

Development of Standard Thai Dessert Recipes from Sago Palm Flour from Phatthalung Province

การพัฒนาตำรับมาตรฐานขนมไทยจากแป้งสาครต้นจังหวัดพัทลุง

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Received: October 10, 2022; Revised: December 15, 2022; Accepted: December 28, 2022

Abstract

The research study aimed to develop standard Thai dessert recipes made from sago palm flour by applying sago palm flour from Phatthalung Province and developing ingredients for seven Thai dessert recipes. The seven desserts were derived from the consumer survey in developing Thai dessert recipes from sago palm flour. Thirty participants including instructors and students in Food and Nutrition major, were asked to complete a 5-point-rating scale questionnaire to evaluate the seven recipes based on the following seven criteria: serving size, characteristics of desserts, color, odor, taste, texture and overall satisfaction. The results revealed the 7 recipes of Thai desserts from sago palm flour had the highest level of overall satisfaction. Then, the standard recipes were carried out and publicized to customers who buy sago palm flour and individuals who might be interested in it. Lastly, the satisfaction levels of the users of the Thai dessert standard recipes from sago palm flour were evaluated. The results showed all eight aspects received the highest levels of overall satisfaction. In addition, the questionnaire respondents reported that they benefited from the recipes the most, accounting for 66%,

Keywords: Standard recipes, Thai desserts, Sago Palm Flour

บทคัดย่อ

งานวิจัยนี้มีวัตถุประสงค์เพื่อพัฒนาตำรับมาตรฐานใหม่จากแป้งสาคูต้น โดยการนำแป้งสาคูต้นจังหวัดพัทลุงมาประยุกต์และพัฒนาในส่วนผสมของตำรับขนมไทยจำนวน 7 ตำรับที่ได้จากการสำรวจแนวคิดของผู้บริโภคในการพัฒนาตำรับขนมไทยจากแป้งสาคูต้น โดยทำการประเมินอาหารจากอาจารย์และนักศึกษาสาขาวิชาอาหารและโภชนาการ จำนวน 30 คน ด้วยแบบสอบถามแบบ Rating Scale 5

ระดับ จำนวน 7 ประเด็น ได้แก่ ปริมาณการจัดเริร์ฟ ลักษณะที่ดีของข้น สีสัน กลิ่น รสชาติ เนื้อสัมผัส และความพึงพอใจโดยรวม ผลการประเมิน พบว่า ขنمไทยจากแป้งสาครตันทั้ง 7 ตำรับ มีคะแนนเฉลี่ยในประเด็นความพึงพอใจโดยรวม อยู่ในระดับความพึงพอใจมากที่สุด จานนั้นจัดทำเป็นตำรับมาตรฐานและนำไปเผยแพร่ให้แก่กลุ่มลูกค้าที่ชื่อแป้งสาครตันและบุคคลทั่วไปที่สนใจ และทำการศึกษาความพึงพอใจของผู้ใช้ตำรับมาตรฐานขنمไทยจากแป้งสาครตัน พบว่า ความพึงพอใจต่อตำรับ ทั้งหมด 8 ประเด็น อยู่ในระดับความพึงพอใจมากที่สุด นอกจากนี้ผู้ตอบแบบสอบถามได้รับประโยชน์จากการทำรับมากที่สุด ร้อยละ 66.00

คำสำคัญ: ตำรับมาตรฐาน ขنمไทย แป้งสาครตัน

Introduction

Sago palm flour is considered as a heritage of Thai wisdom in which sago palm flour is extracted from sago palm. There has been a culture of consumption of sago palm flour for a long time in the southern region. Sago palm flour is made from sago palms that grow in wetlands or swamps. Sago palms are abundant and grow well in Nakhon Si Thammarat, Phatthalung, Trang, Songkhla, Pattani, Yala, and Narathiwat (Papol and Jaipuem, 2011). According to the research conducted by Markphan et al. (2016), it was found that the utilization of sago trunks in Phatthalung and Trang was valued at 1,421,880 baht per year. Snacks made from sago flour are very popular nowadays because they are made from natural ingredients obtained from sago palms produced in a traditional way, with no color and flavor additives (MThai, 2017). Consequently, this can lead to increased sales and production capacity of sago flour, which generates income for people in a community. The price of one kilogram of sago palm ranges from 200 to 250 baht and the production capacity of the sago palm is approximately 5,000 kilograms per day. Sago palm flour is mostly used to make wet desserts such as Sagu Ton Piek ma-prao orn (sweet sago with coconut milk topping). It can also be noticed that both Thai dessert shops and other consumers making desserts for their household consumption tend to use sago palm flour to make Sagu Piek only. This type of flour has not yet been used to make other types of Thai desserts. This may be a result of a lack of knowledge or skills in applying sago palm flour to other Thai desserts. Another problem is that there is still a lack of standard Thai dessert recipes from sago palm flour that provide steps and methods of cooking (Kaewkead, 2021). Provided there is a standard Thai dessert recipe made from sago palm flour, it can help Thai dessert makers to promote as well as adapt Thai dessert recipes by using local ingredients like sago

palm flour.

The researchers hold an opinion that developing standard Thai dessert recipes from sago palm flour will be beneficial to both sellers and buyers of the sago palm. Sellers can relay the standard Thai dessert recipes to buyers, and buyers can use the standard Thai dessert recipes from sago palm for making desserts at home or for business purposes. Moreover, this can help promote and support sago palm flour producers and raise awareness about this product.

Research Objectives

1. To develop standard Thai dessert recipes made from sago palm flour
2. To evaluate the satisfaction levels of the users of the Thai dessert standard recipes from sago palm flour

Literature Review

Nowadays, there are various types of Thai desserts. Partly, Thai people have embraced foreign cultures. In addition, the ingredients used to make Thai desserts are more diverse. Another reason is the knowledge and expertise of entrepreneurs who have applied and developed more diverse Thai dessert recipes. Despite the diversity and change of raw materials, there have been ingredients developed from the wisdom of people and used to make desserts for a long time. Such a local ingredient is sago palm flour. Sago palm flour is extracted from mature sago palms aged about 12 years, or those which are flowering (Santiniyomphakdee et al., 2016). It is found mainly in wetlands in the southern region of Thailand. It is popularly produced for commercial purposes in Phatthalung, Trang and Nakhon Si Thammarat. Sago flour producers cut sago stems into 50-centimeter- long pieces and ground them using their own tools. Then, sago flour producers knead them in water to get the starch out before filtering the water. When getting sago starch, sago flour producers break the starch up into small clumps and roll them into small beads before sun-drying for longer shelf life. At present, there are 2 types of sago flour namely, a powder form and a pearl form, which can be used to make different types of Thai desserts. Sago ton flour can make various types of Thai desserts such as Kanom Guan (scrambled cakes), Khanom Chan (Thai steamed layer cake), Kanom Dok Chok (crispy lotus blossom cookies),

Lod Chong (Thai pandan short vermicelli in palm-sugar coconut milk), Kow Griep Pag Mor (steamed tapioca sago balls) and Bua Loi (Thai rice dumplings coconut milk) (Intharit, 2018). Currently, Thai dessert recipes from sago palm flour have been developed more and more, because sago palm has been gaining popularity among consumers. For example, sago palm flour is used to make dough for dried Krong Krang or instant-dried short vermicelli so that consumers can buy and cook by themselves (Choothong, 2022). In terms of nutritional value of sago palm flour, sago palm flour contains beneficial substances for the body. In fact, it contains higher phenolic compounds than Japanese sweet yellow potatoes and Japanese purple sweet potatoes, and it is high in antioxidants (Sungpud et al., 2019). It is lower in carbohydrates when compared with tapioca starch and also contains 10 percent of fiber (Intharit, 2018). The previous research on sago palm flour conducted by Jaipuem et al. (2010) focused on opinions of 30 consumers on desserts made from sago palm flour and it was discovered that the consumers preferred desserts made from sago flour because the sago flour had special characteristics as follows. It was sticky and greasy. It was easy to swallow and had an opportunity to be developed into a locally unique food.

A recipe refers to instructions and cooking procedures. It contains two important things, namely a list of ingredients and an explanation of preparing and cooking. The purpose of writing a recipe is to create a standard cooking protocol for readers or users so that they can follow it accurately and precisely. If a recipe is accurate and precise, anyone using the recipe will receive similar success. Therefore, a standard recipe must be fully detailed so that readers or users can follow it easily. In fact, characteristics of a good standard recipe cover detailed and clear explanations, easy-to-understand methods of cooking, correct use of language, and short but understandable sentences. Cooking methods and steps are simple, easy to read and understandable. Ingredients should be easy to find. A standard recipe should indicate the correct amount of ingredients and provide clear cooking techniques, suggestions as well as ingredient substitutes (Chitravimol, 2010).

Conceptual Research Framework

This research aimed to develop standard recipes for Thai desserts from sago palm flour and to evaluate the satisfaction levels of users of the standard Thai dessert recipe from sago palm flour. The research concept framework is as follows.

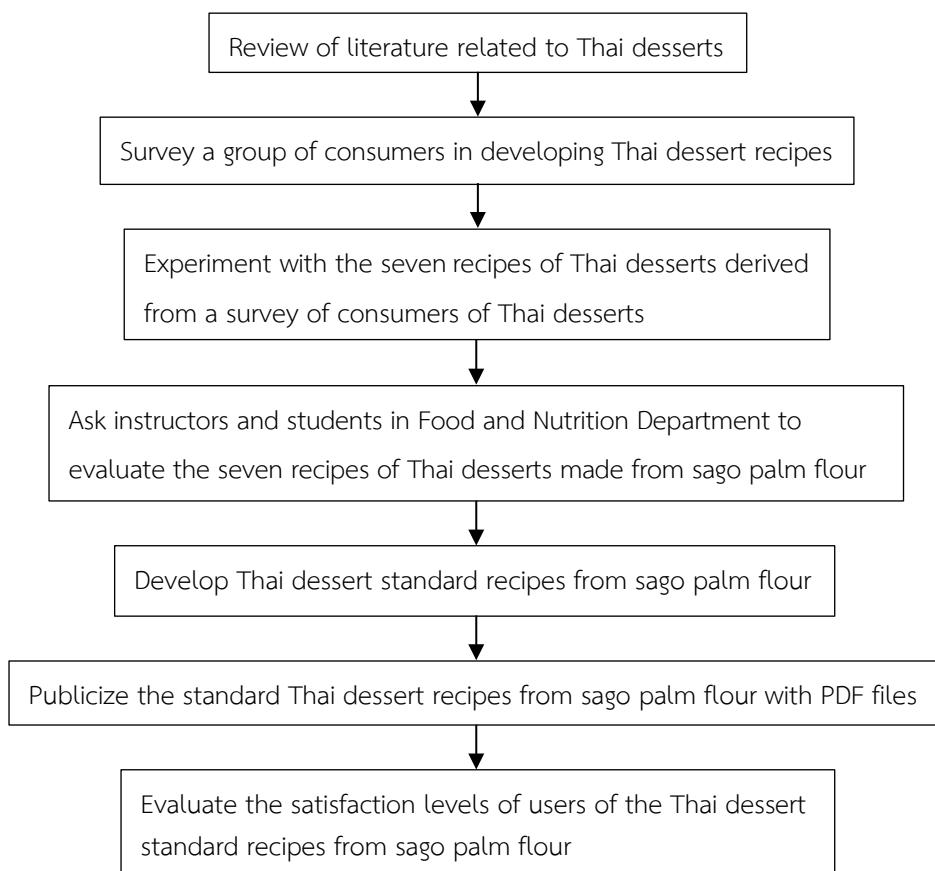


Fig. 1 Conceptual Research Framework

Materials and Methods

1. Surveying a group of consumers on their preference for Thai desserts made from sago palm flour.

Ten Thai dessert recipes were chosen by brainstorming with the research team. Then the list of the ten selected Thai desserts was distributed to the customer ($n= 100$) for their preferences. The participants were asked to choose only one dessert of the most preference. Then, the desserts which received more than ten points will be selected for further processing.

2. Trials of recipes

The researchers adapted the basic recipes by using sago palm powder and sago pearls as the ingredients for the seven Thai dessert recipes. Applying both knowledge and skills of the researchers, the researchers repeated the cooking process of the seven selected desserts several times using sago palm flour to adjust the recipes until they became standard recipes (Ragmai et al., 2019).

3. Evaluating Thai dessert standard recipes from sago palm flour

A sensory test was performed by instructors and students ($n= 30$) in the Food and Nutrition Department, the Faculty of Home Economics Technology, Rajamangala University of Technology Thanyaburi.

4. Develop standard recipes for Thai desserts using sago palm flour

The researchers developed and generated the seven standard recipes of Thai desserts from sago palm flour. The recipes were modified from the book of Thai desserts (Kongpun, 2019). They were put into an electronic file format with PDF files for further publication.

5. Evaluating the satisfaction levels of users of the Thai dessert standard recipes from sago palm flour

The seven Thai dessert recipes were publicized and distributed to sago flour consumers and individuals ($n= 100$) who might be interested in them. Then a survey was conducted to evaluate the satisfaction levels of users of the Thai dessert standard recipes from sago palm flour.

Experimental Procedure

The researchers conducted a survey on consumers' ideas for developing Thai dessert recipes from sago palm flour. There were 100 respondents derived from simple randomized sampling. The respondents were asked to choose one dessert only from a checklist of ten Thai desserts. One answer from each respondent equaled one point.

The 5-point- rating scale questionnaire was distributed to 30 participants who received one serving of each dessert. Scale 1 equaled one point while Scale 5 equaled five points. The participants were asked to evaluate the desserts based on the seven criteria: serving size, characteristics of desserts, color, odor, taste, texture and overall satisfaction.

The questionnaires on user satisfaction levels of the standard recipes of Thai desserts from sago palm flour were prepared. The sample group consisted of one hundred participants derived from simple random sampling. The instrument was employed to evaluate their satisfaction levels of the standard Thai dessert recipes from sago palm flour. The questionnaires contained two parts as follows: Part 1: This part covered eight questions with five rating scales eliciting user satisfaction levels with Thai dessert standard recipes from sago palm flour. Part 2: This part contained seven questions with a checklist eliciting benefits from using the Thai dessert standard recipes from sago palm.

Data Analysis

The data obtained from the 5-point-rating scale questionnaires of Thai dessert standard recipes from sago palm flour was analyzed for descriptive statistic data, namely mean and standard deviation. The data obtained from the questionnaires on user satisfaction levels of the standard recipes of Thai desserts from sago palm flour was analyzed for mean, standard deviation, frequency distribution and percentage using SPSS (SPSS, 2018).

Research Results

1. Consumers' ideas for developing Thai dessert recipes made from sago palm flour

The results revealed that seven desserts made from both sago palm powder and sago pearls as in Figure 2 were chosen by the respondents. The seven desserts receiving more than ten points were as follows. Thapthim Krob Saku Ton received 15 points followed by Khanom Chan Sawei Saku Ton with 14 points. Then, Piek Sagu Ton Sam Klur came in the third place with 13 points. Both Kow Griep Pag Mor Saku Ton ma-prao orn and Yok Manee Saku Ton received 12 points. The last two desserts were Piekpoon Sagu Ton Rice berry Katisod and Tako Lumyai Saku Ton with 11 and 10 points respectively. The other three desserts which received fewer than 10 points were excluded from the development of Thai dessert recipes made from sago palm flour.

It can be concluded that there were seven Thai desserts derived from the survey on consumers' ideas for developing Thai dessert recipes made from sago palm flour. The seven desserts can be divided into two groups: sago palm powder and sago pearls. The

desserts made from sago palm powder were Thapthim Krob Saku Ton, Khanom Chan Sawei Saku Ton, Kow Griep Pag Mor Saku Ton ma-prao orn and Piekpoon Sagu Ton Rice berry Katisod while the desserts made from sago palm pearls were Piek Sagu Ton Sam Klur, Yok Manee Saku Ton and Tako Lumyai Saku Ton as in Figure 3. Then, all seven Thai desserts would be developed as standard dessert recipes made from sago palm flour.



Fig. 2 (a) sago palm powder (b) sago pearls



Fig. 3 Thai dessert made from Sago palm flour

(a) Thapthim Krob Saku Ton (b) Khanom Chan Sawei Saku Ton (c) Kow Griep Pag Mor Saku Ton ma-prao orn (d) Piekpoon Sagu Ton Rice berry Katisod
(e) Piek Sagu Ton Sam Klur (f) Yok Manee Saku Ton (g) Tako Lumyai Saku Ton

2. Sensory test of Thai dessert standard recipes from sago palm flour

The seven Thai dessert recipes from sago palm flour: four recipes from sago palm powder and the other three from sago pearls were evaluated by 30 participants. The participants based their evaluation on the seven criteria shown in Tables 1 and 2.

Table 1 Sensory test of the four recipes of Thai dessert from sago palm powder (n= 30)

Evaluation criteria	Thai dessert recipes from sago palm flour (sago palm powder)							
	Thapthim Krob Saku Ton		Khanom Chan Sawei Saku Ton		Kow Griep Pag Mor Saku Ton ma-prao orn		Piekpoon Sagu Ton Rice berry Katisod	
	\bar{x}	SD.	\bar{x}	SD.	\bar{x}	SD.	\bar{x}	SD.
A serving size	4.63	0.42	4.67	0.41	4.50	0.50	4.43	0.55
Characteristics of desserts	4.70	0.47	4.53	0.68	4.40	0.56	4.35	0.85
Color	4.83	0.38	4.23	0.82	4.35	0.61	4.10	0.45
Odor	4.40	0.81	4.50	0.68	4.40	0.79	4.33	0.84
Taste	4.67	0.55	4.63	0.67	4.43	0.76	4.20	0.93
Texture	4.70	0.54	4.87	0.35	4.40	0.83	4.27	0.83
Overall satisfaction	4.80	0.41	4.77	0.50	4.53	0.58	4.35	0.92

Table 1 showed the results of the evaluation of the four Thai dessert recipes from sago palm powder, namely Thapthim Krob Saku Ton, Khanom Chan Sawei Saku Ton, Kow Griep Pag Mor Saku Ton ma-prao orn and Piekpoon Sagu Ton Rice berry Katisod. All four recipes had the highest level of satisfaction. Tubtim Krob Saku Ton got the first place with the highest mean of 4.80 (± 0.41), followed by Khanom Chan Sawei Saku Ton with a mean of 4.77 (± 0.50). Kow Griep Pag Mor Saku Ton ma-prao orn came in the third place with a mean score of 4.53 (± 0.58) while Piekpoon Sagu Ton Rice berry Katisod was the last with a mean score of 4.35 (± 0.92).

Table 2 Sensory test of the three recipes of Thai dessert from sago pearls (n= 30)

Evaluation criteria	Thai dessert recipes from sago palm flour (sago pearls)					
	Piek Sagu Ton Sam Klur		Yok Manee Saku Ton		Tako Lumyai Saku Ton	
	\bar{x}	SD.	\bar{x}	SD.	\bar{x}	SD.
A serving size	4.40	0.67	4.50	0.67	4.57	0.63
Characteristics of desserts	4.23	0.73	4.70	0.47	4.70	0.54
Color	4.20	0.73	4.83	0.38	4.23	0.43
Odor	4.23	0.82	4.40	0.81	4.44	0.45

Taste	4.35	0.91	4.67	0.55	4.43	0.57
Texture	4.40	0.67	4.70	0.56	4.60	0.50
Overall satisfaction	4.27	0.87	4.80	0.41	4.57	0.50

Table 2 revealed the results of the evaluation of the three Thai dessert recipes from sago pearls, namely Piek Sagu Ton Sam Klur, Yok Manee Saku Ton and Tako Lumyai Saku Ton. The desserts received the highest level of satisfaction. Yok Manee Saku Ton got the first place with the highest mean of 4.80 (± 0.41), followed by Tako Lumyai Saku Ton with a mean of 4.57 (± 0.50). Piek Sagu Ton Sam Klur came in as the last with a mean score of 4.27 (± 0.87).

3. The user satisfaction levels of the standard recipes of Thai desserts from sago palm flour

After the sensory process, the researchers developed the Thai dessert recipes from sago palm flour for further publication to users as shown in Fig. 4. Then, the researchers conducted a survey investigating the user satisfaction levels of the recipes. One hundred respondents completed the questionnaire consisting of two parts, including user satisfaction levels with Thai dessert standard recipes from sago palm flour and benefits from using the Thai dessert standard recipes from sago palm.

Fig. 4 An example of a standard Thai dessert recipe from sago palm flour (Thapthim Krob Saku Ton)

Table 3 The satisfaction levels of the Thai dessert standard recipes from sago palm flour (n= 100)

Item	Questions	\bar{x}	SD.
1	The recipes use easy-to-understand language.	4.64	0.55
2	The characters used in the recipes are easy to read.	4.70	0.57
3	The order of the ingredients is easy to understand.	4.67	0.62
4	The user can follow the instructions easily.	4.69	0.55
5	The provided cooking techniques and suggestions are useful to the user.	4.60	0.45
6	The illustrations in the recipes are beautiful.	4.80	0.55
7	The layout or format of the recipes is neat and beautiful.	4.76	0.47
8	The user has the overall satisfaction with the recipes.	4.80	0.67

Table 3 showed that all eight questions received the highest level of satisfaction with the Thai dessert standard recipes from sago palm flour. Both Question 6 focusing on the illustration in the recipes and Question 8 regarding overall satisfaction received the same highest average score of 4.80.

Regarding the benefits of using the standard Thai dessert recipes from sago palm flour, 73% of the respondents reported using the recipes to make Thai desserts from sago palm for household consumption while the rest (27%) answered that they used these recipes for business purposes. Of the 27 respondents who made the desserts for business purposes, 25 of them stated that their sales increased, accounting for 92.6%. After using the recipes, 95% of the respondents stated they could pass on the knowledge from these recipes to other people and nearly all the respondents (99%) confirmed that they would publicize the recipes. Lastly, two-thirds of the respondents answered that they benefited from the recipes the most, accounting for 66%, while the rest (34%) stated that they benefited greatly from the recipes.

Discussion

1. In this research study, the researchers have selected different types of Thai dessert recipes to conduct a survey. The results of the survey revealed the consumers chose a total of seven Thai desserts for the development of standard Thai dessert recipes

from sago palm flour using both sago palm powder and sago pearls for a wide variety of desserts and for the sake of consumers or individuals wanting to apply the recipes. As for the development process of Thai dessert recipes from sago palm flour, sago palm powder and sago pearls were used as additives or ingredient substitutions of some flour. Mostly, it was used to substitute tapioca starch because sago palm flour has properties similar to tapioca starch. This is consistent with Ahmad et al. (1999) that sago palm flour turns into a soft gel when heated and that it can be used for various kinds of savory food as well as desserts. It can be used in the industry just as tapioca starch. And it is in line with Intharit (2018) that both sago palm powder and sago pearls can be processed into various kinds of desserts such as Khanom Chan, Khanom Guan Nakati, Khanom Lod Chong, Khanom Chak, Khanom Phueng, and Khanom Pak Mo.

2. In the development of Thai dessert recipes from sago palm flour, the researchers have repeatedly conducted trials of the recipes with good control over the main ingredients and cooking methods until each dessert reached a standard dessert recipe with good characteristics of such kinds of desserts. According to (Ragmai et al., 2018; Ragmai et al., 2019), repetition of recipe trials should be focused if there are ingredient substitutions since the quality of ingredients, seasonings and cooking utensils might have an effect on the taste of food. The results of the questionnaire evaluated by the 30 participants revealed that the seven recipes of Thai desserts from sago palm flour had the highest level of overall satisfaction. This might be because all seven desserts had a proper serving size, color, odor, taste and texture as well as good characteristics of desserts of each dessert, resulting in a high level of overall satisfaction and the highest level of overall satisfaction. However, the additional suggestions derived from the evaluators were different based on each person's experiences and preferences. It is consistent with Ragmai et al. (2018); Ragmai et al. (2019) that the taster's or evaluator's experience is a key factor in how that person rates a taste and food characteristics.

3. To study the satisfaction of Thai dessert standard recipes from sago palm flour, the standard Thai dessert recipes from sago palm have been compiled, consisting of ingredients, cooking methods, cooking techniques and suggestions so that readers can

easily understand the recipes (Chittravimol, 2010). The recipes then have been put into an electronic file format (PDF) (Chumkaew et al., 2021) so that they could reach users or those who are interested in the recipes easily, faster and conveniently through various channels such as telephones and the internet. This serves current daily lifestyles (Janpirom et al., 2019). From the results of the study, it was found that all aspects of the satisfaction evaluation of the standard Thai dessert recipes from sago palm received the highest level from the respondents, which shows the usefulness and practicality of the recipes. The following comments were from the respondents. For example, the recipes are very helpful. The recipes can actually be used to make desserts and are useful for both commercial and educational purposes. In fact, sago palm flour is a chemical-free organic product and a product passed down from the folk wisdom of previous generations (Intharit, 2018). When applying sago palm flour to making Thai desserts, it is considered as the benefit maximization and value addition of sago palm flour. This is consistent with Boonying et al. (2009) who state that in the southern region, there are many villagers who produce and distribute sago palm flour to earn supplemental income. It is also considered an integration of Thai desserts and sago palm, resulting in new recipes of Thai desserts that recipe users can use for commercial development. As the respondents in this study confirmed, they stated that these recipes could be used to make desserts for business purposes, leading to more income.

Conclusion

1. The Thai dessert standard recipes from sago palm flour have been produced so that we could have reference sources. Moreover, we could pass on them to customers purchasing sago palm flour to make Thai desserts for business purposes or for household consumption. We could also publicize the Thai dessert standard recipes from sago palm flour to anyone interested in making Thai desserts from sago palm flour.
2. The results of the present study revealed a total of seven Thai desserts for the development of standard Thai dessert recipes from sago palm flour, namely four recipes from sago palm powder and three recipes from sago pearls. The participants gave all seven recipes the highest rating for overall satisfaction. It can be concluded that the standard

Thai dessert recipes reached the standard with good characteristics and taste as well as good characteristics of such kinds of desserts.

3. The respondents gave the standard Thai dessert recipes from sago palm the highest degree of satisfaction in all categories, demonstrating the usefulness and practicality of the recipes.

4. Those who want to use the standard Thai dessert recipes from sago palm flour obtained from this research are able to adapt ingredients with similar characteristics or adjust the amount of ingredients according to their needs and preferences. However, this may affect the quality of the dessert, such as appearance, color, odor, taste, texture and good characteristics of such dessert.

5. Government and private agencies involved in the promotion of Thai food, Thai desserts or local wisdom in the production of sago palm should publicize the standard Thai dessert recipes from sago palm flour from this research to the public or food companies in order to pass on these standard dessert recipes. This will lead to a wide variety of Thai desserts made from sago palm flour. It is also a promotion and conservation of local wisdom in the production of sago palm flour as well as a promotion of sago palm flour producers.

Recommendation/implication for further research studies

This research study was conducted to develop standard Thai dessert recipes from sago palm flour focusing on particular Thai dessert recipes. In fact, there are other interesting Thai desserts that should be studied and developed into standard recipes for a wide variety. However, those who want to develop a standard Thai dessert recipe should take factors regarding the probability and appropriateness of using sago palm flour into consideration.

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