

REVIEW ARTICLE

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Som tum, the famous ethnic food of Thailand: its benefit and innovations

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Abstract

Som tum is widely recognized as a traditional ethnic cuisine originating from Thailand. The dish is composed of various ingredients, including raw papaya, tomatoes, chili, palm sugar, garlic, lime, and roasted peanuts, among others. This food is unique in terms of name, history, culture, properties, and taste. Enhancing health, physical fitness, and immunity are advantageous outcomes. The study uses a descriptive methodology approach. The data were obtained via comprehensive interviews conducted with a consumer, a food technology lecturer, an owner of a traditional shop, and a government staff member. The study was conducted in the Khon Kaen Province. The data supporting the research were obtained through a comprehensive review of relevant literature. Som tum is considered a significant aspect of the cultural experience in Thailand, particularly in the northeastern region. This particular food item has gained popularity among a broader demographic and is now regularly consumed as a staple food. Currently, this product has been introduced as an innovative addition to the business sector, with its availability in various products including ready-to-eat and seasoning. Som tum has the potential in the health food sector because it is made from many ingredients, so it is rich in glutamic acid, vitamin C, protease enzymes and essential amino acids which are good for human health. The objective of this article was to impart information relating to the historical background, uniqueness, composition, processing, health benefits, development, and innovation of som tum.

Keywords Som tum, Thailand food, Laos food, Traditional food, Pla ra

Introduction

Cultural heritage is a neutral and unbiased concept or attribute that serves to delineate the unique qualities of a group or community [1]. The form represents an inheritance of artistic ingenuity, skilled workmanship, and visual

perception that has been transmitted from past generations and is similarly preserved for future generations [2]. The culinary heritage, encompassing customary cuisine and beverages, is of significant cultural importance. Authentic traditional cuisine is prepared using locally sourced ingredients and methods, resulting in a rich expression of local characteristics [3].

Thailand is a nation that has many variants of spices, resulting in a wide range of customary cuisine and beverages. Despite having identical composition and ingredients, each region exhibits distinct characteristics attributable to its unique regional background, which imparts diverse flavors and traits. which is one of the most famous Thai dishes, som tum. The latter, which is also known as raw papaya salad, is a popular Thai cuisine that shows a unique blend of flavors, particularly

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sweetness, acidity, and spiciness. It is prepared by slicing raw papaya and combining it with an assortment of spices. The term som tum encompasses a diverse range of variations, including the popular som tum Thai (ส้มตำไทย) (Fig. 1A) prepared using unripe papaya and typically featuring dried shrimp as a key ingredient. Som tum Lao (ส้มตำลาว) (Fig. 1B) is commonly consumed in Laos and is identical with the use of a unique fermented fish sauce traditionally known as pla ra [4]. Som tum Korat (ส้มตำโคราช) (Fig. 1C) combines the ingredients of som tum Thai and som tum Lao, including raw papaya, chili, red tomato, and pla ra. This dish is praised for its distinct sweet, spicy, and savory taste. Som tum pu pla ra (ส้มตำปูปลาร้า) (Fig. 1D) is a subvariation of som tum Lao that incorporates fermented raw crabs or other seafood, and the data regarding popular som tum were obtained from some experts in local Thai foods.

From a cultural point of view, som tum can be considered as a daily food for Thai people and has been an integral part of Thai food culture for millennia. Common meal arrangement in Thai food culture usually consists of source of carbohydrate (sticky rice or noodles), meat as source of protein, and som tum as source of vitamins,

minerals, and fiber (Fig. 2) [7–10]. Most Thai people usually eat collectively and order several foods to share together, including ordering several types of som tum and sharing them on a common table.

Som tum is generally made from shredded raw papaya, chili, yardlong beans, cherry tomatoes, dried shrimp, carrots, and roasted peanuts. Palm sugar, lime sauce, and fish sauce are used to add flavors to som tum, thus giving som tum a refreshing combination of sweet, sour, and salty taste. In some som tum variations, specific ingredients are added, such as fermented seafood or vermicelli. These additional ingredients lead to a plethora of som tum variations that can differ from one region to the others in Thailand. The final characteristic that contributes to the distinctiveness of som tum is the incorporation of a unique fermented fish sauce native to the Isan region in Thailand, which is known as pla ra. Since som tum represents Thai food culture, it has been considered as an intangible cultural heritage and a tourism asset [12–15].

Despite being a famous Thai ethnic food, scientific publications about som tum in international database are currently very limited. The objective of this review is to furnish insights pertaining to the historical background,

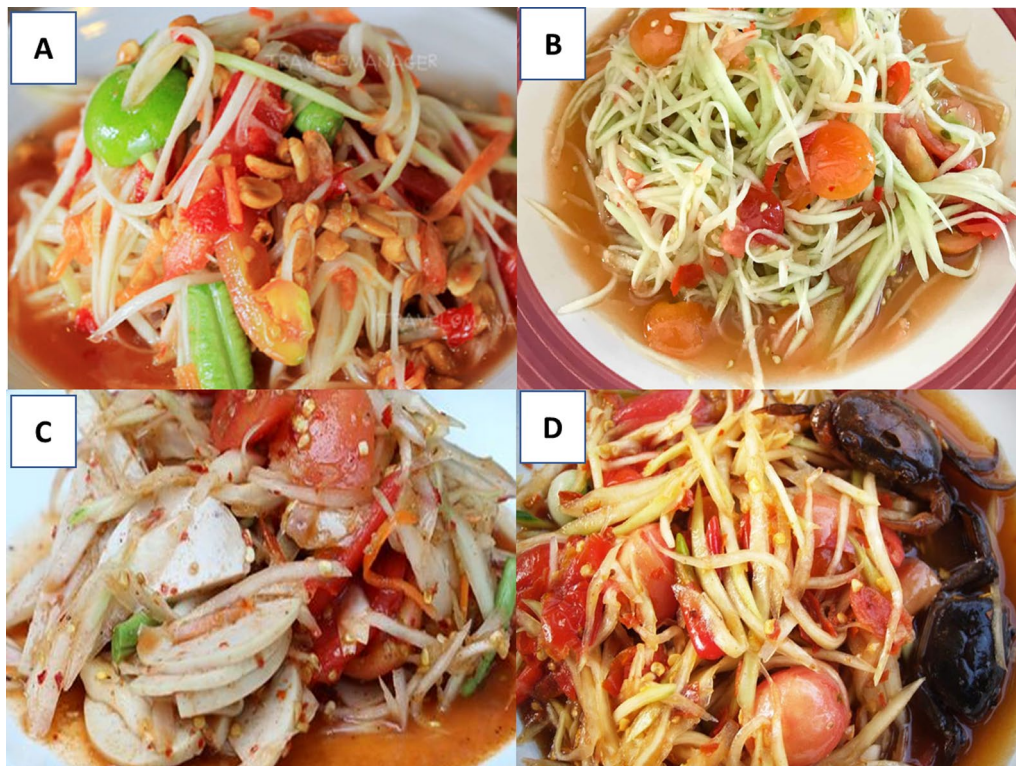


Fig. 1 Different famous variations of som tum in Thailand: **a** som tum Thai (ส้มตำไทย) usually served with yardlong beans, dried shrimp, roasted peanuts, but without fermented fish sauce (pla ra) [5], **b** som tum Lao (ส้มตำลาว) served with pla ra as one of the main ingredients, **c** som tum Korat (ส้มตำโคราช) that appears like a mix of som tum Thai and som tum Lao, and **d** som tum pu pla ra (ส้มตำปูปลาร้า) served with fermented seafood, such as crab [6]

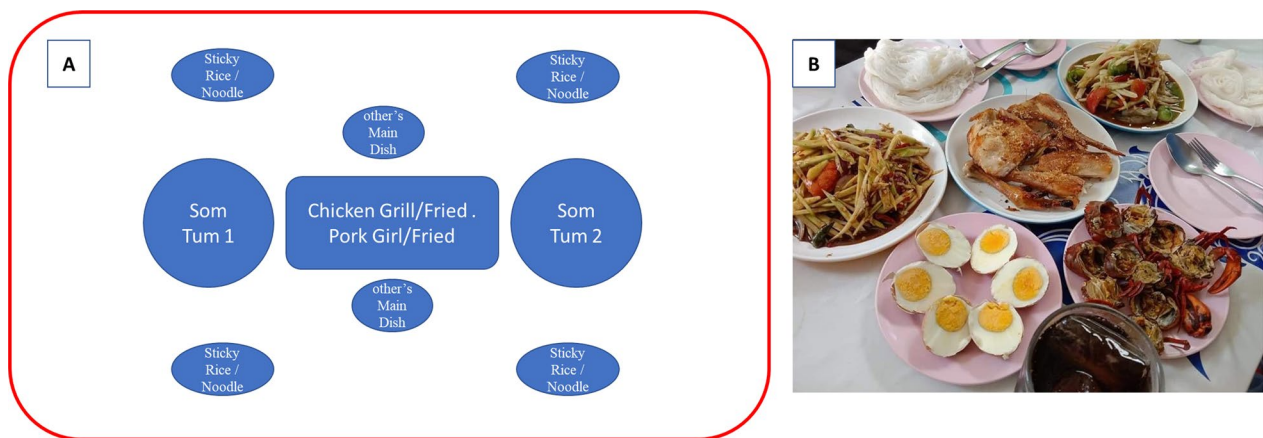


Fig. 2 **a** Illustration of a common meal arrangement in Thai food culture, of which som tum becomes an integral part. The illustration was created based on the interview sessions. **b** Example of a complete Thai meal including som tum. (*Illustrations were obtained from some experts in Thai Local Foods)

ingredients, production techniques, distinctiveness, nutritional advantages, and innovations of som tum. The facts provided in this review may serve as a valuable resource or point of reference for future scholars seeking to conduct further research on som tum. This study has been conducted using a qualitative approach through face-to-face interview sessions with total 15 peoples with the range age 20–50 years old (Additional file 1: Table SM1), Thai (11 peoples) and Laotian (4 peoples), they are represent from food technology lecturer, employee, student, and the owner of Thailand food restaurant that famous in khon kaen city area, food technology lecturer and Thailand food restaurant were interviewed due to their knowledge of history, health and benefit, and the origin of som tum. Employee and student to get information a general understanding of the history, different types of som tum and to obtain data on their knowledge of the som tum to provide comparative data from interviews with others. Khon kaen are the central province in Isan area and has a large immigrant population from various provinces in Thailand in Isan area because Khon Kaen has Khon Kaen University which is the top 10 famous campuses in Thailand that can be represent of Thai citizen. In addition, a literature review on som tum was performed using Google Scholar as database.

History and philosophy of som tum

The Kingdom of Thailand is a Southeast Asian country sharing borders with Laos, Cambodia, Myanmar, and Malaysia (Fig. 3). Over 66 million people live in 77 provinces across 513,120 km² in Thailand [16]. Thai culture is founded on a sufficient economy that uses knowledge and virtue as rules for living and is centered on principles like moderation, prudence, and social immunity.

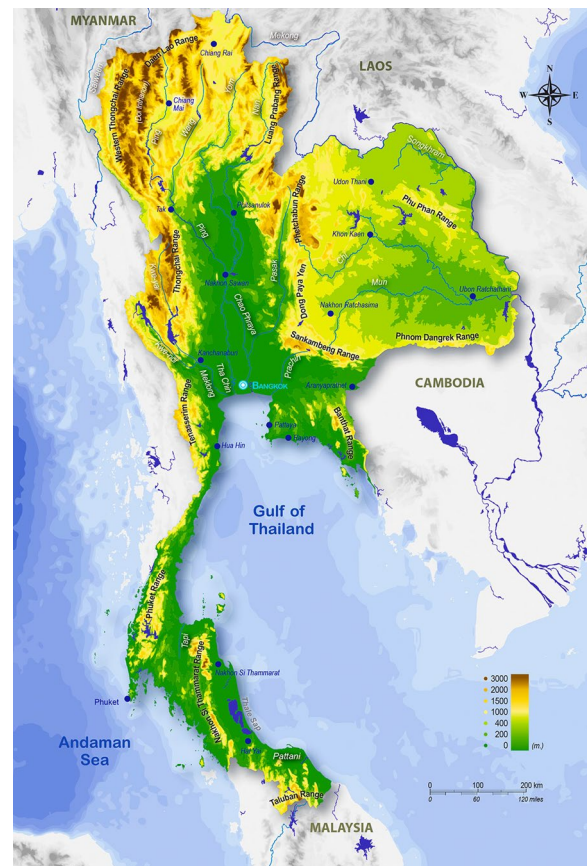


Fig. 3 Geographical the Kingdom of Thailand [11]

Intricacy, attention to detail, texture, color, taste, and the use of products with therapeutic properties and good flavor are important features of Thai culinary traditions [17]. Thai cuisine has a distinctive blend of flavors and is

renowned for its zealous use of fresh herbs and spices. For decades, Thai government has used Thai food as a promotional medium to attract the attention of foreign tourists, by holding Thai food and cultural festivals in collaboration with Thai embassies abroad and developing the traditional night market and streetfood culture that are traditionally popular among Thai people. Such a phenomenon is identified as the Thai gastrodiplomacy [18, 19]. Currently, some popular night markets that have been the popular travel destinations among foreign tourists in Bangkok, the capital city of Thailand, include Jodd Fairs, Khaosan Market, Chatuchak Weekend Market, etc.

The history of food culture in Thailand has been strongly associated with the eras of different Thai kingdoms. In general, there are four historical eras that have defined Thai food culture until today. In the era of Sukhothai (1249–1583), food was mainly grown by local families and shared in limited communities without any engagement in trading. Rice appeared to be a staple meal and fish was the primary source of protein in most of the Thai meals. The Ayutthaya period (1350–1767) was characterized by the introduction of Indian food culture and spices into local cuisines. The Thonburi era (1767–1782) appeared as the development era of Thai food traditions, during which many variations of foods and recipes were invented and adopted by the indigenous people of Thailand. In the current age, known as the Rattanakosin era (1782–present), additional world cuisines are adopted into Thai food culture along with the introduction of foreign culture to Thailand through international trade and tourism [20–22].

Traditional food is an authentic food specialty of a country that has become part of local wisdom and has been traditionally known for a long time. As an ethnic food, som tum is believed to have originated from a community of ethnic Chinese-Lao settlers in Thailand.

These people adopted ancient Laotian tribal traditions, including their dietary habits of preparing som tum (fruit salad). Over time, the new dish known today as som tum is thought to have originated during the early Rattanakosin period (late 18th to early nineteenth centuries), and then spread to all around Thailand [23–26]. Som tum that is known today as an authentic Thai food, originally came from a neighboring country, namely Laos, with its original name som tum Luang Prabang (ส้มตำหลวงพระบาง) (Fig. 4A). Luang Prabang is the name of the ancient capital city of Northern Laos [27]. According to a Laotian scholar that became one of our informants, som tum Luang Prabang has the same ingredients as som tum pu pla ra which is famous for its uniqueness in the North Eastern part of Thailand. Uniquely, som tum Luang Prabang is served with special rice sheets known as kway chap. With the time, som tum became famous and accepted by Thai people, thus making som tum a part of Thai food culture consumed on daily basis. Interestingly, som tum grew into many variations as Thai people from different regions adapted som tum recipes according to their local taste and the availability of local ingredients.

Som tum in Thailand currently has many flavors and variations. The traditional som tum from the North Eastern (Isan) region is called som tum pu pla ra (pu means crab and pla ra means traditional Isan-style fermented fish sauce). Since some people did not like consuming fermented crab, the recipe of som tam pu pla ra was then developed into another similar Isan-style som tum recipe without fermented crab, namely som tum Lao. Another variation of som tum Lao served with rice vermicelli is called som tum khao poon (ซำตำข้าวปุ้น, Fig. 4B). In the Central Thailand, people prefer dominantly sweet and savory flavors. Since the flavor of pla ra could be too strong and unpleasant for them, pla ra was omitted from the recipe of som tum developed in the central Thailand.



Fig. 4 **a** Som tum Luang Prabang (ส้มตำหลวงพระบาง) typically served using pre-boiled traditional rice sheets (kway chap). **b** Som tum khao poon (ซำตำข้าวปุ้น) served with rice vermicelli

These people invented som tum Thai without using pla ra but with the addition of yardlong beans and tomatoes. Som tum continued to grow and expand in Thailand until it finally reached the southern part of Thailand, where people prefer spicy food. In this area, som tum are served with a higher amount of chili peppers, thus making som tum from South Thailand tends to be spicier than som tum from other areas in Thailand.

Some areas in Thailand also developed som tum recipes that appeared to be a combination of other som tum recipes from adjacent areas. According to our interviewees who were educational figures in the field of food science, there is a combination between som tum Thai and som tum Lao or som tum pu pla ra, which is referred as som tum Korat (Korat is another popular name of the Province of Nakhon Rachasima) [7, 28, 29]. Nowadays, many foreigners visit Thailand to obtain gastronomic experience and satisfy their interest in discovering traditional Thai food, one of which is som tum. It is noteworthy that the term som tum for foreigners usually refers

to som tum Thai, which is served using shredded green papaya, dried shrimp, roasted peanuts, cherry tomatoes, and yardlong beans without the presence of pla ra that could be too strong in terms of flavor and smell for foreigners who are not used to consuming fermented seafood [30–32].

Composition and preparation of som tum

Currently, a myriad of som tum variations exists in Thailand. The difference between som tum recipes in Thailand relies particularly on the addition of additional local ingredients found in different regions in Thailand. In this part, we present the composition of the most popular som tum, which is som tum Thai. According to our interviewees who were traditional Thai food sellers (อาหารตามสั่ง = *ahar tam sang*), the basic ingredients of som tum Thai consists of shredded green (young) papaya as the main component, fresh red chili peppers to give a spicy taste, lime and cherry tomatoes to give a fresh sour taste, fish sauce to give a salty and fishy taste, palm sugar to give

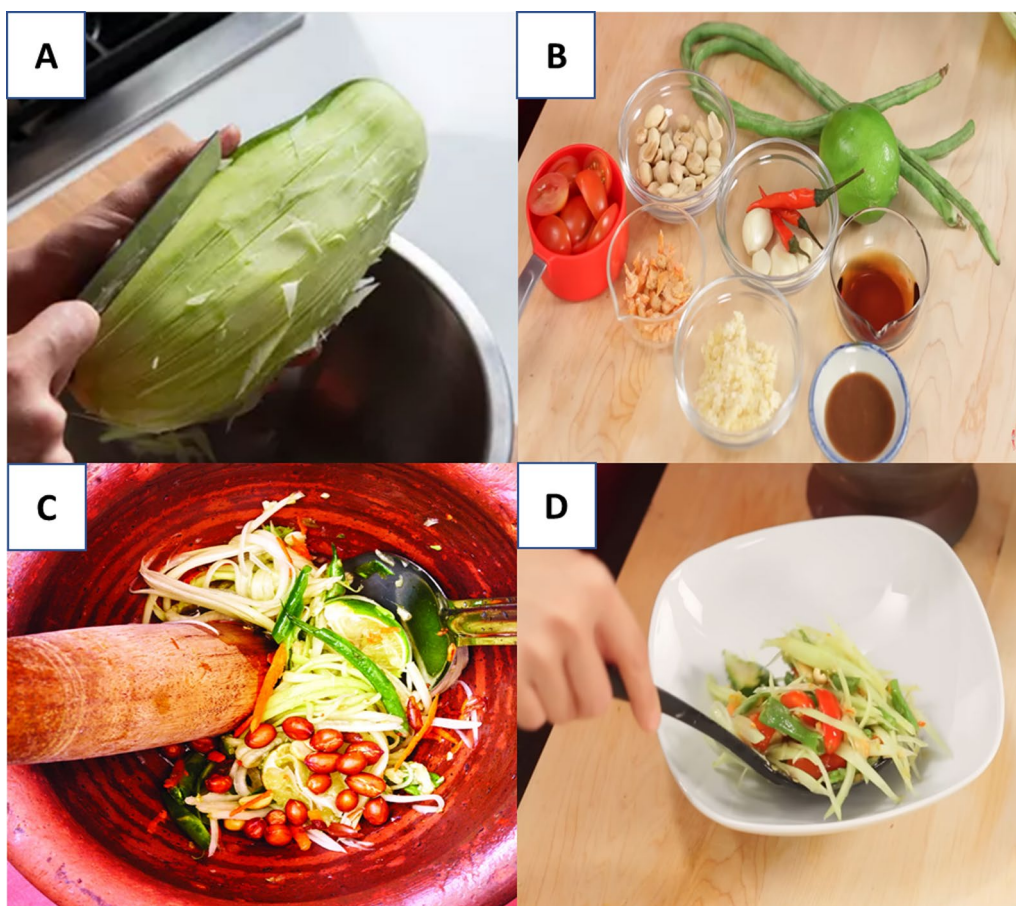


Fig. 5 General steps in som tum making that consists in: **a** cutting green papayas into shreds, **b** mixing the green papaya shreds with other ingredients for seasoning, **c** pounding all the ingredients together using a mortar, and **d** serving the som tum on a plate for consumption. (*Data were obtained from some experts in Thai Local Foods)

a hint of sweetness, garlic, roasted peanuts, dried shrimp, and cut yardlong beans. Therefore, som tum generally has a rich and complex taste combining flavorful different ingredients. Fish sauce provides umami taste (savoryness) or in some cases, monosodium glutamate (MSG) is also added to enhance flavor.

The general steps of the preparation of som tum are presented in Fig. 5. Green (young) papaya is usually the main ingredient of som tum. It is abundantly available every time and everywhere in Thai market. To make som tum, green papaya should be peeled and shredded by making a series of parallel cuts running lengthwise on the papaya and shaving down across the length of the papaya. This step can be done manually or automatically using specialized shredding machines. The next step consists in mixing and pounding all the ingredients together using a mortar. This step is performed manually using both hands. While the left-hand pounds all the ingredients together using a pestle, the right hand mixes the ingredients with a spoon. When all the ingredients are evenly mixed, they are ready to serve as a dish on a plate.

Variations of som tum

Som tum offers a diverse range of flavors and ingredients, including but not limited to som tum Lao, som tum Thai, and som tum Korat. Other variants of som tum (Fig. 6) use basic ingredients as previously explained. Table 1 demonstrates variants of som tum known in Thailand

along with their different basic ingredients. It is noteworthy that pla ra is used in almost all som tum variants, except from som tum Thai that whose recipe has been modified to result in a som tum dish with a weaker flavor of fermented seafood. In the absence of pla ra, fish sauce is used to supply fishy flavor that is lighter in flavor compared to pla ra. In many cases, the presence of vegetables in som tum is optional. Interestingly, some variations of som tum even do not include green papaya, such as som tum hoy kraeng (boiled cockle som tum) and som tum pu ma (raw sea water crab som tum). The main highlight for different som tum variations is the additional ingredients that render each som tum variation unique, particularly seafood. In som tu mu vo, Vietnamese pork sausage is used as protein source [33].

Health benefits of som tum Thai

Traditional food is believed to provide many benefits, starting from enhancing social values through strengthening social relationships between family, friends, and society, as well as offering benefits for health. Som tum is consumed on daily basis by almost all Thai people and can be considered as a staple food besides rice. Its positioning in Thai food culture could be likened to kimchi in South Korea [34]. Our interviewees believed that som tum brought them potential health benefits. However, to our knowledge, there have been no studies conducted to explore the health benefits of som tum.

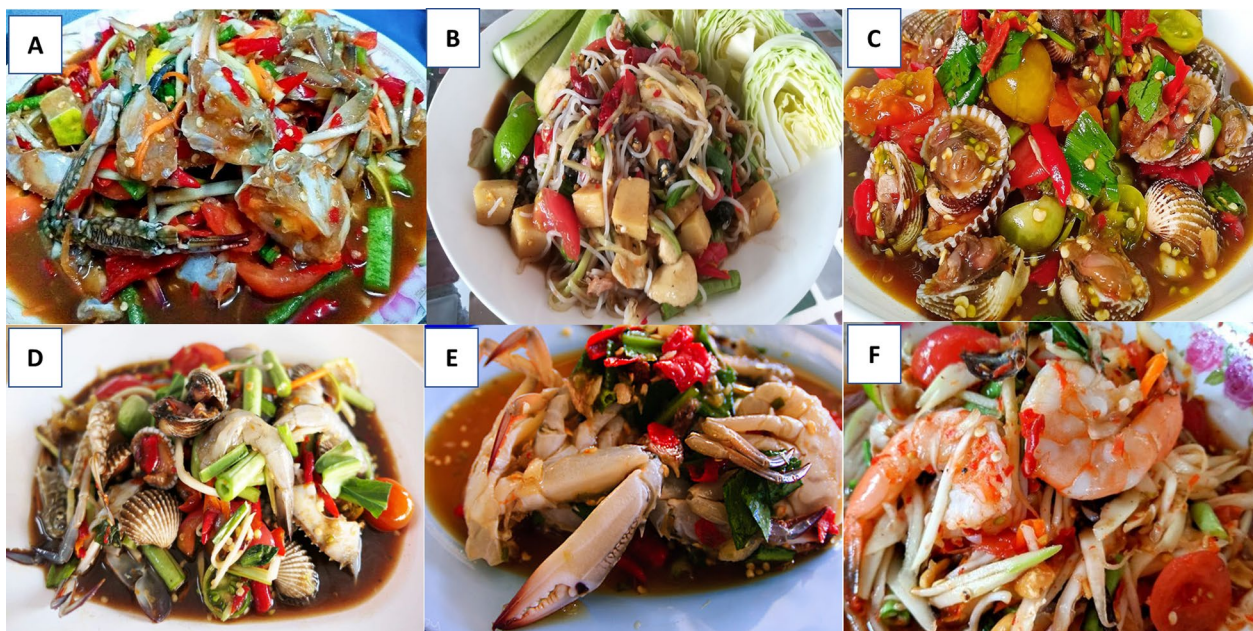


Fig. 6 Other variations of som tum in Thailand, **a** som tum pa (ส้มตำปลา), **b** som tum muo (ส้มตำมั่ว), **c** som tum hoy kraeng (ส้มตำหอยแครง), **d** som tum thale (ส้มตำทะเล), **e** som tum pu ma (ส้มตำปูม้า), and **f** som tum kung suk (ส้มตำกุ้งสุก)

Table 1 Based ingredient of various favorite som tum in Khon Kaen city, Khon Kaen province, Thailand

No	Name of Som Tum	Papaya	Tomato	Chilli	Palm Sugar	Garlic	Lime	Fish Sauce	Roasted Peanut	Dried Shrimp	Pla ra	Vegetable	Original Location	Others
Alphabet Name	Thai Name													
1	Som tum Thai	√	√	√	√	√	√	√	√	√	√	√	Bangkok area	
2	Sum tum Lao	√	√	√	√	√	√	√	√	√	√	√	Isan area	
3	Som tum Korat	√	√	√	√	√	√	√	√	√	√	√	Isan area	
4	Som tum pu pla ra	√	√	√	√	√	√	√	√	√	√	√	Isan area	
5	Som tum pa	√	√	√	√	√	√	√	√	√	√	√	Isan area	Raw sea water crab
6	Som tum muo	√	√	√	√	√	√	√	√	√	√	√	Isan area	Boiled snail, fish
7	Som tum khao poon	√	√	√	√	√	√	√	√	√	√	optional	Isan area	Vermicelli
8	Som tum hoy kraeng	√	√	√	√	√	√	√	√	√	√	√	Isan area	Boiled cockle
9	Som tum thale	√	√	√	√	√	√	√	√	√	√	optional	Isan area	Raw seafood
10	Som tum pu ma	√	√	√	√	√	√	√	√	√	√	√	Isan area	Raw sea water crab
11	Som tum kung suk	√	√	√	√	√	√	√	√	√	√	Optional	Isan area	Boiled prawn
12	Som tum mu yo	√	√	√	√	√	√	√	√	√	√	Optional	Isan area	Vietnamese pork sausage

Data were obtained from some experts in Thai Local Foods

Plausibly, the ingredients of som tum consisting of mainly vegetables contain vitamins and minerals. Green papaya also contains protease enzyme known as papain which facilitates protein digestion in human body, thus increasing the bioavailability of essential amino acids [35]. Chili peppers and lime are rich in vitamin C which has potent antioxidant properties and is important in tissue regeneration [36, 37]. Tomatoes, shrimp, and fish sauce contain glutamic acid which can help nerve cells in the brain send and receive information from other cells [38–40]. Garlic contains allicin with antioxidant and antimicrobial properties [41]. Roasted peanuts are rich in methionine, an essential amino acid that often becomes the limiting amino acid in leguminous [42]. The addition of seafood in other variations of som tum provides essential amino acids and iodine [41], thus improving the nutritional values of som tum.

Som tum could be considered as a significant source of fiber since it is mainly made from vegetables. A portion of som tum made from 200 g of green papaya contains 3.4 g fiber which contributes to 11% of human fiber daily requirement (30 g/day). The amount of fiber in som tum could be more when more vegetables are added into it. Fiber is also prebiotic that participates in gut health [43, 44]. In addition, pla ra and fish sauce could also provide probiotics, live microorganisms intended to give health benefits when consumed [45]. Both probiotics and prebiotics can form symbiotics that are beneficial for gut health and furthermore, for human health in general [46].

The caveat of consuming som tum could be the excessive amount of sodium consumed since most ingredients are rich in sodium, particularly seafood, pla ra, and fish sauce. Pla ra and fish sauce are made by salting seafood with a relatively high amount of sea salt (17.9%) [47]. High sodium intake is associated with hypertension and cardiovascular diseases [48]. Furthermore, sea pollution should also be considered since seafood is often used in som tum. Seafood is often found to contain a relatively high level of mercury and other heavy metals that could be harmful toward human health [49–57]. Our interviewees, Mr. Teerachat as a Food technology lecturer in Thailand said that Pla ra also can be consider for those people that have sensitive stomach because can make a diarrhea.

Modern image and innovation of som tum

Today, Thai people consider som tum as a traditional healthy food. Based on the interview with our informants, 91% Thai interviewees eat som tum on daily basis at least in a meal and once they eat with friends or family in

a restaurant or eatery, they can order up to two to three som tum variations, such as som tum Lao, som tum Thai, or som tum muo. Despite the current westernization that has also reached Thai food culture, som tum is still believed to survive in Thai culture and will surely continue to adapt to social changes. Currently, som tum has been widely industrialized and is practically always available at the market all year long in Thailand, including ready-to-eat som tum processed via freeze drying and som tum seasoning (Fig. 7). The development of variations in the taste of som tum is currently growing to attract the interest of tourists to try the som tum and people in Thailand so that they have a variety of new flavors of food, of Furthermore, som tum was subject to innovation to attract Thai younger generation and tourist (Fig. 8), such as som tum MAMA (ส้มตำ มามา) which combines instant noodles and som tum Thai. Other types of newly invented som tum do not contain green papaya, but other vegetables, including som tum taeng (ส้มตำแตง) made from cucumber, som tum twa (ส้มตำถั่ว) made from yardlong beans, and som tum khawpod (ส้มตำข้าวโพด) made from boiled sweet corn and, optionally, salted egg.



Fig. 7 Som tum-derived products commercially available in Thai market. **a** Ready-to-eat (RTE) pre-dried som tum that only requires hydration prior to consumption [58], **b** pre-mixed seasoning powder containing spices that are generally used to make som tum [59, 60]

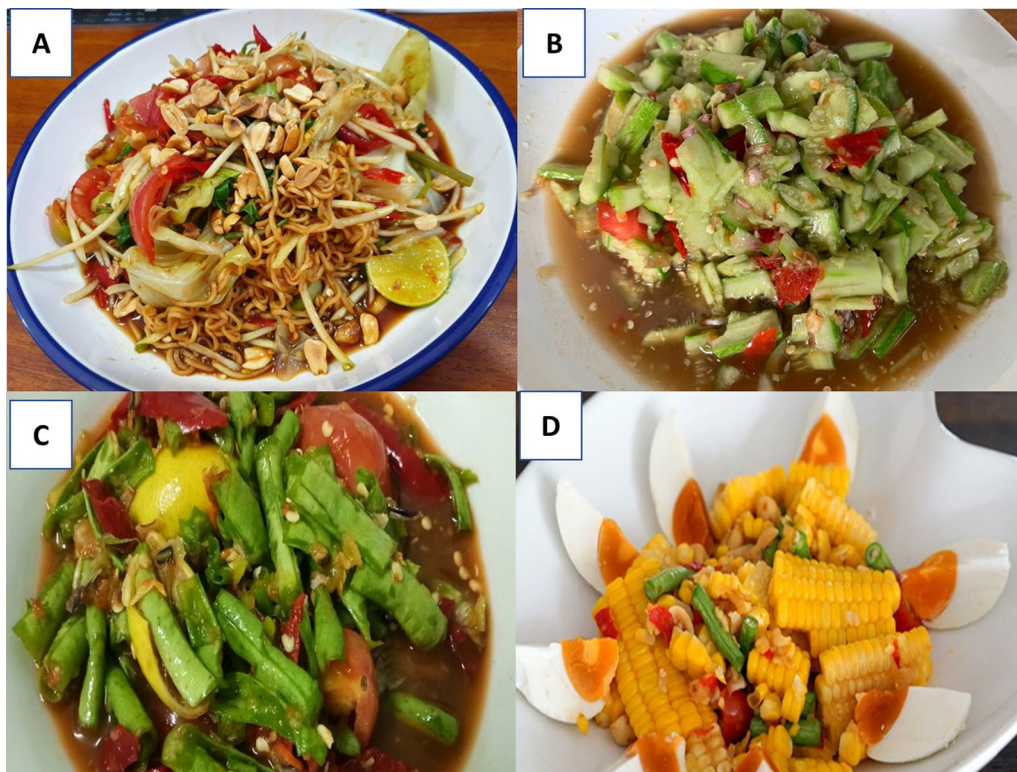


Fig. 8 New variations som tum without green papaya including, **a** som tum MAMA (ส้มตำมามา) [61] serve using pre-boiled famous instant noodles in Thailand (Brand: MAMA), **b** som tum taeng (ส้มตำแตง) made using cucumber [62], **c** som tum twa (ส้มตำถั่ว) made using yardlong beans, **d** som tum khawpod (ส้มตำข้าวโพด) made using sweet corn [63]

Conclusion

Som tum is a well-known ethnic traditional food from Thailand, despite having its roots in Laos. It has a distinctive name and a wealth of medicinal benefits. It includes nutritious ingredients and seasonings including green papaya, tomatoes, chili, palm sugar, garlic, lime, and roasted peanuts, among others. Ascorbic acid and glutamic acid, which are found in som tum, can assist the immune system, promote wound healing, and fight off various diseases. In addition, it has economic worth as a prospective good that might help the tourism industry and the neighborhood. Since many tourists enjoy visiting Thailand, especially around this time, and they enjoy trying real traditional cuisine, som tum has grown famous. This condition makes it more marketable and competitive while upholding traditional values. Som tum is currently offered in a variety of innovative products, including ready-to-eat, seasoning, and instant paste. With this invention, those who want to consume and prepare som tum conveniently can adapt to current lifestyles. The excellence of this article is that it provides comprehensive knowledge about authentic traditional food from Thailand of knowledge in the historical background, uniqueness,

composition, processing, health benefits, development, and innovation of som tum. Future research that is more focused on innovation business models and branding tactics to expand the market for Som tum will be necessary to effectively promote the som tum.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s42779-023-00204-4>.

Additional file 1. Supplementary table.

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Author contributions

DN, RG, JJ, AT, RB were equally involved in the production of this manuscript. All authors have read and approved the final manuscript.

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All data in this research are available from the corresponding author by reasonable request.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

The authors approve the publication of this manuscript.

Competing interests

The authors declare no competing interests.

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