetite stimulant potential	Aktar and Foyzun (2017); Paul et al. (2015)

(continued)

Table 15.5 (continued)

S. no.	Botanical name	Local name	Parts used	Uses	References
12.	*Agrimonia pilosa*, Ledeb. Rosaceae	Kafliya	Whole plant	Sore throat, abdominal pain, bloody discharge, headaches, eczema, and parasitic infections	Le et al. (2018)
13.	*Ajuga parviflora*, Benth. Lamiaceae	Ratpatia	Whole plant	Toothache, fever, diuretic, antimicrobial agents, and anti-inflammatory	Kumar et al. (2018)
14.	*Syzygium samarangense* (Myrtaceae)	Semarang rose-apple, wax apple, wax jambu, and Java apple	Fruits	Liver tonic and diabetes.	Khandaker and Boyce (2016)
15	*Parkia timoriana* (Fabaceae)	Petai Keruyung, Petai Kerayong, Kerayong, Kedawong	Fruits	Gastritis, diabetes and diuretic	Saleh et al. (2021)
16	*Melastoma malabathricum* (Melastomataceae)	Malabar melastome	Fruits	Gastritis, wound healing, and diarrhea.	Joffry et al. (2012)
17	*Allium wallichii*, Kunth. Alliaceae	Jangali Lasun	Root	In infection	Prakash (2014)
18.	*Aloe vera*, Linn. Alliaceae	Patquar	Leaf	Stomach problem wound healing	Sahu et al. (2013)
19.	*Althaea officinalis* Linn (Malvaceae)	Jangali hauli	Whole plant	Mild gastritis, oral and pharyngeal mucosa, skin burns, dry cough, insect bites, gastrointestinal tract and urinary tract complaints, catarrh, burns, inflammation, ulcers, abscesses, constipation, and diarrhea.	Husain et al. (2019)
20	*Artemisia nilagirica*, Pampanini. Asteraceae	Patti & Kunj Indian wormwood	Whole plant	Parasitic and helminthic diseases, neurological disorders, dermal infection and antifungal, antimicrobial, larvicidal, anti-inflammatory activities	Mohanty et al. (2018)

(continued)

Table 15.5 (continued)

S. no.	Botanical name	Local name	Parts used	Uses	References
21	*Abies webbiana*, Lindl Pinaceae	Talispatra	Leaves	In chronic obstructive pulmonary diseases, tumors, cough, hypochlorhydria, hiccup, amoebiasis, helminthiasis, vomiting, and mouth disorders	Vadivel et al. (2018)
22	*Acacia catechu*, Wild Fabaceae	Khair	Stem	Spongy and bleeding gums, leucoderma, stomatitis, leprosy, urinary disorder, diabetes, syphilis in urine problem & dysentery, psoriasis	Rashid (2015)
23	*Aconitum balfouria*, stapf. (Ranunculaceae)	Bishjahar	Root	Diaphoretic, febrifuge, diuretic, antirheumatic, anti-inflammatory, vermifuge, and antipyretic	Sharma and Gaur (2012)
24	*Acorus calamus*, Linn. Acoraceae	Banj	Root	Fever & toothache	Balakumbahan et al. (2010)
25	*Aesculus indica*, Colebr Sapindaceae	Pangar	Fruit	In stomach problem	Paudel et al. (2022)
26	*Allium stracheyi*, Baker. Alliaceae	Jambu	Whole plant	Cough-cold and jaundice	Chandrasekaran et al. (2020)

summary of the 26 most significant functional food worldwide, together with information on their distribution and medicinal properties.

15.5 Health-Promoting Factors & Nutrition Security

Energy and nutrition are provided by food, which has been at the center of human biology and sociocultural existence. For millions of years, people had a close relationship with the Wild, which provided them with a variety of foods and food items made from plants and animals and the opportunity to learn extensive environmental information. Thousands of underutilized edible plant species are wild, semi-wild, or left out during domestication (Ray et al. 2020). Indian floral elements' spectrum of functional foods has the potential to revolutionize our food systems (Hunter and Fanzo 2013; Powell et al. 2015).

Functional food supplements, primarily proteins, minerals, micronutrients, and numerous vitamins, improve dietary quality and offer rural and semi-urban people across all cultures and continents a cheap source of nutrition. The main reasons for recommending diverse diets are optimum nutrition, health, and general well-being. In rural and semi-urban areas around the world, tribal groups and non-tribal populations have embraced consuming functional foods (Mahapatra et al. 2012). During the twentieth century, researchers were mainly engaged in studying the nutrient composition and ethnobotanical perspective of plants, plant parts, and plant products, but later on, advanced studies got momentum due to the use of advanced tools and techniques, and investigations were initiated on pharmacological actions, food science, economic status and microbiology of the plants and their products (Sardeshpande and Shackleton 2019).

Functional food could be herbs, shrubs, small-height plants, trees, etc., as an integral part of an ecosystem and ecological balance (Ju et al. 2013). Functional food is being widely used as a traditional food resource for the people of remote and countryside areas (Mir 2014; Shivprasad et al. 2016; Kumar and Saikia 2020). Functional food has been established as a suitable source for many chronic diseases, including cardiovascular diseases, diabetes, obesity, and certain cancers (Deshmukh and Waghmode 2011). A large part of the world population depends on forest and forest products for their livelihood and food security (Sunderland 2011). Functional food is a vital supplementary source of nutrition, medicine, and fiber (Feyssa et al. 2011); in addition to these values, some species are commercialized and offer a source of income for the rural community (Sardeshpande and Shackleton 2019). Considering these facts, researchers worldwide have started intensive research on functional food to investigate their potential and document these wild edibles and their sustainable exploration for human welfare.

The high nutraceutical-rich value-added functional food supports human health and food security and provides rural and tribal populations with a source of additional revenue. These functional foods are excellent sources of natural antioxidants, phytochemical components, sugar, dietary fiber, proteins, minerals, and vitamins. Recent research suggested that a high nutraceutical-rich functional diet reduces the risk of diabetes, infections, cardiovascular problems, gastrointestinal diseases, and urinary illnesses. People live in poverty and cannot afford to eat a regular, balanced diet often get nourishment from the local indigenous food resources (Achaglinkame et al. 2019).

Functional foods are an excellent source of nutraceuticals and are essential for preserving human health (Donno and Turrini 2020). The macronutrients are those with concentrations of 1000–15,000 g/g of dry weight, such as calcium (Ca), nitrogen (N), phosphorus (P), magnesium (Mg), and potassium (K), while the micronutrients are those with concentrations 100–10,000 times lower than those of the macronutrients, such as chlorine (Cl), manganese (Mn), sodium (Na), copper (Cu), cobalt (Co), iron (Fe), and zinc (Zn) (Florkowski et al. 2009).

15.6 Future Prospective and Conclusions

Indigenous peoples' traditional food systems are filled with a variety of inadequately described and reported micronutrients in scientific literature. Due to the absence of scientific support, the information cannot be programmed for public health promotion, and health training is also included. However, indigenous peoples may be able to enhance their micronutrient status by using their traditional knowledge and various food options. The assistance of indigenous populations should be sought first by those working in the health sector who desire to utilize traditional knowledge regarding locally accessible food. Additionally, certain cuisines have gained popularity in specific regions based on the population's health, such as lactose sensitivity in Bengal, which has led to the popularity of lactose-free dairy sweets. In order to preserve knowledge on the processing, preservation, and dietary recommendations of traditional and ayurvedic foods for the benefit of both the Indian and international communities, a national research project in India is advised to scientifically document the health benefits of traditional and ayurvedic health foods across various regions.

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