

## The Evolution of Thai Curry Pastes

### วิวัฒนาการเครื่องแกงไทย

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### Abstract

This is a qualitative cultural research investigation to examine the history of traditional Thai curry pastes in central Thailand. Three higher education institutions were purposively selected as the research area, which were School of the Oriental Hotel Apprenticeship Program (Thai Cuisine Management Course), Suan Dusit International Culinary School (Intensive Thai Cooking Course) and Rajamangala University of Technology, Krungthep Phranakhon Tai Campus (Food and Nutrition Course). The research sample included 6 key informants, 15 casual informants and 170 general informants. Data were collected through observations, interviews, focus group discussions and workshops. Data was validated using a triangulation method and the results are presented here as a descriptive analysis. The results show that Thai curry pastes originated in the Sukhothai period of Thai history. The components of the pastes came from areas near waterways, where plants and spices were grown, where animals were raised for consumption, where condiments were used to flavour food and where food was imported from China. During the Ayutthaya

period, *kapi* (shrimp paste) became a popular ingredient in curry pastes, along with more varied herbs and spices and other strong-smelling plants and meats. Seafood also became more prevalent and tastes were influenced by the flavours of China, Japan, Persia, France, the Mon Kingdom, Portugal, India and the Netherlands. Traditional Thai curry pastes are often flavoured with lemongrass, kaffir lime leaves and coconut milk. The other spices in the pastes varies from location to location but traditional Thai curry pastes have found popularity throughout the world.

**Keywords:** Curry paste, Thai food, Traditional knowledge

### บทคัดย่อ

ในงานวิจัยนี้ใช้การวิจัยเชิงคุณภาพทางวัฒนธรรมที่มีความมุ่งหมายเพื่อศึกษาประวัติความเป็นมาของเครื่องแกงไทยโดยใช้ภูมิปัญญาพื้นบ้านในเขตภาคกลาง คัดเลือกพื้นที่วิจัยแบบเจาะจงจากสถาบันอุดมศึกษา 3 แห่ง คือ โรงเรียนวิชาการโรงแรมแห่งโรงแรมโอเรียนเต็ล (หลักสูตรบริหารการครัวไทย) โรงเรียนการอาหารนานาชาติสวนดุสิต (หลักสูตรการฝึกอบรมช่างฝีมืออาหารไทย) และสถาบันเทคโนโลยีราชมงคล วิทยาเขตพระนครใต้ (หลักสูตรอาหารและโภชนาการ) กลุ่มตัวอย่างประกอบด้วย กลุ่มผู้รู้ด้านเครื่องแกงไทย 6 คน ผู้ปฏิบัติ 15 คน และกลุ่มบุคคลทั่วไป 170 คน เก็บรวบรวมข้อมูลด้วยวิธีการสังเกต การสัมภาษณ์ การประชุมกลุ่มย่อย การสนทนากลุ่ม และการประชุมเชิงปฏิบัติ ตรวจสอบความถูกต้องของข้อมูลด้วยเทคนิคสามเส้า นำเสนอผลการวิเคราะห์ข้อมูลโดยการพรรณนาวิเคราะห์ ผลการวิจัยพบว่า ความเป็นมาของเครื่องแกงไทยเกิดขึ้นในสมัยสุโขทัยในภูมิภาค มีใช้วัตถุดิบที่มาจากแหล่งน้ำ มีการปลูกพืช ผัก และเครื่องเทศ มีการเลี้ยงสัตว์เพื่อนำมาประกอบอาหาร มีการใช้อุปกรณ์ในการปรุงอาหาร มีการนำเข้าอุปกรณ์ใส่อาหารจากประเทศจีน ในสมัยอยุธยามีการบริโภคแกงที่ใส่กะปิ มีส่วนผสมของสมุนไพร เครื่องเทศ และผักกลิ่นฉุน มีการบริโภคเนื้อสัตว์ วัตถุดิบที่มาจากแหล่งน้ำและทะเล โดยแกงบางชนิดได้รับอิทธิพลจากการประกอบอาหารจากจีน ญี่ปุ่น เปอร์เซีย ฝรั่งเศส มอญ โปรตุเกส อินเดีย และฮอลันดา เครื่องแกงไทยโบราณมักจะมีรสชาติตะไคร้และใบมะกรูดรวมกับกะทิ เครื่องเทศที่ใช้ในเครื่องแกงไทยขึ้นอยู่กับภูมิภาค อาหารไทยที่สร้างขึ้นจากเครื่องแกงเป็นที่นิยมทั่วโลก

**คำสำคัญ :** เครื่องแกงไทย อาหารไทย ภูมิปัญญา

### Introduction

Thai food created using traditional curry pastes is some of the most complex and refined food in Asia. This reflects the royal origins of the cuisine in the royal court and religious strongholds. These establishments encouraged the culinary arts, paying particular attention to regional diversity and a broad spectrum of ingredients (Hazra, 1982; Kulke & Rothermund, 1998; Rajadhon, 1988). Indeed, religion has had a large part to play in the shaping of Thai food culture.

In Thailand, Buddhism is the national religion and an integral part of local lifestyle. Buddhism can be broadly classified into two schools, Theravada and Mahayana (Hazra, 1982). Theravada Buddhism is the discipline practiced by most Thai people and this particular school does not prohibit or discourage the eating of meat, except as a voluntary practice. A number of geographical and agricultural factors also enhance the nature of Thai cuisine. Very generally, Thai meals consist of jasmine rice with a combination of soup, salad, a steamed, fried, stir fried or grilled dish, a spicy vegetable and fish dish, curry, condiments, dessert and fruit, served at the same time and in no particular order. Widespread use of curry pastes has been traced back to the 13th century and this has continued through history from the Sukhothai Kingdom to the Rattanakosin Kingdom (Kanchanakunjara, 2013). However, despite the prevalence of curry pastes in Thai cooking, there has been no systematic documentation of the historical development of this vital component of Thai cuisine. This investigation therefore aims to synthesize the knowledge of curry-paste types and identify the active components in different curry pastes. The research also aims to track the historical development of curry pastes in Thailand from historical sources and other scholarly documents.

### Research Objectives

The three aims of this qualitative cultural investigation were 1) to study the history of Thai curry pastes from the Sukhothai Kingdom to the Rattanakosin Era in central Thailand. This study also aims 2) to examine the development of curry pastes in Thailand and 3) to determine the traditional ingredients used in the pastes.

### Scope and Conceptual Framework

This investigation is a qualitative research project to examine the development of consumption behaviours, ingredients and flavour adaptation of traditional Thai curry pastes across time. Six coconut-milk based curry pastes were examined during initial research for this investigation: *gaeng ped* (spicy red curry with coconut milk), *gaeng kiao wan* (sweet green curry with coconut milk), *gaeng mussaman* (rich spicy curry with beef, lamb, pork or chicken), *gaeng gari* (mild yellow curry), *chu chee* (rich red curry with fish) and *gaeng panaeng* (thick nutty curry). In addition, seven non-coconut-milk based curry pastes were also examined, namely *tom yam* (hot and sour soup with lime juice, lemongrass, kaffir lime leaves and straw mushroom), *tom ka* (soup with galangal rhizome, kaffir lime leaves and coconut milk), *tom som* (spiced tamarind soup), *tom klong* (sour and spicy soup with dried fish and herbs), *gaeng ba* (spicy, watery curry

with kaffir lime leaves, lemongrass, peppercorns and galangal), *gaeng liang* (spicy mixed vegetable soup) and *gaeng som* (sour and spicy fish curry). From these lists, two curry pastes were purposively selected for the remainder of the research: *mussaman* and *tom yam*. The basic recipes for these two curry pastes were taken from the three research areas, the Oriental Hotel Apprenticeship Program, Suan Dusit International Culinary School and the Rajamangala University of Technology. These three recipes were combined to make a standardized recipe for each of the two curry pastes.

## Literature Review

Much of the literature surrounding Thai traditional curry pastes concerns the strong connection with religion and the royal courts (Hazra, 1982; Kulke & Rothermund, 1998; Rajadhon, 1988). The literature primarily focuses on the basic ingredients in Thai curries, *gaeng* and their prevalence throughout Thailand (Faithong et al., 2010). While acknowledging the common features of Thai curries, many researchers have also recognised regional differences in original Thai cooking (Chotechuang, 2012). For example, the central region of Thailand is known for using more sugar in their cooking than other regions, while Thai fish sauce (or *nam pla*) is also a feature of traditional curry pastes across the region (Mouritsen, 2012; Yoshida, 1998). Scholars agree that the reason for regional differences are due to the wide variety of ingredients from local sources, such as chili peppers, kaffir lime leaves, lemongrass, galangal and coconut milk, which tend to add a distinct aroma or recognisable flavour signature to each dish (Raghavan, 2007). This is typified by the famous green curry, made from fresh local spices and fragrant cumin (Siripongvutikorn et al., 2008).

Thai curries have long been linked to the royal family, which has been the theme of much scholarly work in the field of culinary arts. A long history of traditional *massaman* curry paste was found to date back to the thirteenth century. In the thirteenth century, Islam spread to Southeast Asia via the maritime trade routes that connected India with the spice islands of the East (Kulke & Rothermund, 1998; Pelliot, 1959). Massaman curry is a Thai dish that is Muslim in origin, using Portuguese spicing. The development of the dish in Southeast Asia is a good example of cultural diffusion, particularly considering the use of cumin, a spice from the Mediterranean region (Douglas et al., 2005). Moreover, the name may be derived from the word *musulman*, meaning of Islamic or Muslim heritage (Grove & Grove, 2010).

Thai food is functional food and has a demonstrably proven positive effect on basic nutrition, not least because many of the ingredients have been used as traditional medicines for a long time. A further body of literature is concerned with the components of Thai cooking and, particularly, their pharmacological properties, including antimicrobial, antioxidant, anti-inflammatory, and anticancer (Jones et al., 1997; Kuljanabhadgavad et al., 2014; Miquel et al., 2002; Seah et al., 2010). The system of holistic medicine known as Thai Traditional Medicine (TTM) uses mainly plant-based drugs or formulations to treat various diseases. Many of the ingredients in these traditional remedies are also found in Thai cuisine.

With the findings from a broad range of scholarly literature in mind, this investigation will now document the development of traditional curry pastes through Thai history and attempt to identify the original ingredients of some traditional recipes.

## Research Methodology

A qualitative cultural research method was used for this investigation. The aim was to study the history of Thai curry pastes from the Sukhothai Kingdom to the Rattanakosin Era in central Thailand. For this investigation, the research area was purposively selected as three locations in Bangkok, Thailand, which were the Oriental Hotel Apprenticeship Program (OHAP), Suan Dusit International Culinary School (SDICS) and the Faculty of Home Economics and Technology at Rajamangala University of Technology, Krungthep Phranakhon Tai Campus (RMUTK). From these three locations, a research sample was selected, including six key informants, 15 casual informants and 170 general informants. The tools used for gathering data were document analysis, survey, participant observation, non-structured interviews and a focus group discussion, as well as a concluding workshop. The six key informants participated in in-depth interviews to provide data concerning each of the research aims. This data was corroborated by interviews and focus group discussions with casual informants. General informants took part in the basic survey and were the subjects of observations and informal interviews. Data validation was conducted by methodological triangulation. Data were analyzed by both inductive and typological analysis methods. The results are presented below by means of a descriptive analysis.

## Results

### 1. The Background of Traditional Thai Curry Pastes

*Gaeng* usually means any wet savory dish enriched and thickened by a paste. This paste is aromatic and can either be homemade or shop-bought. The curry paste ingredients

are pounded together in a stone mortar using a pestle. This process allows the release of essential oils from the Thai herbs and spices, which impart flavors and fragrances. The preparation of curry pastes can take twenty minutes to half an hour for each meal. Although traditional Thai curry pastes have been influenced by other cultures, they retain their own culinary style, largely developed by ethnic Thai people. The pastes include such ingredients as galangal, lemongrass and fragrant basil. Moreover, regional variations of curry pastes with distinct and significant flavours have emerged over time, including *massaman* curry, red curry (*gaeng ped*), green curry (*gaeng kiao wan*), the well known hot and sour soup, *tom yum*, and the Southern-Thai yellow curry (*gaeng som*). In Thailand, many curry pastes contain shrimp paste, which is known locally as *kapi*. This pungent paste is made from tiny shrimps marinated in salt, dried in the sun, pulverized and fermented for several months. *Kapi* is commonly used in traditional Thai food. It is consumed extensively as a condiment in every region of Thailand (Faithong et al., 2010). It is the main ingredient used for flavoring dishes and is found in various spicy Thai soups (Chotechuang, 2012). The different forms of Thai curry also depend on the type of *num prik* (spice mixture) used in their creation. *Num prik* may be composed of roasted chilies, ginger, garlic, *kapi*, lime juice, and sugar (palm sugar or cane sugar). The central region of Thailand is famous for including more sugar and sweeteners in local dishes. Fish sauce is an integral ingredient in all Southeast-Asian cuisines and is known by many different names in many different countries, such as *tuk Trey* in Cambodia, *bakasang* in Indonesia, *ngan-pya-ye* in Myanmar, and *nuoc mam* in Vietnam (Mouritsen, 2012; Yoshida, 1998). Thai fish sauce (or *nam pla*) is used in traditional curry pastes and Thai dishes throughout the country. Thailand is rich in food resources and the use of locally available ingredients has become a main feature of curry pastes.

The classifications of traditional Thai curries are yellow curry, *massaman* curry, green curry, red curry, panang, and jungle curry. Curries are the richest dish of Thai cuisine and are based on herbs and spices and different combinations of meats, fish, vegetables, and fruits. Ingredients are mostly sourced locally and also include chili peppers, kaffir lime leaves, lemongrass, galangal and coconut milk. As a result, the flavours of Thai curries tend to be more aromatic than Indian curries (Raghavan, 2007). The curries in Thai foods are categorized by the methodology of the paste preparation. It is normally described by color, for instance red curries use red chilies and green curries use green chilies as the essential ingredients. One yellow-coloured curry is called 'gaeng curry' (or *gaeng kari*), for which a direct translation would be 'soup curry'.

Yellow curries in Thai cuisine are closely related to Indian curries with their use of turmeric and cumin as the important ingredients. Furthermore, curries within Thailand often contain different ingredients to their namesakes in other countries. For example, yellow curry (or *geang hleung*) in Thailand does not usually contain potatoes, except in some Southern Thai versions. However, restaurants abroad usually include potatoes in this particular dish. Thai curries are either water-based or coconut-milk-based. Coconut-milk-based curries are prevalent in Bangkok and the central region of Thailand. Water-based curries are more common in Northern Thailand.

Red curry paste includes dried red chilies, peppercorns and lime zest, and sometimes roasted and ground Indian spices, such as coriander, cumin, and cloves. Many popular Thai dishes use red curry paste, which is compared to the Indian Sambar. Important ingredients in red curry dishes are kaffir lime leaves, pea eggplant, Thai eggplant, coconut milk, Thai basil, and meat, such as beef, chicken, fish, duck, pork or shrimp. Thai red curries have plenty of chilies. The paste can be salty, sweet and fiery. In some parts of Central and Southern Thailand, local, seasonal ingredients are added, such as bamboo shoots and young coconut stems.

Green curry paste originated in Asia and has been changed to suit the taste of every palate. In the 13th century, Siam opened up trade with the Indian and Moorish peoples, who were said to have added milk and creams and, later, coconut milk to a basic paste of coriander fruit and root cumin, peppercorns, lemongrass, kaffir lime skin, garlic, shallots, and shrimp. This green curry was made from these fresh spices and fragrant cumin plant (Siripongvutikorn et al., 2008). Coriander roots and stems are chopped and used as an additional ingredient. Green curry paste is an indispensable ingredient in Thai green curries and green dishes using green chili peppers. Green curry pastes combine well with strongly flavored fish, meat or bitter vegetable dishes that contain fresh green chilies, basil leaves, lime leaves, pea eggplant, and round Thai eggplant. A basic green curry includes green chilies, coriander, kaffir lime leaves, shallot and rinds, lemongrass, garlic, cumin, and *nam pla*. The dish has citrus undertones and can be mild or hot. Green curry, like all curry blends, varies in composition and the flavor depends on the cook and regional ingredients.

A long history of traditional *massaman* curry paste was found to date back to the 13th century. In the 13th century, Islam spread to Southeast Asia via the maritime trade routes that connected India with the spice islands of the East (Kulke & Rothermund, 1998). The first time *massaman* curry was found in Thailand was in the 14th century Lanna Kingdom (Pellicot, 1959). *Massaman* curry paste is mixed with beef, lamb or pork. It is Muslim in origin and uses

Portuguese spices. The curry paste includes cumin, which originated in the Mediterranean region (Douglas et al., 2005). The name of *massaman* (singular noun) is thought to be derived from the word of *musulman* (plural noun), the word meaning Islamic or Muslim (Grove & Grove, 2010). *Massaman* curry is a blend of traditional Thai and Indian curries and usually contains coconut milk, roasted peanuts, potatoes, bay leaves, cardamom pods, cinnamon, palm sugar, tamarind sauce, and *nam pla*. It is commonly made with beef in Thailand and is named *gaeng massaman*. In Southern Thailand, the three border provinces of Yala, Pattani, and Narathiwat are home to large Muslim populations. Consequently, this is the region in which most authentic *mussaman* curries are found. The original paste contains dried red chilies, ground coriander, cumin, cloves, white pepper, peanuts, and, unusually for a Thai curry, roasted whole spices such as cinnamon, cardamom, and nutmeg.

The most famous hot and sour soup of Thai cuisine is *tom yum*. *Tom yum* is typically characterized by its distinct hot and sour flavors with aromatic herbs and generous use of spices. The basic broth is made of stock and fresh ingredients such as galangal, kaffir lime leaves, lemongrass, and lime juice, combined with *nam pla* and crushed bird's eyes chili with prawns. *Tom yum gai* uses chicken instead of seafood and is often called the signature dish of Thailand (Kanchanakunjara, 2008; Kanchanakunjara, 2013).

Many of the plants used in Thai cuisine are found in the kitchen garden, such as clove, cardamom, cinnamon, coriander, cumin, galangal, garlic, kaffir lime, lemongrass, nutmeg, chili, shallot, star anise, and white pepper. Herbs and spices are commonly used in traditional curry pastes but may differ from home to home or region to region. Herbs and spices are important plant products that are high in vitamins, nutrition component, and phytonutrients. Plant products are mixtures of chemical compounds that are used to flavor or season food. Aromatic compounds, monoterpenoids, and sesquiterpenoids can be found in the aromatic dried plant products. Spices include all aromatic dried plant products, such as arils, barks, flower buds, fruits, leaves, rhizomes, and other parts of woody plants such as climbers, shrubs, and trees. Thai curry paste is made from herbs and spices that contain various natural compounds. The herbs and spices are classified as natural preservative agents because of the active compounds in their plants, which inhibit bacterial and fungal growth. Curcumin in the rhizome of *Curcuma longa* L. (cumin) shows a wide range of pharmacological properties including antimicrobial, antioxidant, anti-inflammatory, and anticancer (Miquel et al., 2002). Allicin in garlic (*Allium sativum* L.) is the most active compound showing antimicrobial activity. This compound was found

to exhibit antibacterial activity against gram-negative and gram-positive bacteria that included multidrug-resistant enterotoxigenic strains of *Escherichia coli*, antifungal activity such as *Candida albicans*. In Thailand, the rhizome of galangal (*Alpinia galangal* L.) is used for medicinal purposes such as stomachic, carminative, antispasmodic, antichloristic, and antibacterial drugs, and as an antioxidant. Capsaicin in the chilies (*Capsicum frutescens* L.) is the major compound that can inhibit the growth of *Helicobacter pylori* (Jones et al., 1997). According to Seah et al. (2010), studies found that the combination of herbs and spices used in yellow curry paste shows significant antioxidant and antibacterial potential as a natural preservative and functional food (Kuljanabhagavad et al., 2014; Seah et al., 2010).

The role of natural products in human healthcare cannot be underestimated. An estimated 80% of individuals in developing countries depend primarily on natural products to meet their healthcare needs (Goel et al., 2008). Medicines derived from plants have played a pivotal role in the health care of many cultures, both ancient and modern. The system of holistic medicine known as Thai Traditional Medicine (TTM) uses mainly plant-based drugs or formulations to treat various diseases. Since the beginning of civilization, food plants, herbs, and spices have been used by humankind for their multiple values and people have grown dependent on plants for their health care needs. The source of phytochemical compounds can be linked to the effectiveness of individual compounds and mixture compounds of the natural product of herb and spices. Chili is characteristically red color due to the presence of red-pigmented carotenoids and it is a good source of carotenoids. Turmeric has a characteristic yellow color due to the presence of curcuminoids. The aroma of the plant is due to the volatile oils present to the extent of 1.80–2.49% in dry turmeric (Kuljanabhagavad et al., 2014). The plants contain essential oils widely used in food, drink, body care products, soap, perfumery, and pharmaceutical products (Wei & Wee, 2013). The fruits and rhizomes of galangal have a pungent smell. Two common spices of citronella grass (*Cymbopogon nardus* Rendle) and lemongrass (*C. citratus* (DC) Stapf.) are native herbal plants. Garlic, one of the ingredients in *massaman* curry and other curries, has been reported to contain allicin, a highly active volatile constituent showing antimicrobial activity (Ankri & Mirelman, 1999).

## 2. Historical Development of Traditional Curry Pastes

Thai food has been a product of transnational interactions for long periods during the 6th and 11th centuries of Dvaravati Kingdom influence of Indian culture (Sirivejkul, 2003). In the 15th century, Khmer cooks introduced Indian food patterns, such as many curries and boiled

red and white sweets. These dishes remained until the Ayutthaya court during the 14th to 18th century. In the 16th century, the Portuguese introduced chilies to traditional curry paste and, in combination with *nam pla*, galangal, and kaffir lime, they gave a distinctive aromatic taste. In earlier 17th century contact with Western cultures, a Thai dessert modified from a Portuguese dish left a culinary legacy of *Kanom thong yip*. There is evidence for some curries in Thailand starting in the Sukhothai period (1157–1438 A.D.). In order to understand the traditional curry paste, it is necessary to trace back different eras in the history of the state. A long history of Thai traditional curry paste begins 817 years ago. Sukhothai was one of the early Kingdoms in Thailand and it emerged by integrating traditional muang administration with the Indian mandala concept of the centralized states. In spite of influences from India, Sri Lanka and neighboring regions, Sukhothai evolved its own language, script, and religion that became an essential part of Thai culture. Thai pastes from the Sukhothai period were similar to traditional curry pastes used in Thai cooking today, using the same traditional ingredients.

During the Sukhothai period, Thailand was an important commercial hub and was home to various centers of food and eating. The link between Thai food the ancient capital have been found in stone inscriptions of the Sukhothai period (Bradley, 1909; Frankfurter, 1906; Rajanubhab, 1914–15). From the historical records in King Ramkhamhaeng's famous stone inscription, it is clear that rice and fish were the major ingredients of Thai food. The origin of the modern Thai diet began with the waterborne communities. The foods they ate were consistent with the traditional Thai eating pattern. Thai culture developed under Ramkhamheng's reign in the Sukhothai period. At that time, aquatic animals, plants, and herbs were used. Many ingredients were used to prepare meals; large pieces of meat were rarely used in any dish. The common cooking methods still widely practiced were stewing, grilling, baking, and frying. Fresh herbs and spices were common ingredients of most Thai dishes. The dishes were not served in courses, instead served at the same time to allow the various dishes to complement and enhance one another. Thai food recipes were eaten with rice, which is the main dietary staple for the Thai population.

In the year 1279 people reported growth of various plants everywhere, such as rice, coconut groves, mangoes, palm trees, betel and tamarind for used in the household (Bradley, 1909; Coedes, 1918). The starting point of the Ayutthaya period was in the year 1350. King Naresuan the Great developed Thailand into one of the richest and most diverse nations in the world. The country was home to rice plains, spice plantations and many medicinal plants

(Wright, 1992). By the time of the reign of King Narai in the year 1685, Thailand had become a center for the best chefs, who cooked Chinese, French, Japanese, Persian, and Portuguese cuisine (Coedes, 1921; Wyatt, 1974). During the reign of King Narai, the Portuguese brought chili on their boats, which was included in many dishes to add more spice. Prior to this, in the Ayutthaya period, chefs used pepper as an ingredient to add spice to curries. *Massaman* curry is a spicy curry that was adopted from foreign civilizations at this time. It was presumably cooked by an Indian chef at the royal court. It was noted by a contemporary Persian Ambassador that King Narai was the only member of the court who liked the rich Indian food. During his reign, Indian chefs were directly involved in the royal kitchen. One theory of the origin of *Massaman* in Thailand is that the dish was favoured by the Persian merchant Sheik Ahmad Qomi, from whom the noble Thai Bunnag household descends. Sheik Ahmad worked in the Royal Institute and adapted Thai Muslim food by replacing coconut cream with milk or yoghurt. Around the same time, Japanese stew types used coconut oil and coconut cream in their cooking.

Key informants indicated that the original Thai food in the Thonburi period was similar to that of the Ayutthaya period and took on especially Chinese flavours. Regarding food, the important information of this period comes from the first Thai cookbooks, beginning with that of Mae Krua Hu Pra. This was written by Thanpuying Plien Paskornwong and shows a continuation of culinary styles from the Sukhothai and Ayutthaya periods. During the reign of King Rama V, there were a lot of changes in food development, which continued through to the reign of King Rama VI. The Thai food in King Rama VI's palace was described in the 'Boat Song' as being similar to the food in the reign of King Rama V in decoration, colour, flavor, and taste. In the reign of King Rama VII, popular foods were those with simple cooking methods. Spicy curry would be prepared in the evening and vegetables added the next morning. This was because there was no refrigerator available for the common people. The current reign of King Rama IX has seen the most complex development of Thai food in the country, with influences from Japan, South Korea, and Vietnam. During the Ratthanakosin Kingdom foreign food imports have been more commonplace, including coconut oil, Chinese peas, garlic and onions, flour, rice, salt, tea, white and brown sugar, and wheat (Bradley, 1906). The unique Thai food is an accumulation of local traditional knowledge and is sold for both local and overseas consumption (Koo & Kim, 2005). In 1960, the beginning of widespread international tourism in Thailand first exposed foreign visitors to Thai food. From 2003 until today, globalization has

enhanced access to traditional Thai foods because of changing prices, production practices and eating behaviors, as well as imports and exports.

### 3. Traditional Ingredients of Original Thai Curry Pastes

From focus group discussions, the researchers were able to determine common traditional ingredients for the curry pastes investigated. Thailand possesses a wealth of natural resources, including fragrant herbs, spices, plants, and vegetables (Hugh, 2005). The original Thai food is popular with consumers in many countries in Asia and is especially widespread in Southeast Asia and Japan, Germany, and United States. The processing of traditional ingredients remains key to the production of many Thai curries. The important ingredients are fresh spices, garlic, shallots, galangal, lemongrass, skin of kaffir lime, chili and other fresh herbs. They are crushed, chopped and cooked until they smells piercingly aromatic (Nakornriab & Puangpronpitag, 2011). The spice is a vital part of food preparation and enhances the aromatic flavor of Thai dishes. One such spice is *Heracleum siamicum Craib*, named *Ma Laep* and found in the North and Northeast of Thailand (Hedge & Lamond, 1992). The essential oils from the fruits of *Ma Laep* show bactericidal and fungicidal activity against five bacterial strains and two fungal strains (Kuljanabthagavad et al., 2011). From survey results, the most popular kinds of Thai curry paste (selected in order) are *gaeng massaman*, *gaeng khiao wan*, *tom yum*, *tom kha*, *gaeng phet* and *gaeng kari* (Grove & Grove, 2010; Kanchanakunjara, 2013). In an interesting recent case study of Thai curry pastes, Thai herbs and spices contained within the pastes were found to be high in vitamin content from the green vegetables and phytonutrients included in the mixture (Njomo, 2012).

The fresh ingredients give the pastes their unique flavour and add to the variety of tastes in dishes such as *gaeng massaman*, *gaeng kari gai*, *gaeng khiaw waan*, *tom yum goong*, *tom kha gai*, and *gaeng jeud* (soup with vegetables and meat) (Kanchanakunjara, 2008). Nowadays, commercial condiment processing in Thailand has increased the convenience of cooking, as companies manufacture pre-combined pastes and ready to eat curry sauces (Kosulwat, 2002). They have proved an easy way for general consumers to store and use curry pastes.

## Conclusion

The development of traditional curry pastes and use in Thai cooking can be divided into nine eras. The development of curry pastes in Thailand has been influenced by individual and social factors, available local materials and the development of trade routes. Over the course

of history, Thai cuisine has been influenced by Indian and Chinese cooking techniques. Nevertheless, traditional Thai curry pastes have their own unique identity. Traditional pastes used from the Sukhothai to Ratthanakosin kingdoms were heavily and continuously influenced by religion and the royal courts. Traditional Thai curry pastes often contain the fresh, subtle flavors of lemongrass and kaffir lime leaves and skin. These are combined with smooth coconut cream and coconut milk. Spices used in curry pastes differ from one household to the next and from one region to the next. The delicious, spicy Thai foods created from these curry paste bases and enhanced by a traditional blend of aromatic flavors are popular across the world. Original Thai curry-style dishes that enjoy particular renown and popularity include *gaeng massaman* (*massaman* curry) and the well-known hot and sour soup called *tom yum*.

## Discussion

In this investigation, we have found that original curries and traditional curry pastes started their development during the Lanna and Sukhothai periods in the 13th century, which was approximately 700 years ago. They are used with a variety of raw ingredients, including pork, poultry, fish and shellfish and wild vegetables. The pastes are made by cutting, pounding, smashing or chopping herbs and spices and cooking them to enhance flavour. Utensils for preparation include the traditional pestle and mortar, which are used to crush and combine the ingredients. During the Ayutthaya period, Thai people traded with many nations in Asia and the Western. Chinese people came to the country and had a significant influence on Thai cooking. The collection of cooking utensils and tools was also enlarged and consequently the range of Thai cooking techniques was expanded by the Chinese. Some curry recipes use shrimp paste, *nam pla* and many herbs and spices such as galangal, peppercorn, cinnamon, clove, nutmeg, garlic and shallot. Coconut cream and milk are often added. The first cookbooks were compiled during the Thonburi period of Thai history and were mainly lists of recipes, preparation methods and cooking techniques. During the Ratthanakosin period, food from religious ceremonies and the royal courts were popularized. Additionally, the influence of foreign food increased, especially from China and India. In Thailand, most pastes contain the same basic ingredients, while their proportions can vary in order to modify the characteristics of the flavour. The creation procedure using a stone pestle and mortar can be divided into four steps: 1) pound salt, chili (for dried chili, remove the seeds and ribs to minimize the heat, soak until soft and minced) and pepper until the chili are reduced to a thick paste; 2) add

wet ingredients, herbs and spices, such as lemongrass, galangal, kaffir lime skin, coriander root, garlic, and shallot, pounding to as smooth a paste as possible; 3) add dried spice powders, pounding until well mixed; 4) add shrimp paste, softly pounding again to form the curry paste (Kanchanakunjara et al., 2014a). There are usually two ways to cook the curries; either fry the meat in the curry paste first, before adding coconut milk, or simmer the curry paste in the coconut milk first, before adding other ingredients.

Traditional ingredients and original curry pastes used from the Sukhothai to Rattanakosin periods are significant and worthy of protection as part of the cultural heritage of Thailand (Gerini, 1904; Hazarika, 2006). They play a particularly important role in promoting Thai culture around the world and attracting visitors to Thailand, who in turn contribute to the Thai economy (Cochrane, 2008). The evolution of the curry pastes is a reflection of the dynamic interplays between tradition and modernity in the construction of the dynasty and society. The culinary arts in Thailand reveal the close societal relationship with region and the royal court, as well as showcasing the wide range of ingredients in Thailand. The original curry pastes are an integral part of individual, collective, and territorial identity.

## **Recommendations**

Based on the findings of this investigation, the researchers wish to make a number of recommendations:

### **1. Practical implementation of the research results**

The findings of this investigation can be used for further study by both the private and public sector, especially by institutions concerned with the production of traditional Thai curry pastes. These findings can also be used to help the inheritance of traditional curry paste recipes and methods. The findings should be used in promotional material for producers, sellers and consumers. The investigation may also be used by academics for the instruction of their students. The findings may be used to add value to curry paste packaging and enable producers to access the creative economy.

### **2. Areas for further investigation**

Further investigation should concern different traditional Thai curry pastes, the development of curry pastes in different regions of Thailand, the potential of the market for traditional Thai curry pastes and the development of traditional Thai curry pastes according to halal certification.

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