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# The Development of Local Based Riceberry Rice Standard Recipes to Promote Commercialization and Tourism in the ASEAN Community

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**Abstract:** This research is in the sequence of the innovative utilization from a previous study on developing standard food recipes utilizing Riceberry rice as the key ingredient under the context of the communities of Uttaradit province, Thailand along with the context of the ASEAN Community. The 10 standard recipes from the previous study were used in real commercialization that aimed to promote the utilization of local food raw materials of Uttaradit province, to increase the competitiveness of local products in the ASEAN Community's market, and to promote commercialization and tourism. The recipes were tested on sensory acceptance evaluation with 100 tourist samples and nutritional values assessment. The evaluation data were used to indicate the potential of the recipes to meet tourists' satisfaction, which was eventually used together with the recipes' nutritional data as the reference for the consideration of and selection for one month of real commercialized trial testing by seven food business entrepreneurs in Uttaradit province. After finishing the commercialized test, the food business entrepreneurs evaluated the appropriateness of the recipes to use for real commercialization. The result of the average sensory acceptance evaluation scored on all 10 recipes using a 5-point hedonic scale evaluation form indicated that, all 10 recipes were accepted by the tourists and had the potential to be utilized for serving to tourists. The seven food business entrepreneurs selected four out of the 10 recipes for the commercialized test according to the reference data of each recipe provided for their consideration, flexibility, convenience and capability to adopt the recipes. The reasons that the entrepreneurs selected only four recipes were because of their consideration on the available raw materials during the testing period, their capability to cook the food according to the instruction of the recipes, and the conforming of the theme of the recipes to their business theme that mostly sold healthy food. The results of the recipes' appropriateness for real commercialization using a Likert-type scale appropriateness evaluation form have shown that the selected recipes were appropriate for use in a real commercialization situation.

**Keywords:** Riceberry Rice, Standard food recipe, Community-context, Commercialization, ASEAN Community, Tourism promotion

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## 1. Introduction

After the official establishment of the ASEAN Economic Community (AEC) in 2015, member countries consisting of Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam have been affected by many major changes, especially on the economic situation. Consequently, the regional economic growth rate is rapidly increasing due to many changes of economic policies and agreements; such as, exemption of import and export tariffs between member countries, the free transfer policy for skilled labour in the region, and tourist visa exemption policy for the citizens of the member countries. The tourist visa exemption policy is one of the most effective policies that has had an effect

on the growth in tourism markets. Therefore, the number of ASEAN tourists who travel to other ASEAN countries has been increasing greatly in recent years (Association of Southeast Asian Nations, 2015). Hence, the rapid expansion in the number of tourists has largely affected the increasing demands of tourist accommodation businesses, which has led to an increasing demand of food service businesses as a part of the tourist accommodation businesses as well.

It is known that rice is one of the most important staple foods of all ASEAN nations and is also one of the widely accepted staple grains of people of all cultures around the world. In 2015, the Mintel Group Ltd. (2015), one of the leading marketing research companies, revealed a study on the present global food trend showing that global consumers are currently concerned about healthy food and

food with cultural background stories. A study by Bunnak (2014) on tourist consumption behavior found that tourism services that offered local food would receive positive satisfaction to the local tourism services. Furthermore, Kawano's (2001) study about tourists' point of interests stated that tourists showed an interesting trend in local culture and traditions of the local community during their trips. Accordingly, these studies about tourist behavior conform to the study of the Mintel Group Ltd. (2015) revealing the present trend of consumers' food behavior that gives priority to the cultural background stories of the food.

Riceberry rice, a product of a natural cross-breeding process between Dok Mali 105 white rice and Hom-Nil rice from the collaborative research of the National Research Committee of Thailand and Kasetsart University, has higher nutritional benefits than normal white rice according to the Rice Science Centre of Kasetsart University (2015), and the study of Wanassanan et al. (2011) also showed that Riceberry rice had the potential to prevent Alzheimer's disease and other neurodegenerative syndromes. From the above-mentioned, the researchers have considered rice, which has special nutritional properties, to correspond to the current global food trend.

Uttaradit province has a rich cultural background, as it borders the three diverse cultural regions of Central Thai, Lanna, and Lan Xang (Sukha et al., 2012); which has resulted in the people in different areas of Uttaradit have their own ways of living, local language and local traditional ceremonies, including distinctive food cultures (Chaima and Toosaranon, 2012). This distinctive integration of cultures has made it possible for Uttaradit to have the suitable potential for further tourism promotion.

In 2016, the researchers developed 10 new food recipes utilizing the Riceberry rice and local community-based food and raw ingredients of Uttaradit province to meet the current consumer demand trend that concerns about health issues and the cultural background stories of the food. All of these 10 recipes have already been approved and modified by internationally recognized food experts. However, for actual commercialization opportunities, the potential of these recipes still needs to be proved (Panyayong and Chatjaroenchaikul, 2016).

In order to prove this potential of the developed community-based Riceberry rice standard recipes, the researchers aimed to study the potential of the recipes utilization in real commercialization and tourism promotion purposes.

The study would show the possibility of local wisdom and resource utilization for tourism

purposes. It would also assist to serve the local Uttaradit raw material markets, especially local Riceberry rice supplies due to the expansion of the cultivated area in Uttaradit province (Bank of Agriculture and Agricultural Co-operatives, Uttaradit Branch, 2014).

This result might be adapted to be used as a model for other regions to enhance the local competitiveness of the tourism industry as well as prepare for joining in the ASEAN Community at the present time.

## 2. Objective

This research aimed to study the acceptance of tourists on 10 previously developed Riceberry-based recipes using a 5-point hedonic evaluation with 100 tourists, and each recipe was analyzed for its nutritional value. Therefore, the result would be used as reference data for local food business entrepreneurs to select the recipes for a one-month trial to study the appropriateness for commercialization by using a modified Likert-type appropriateness evaluation form.

## 3. Study Procedures

There were six procedures conducted during this study as follows:

1. All 10 developed recipes from the previous study (Panyayong and Chatjaroenchaikul, 2016), which were already approved and modified by internationally recognized food experts, were evaluated on a sensory acceptance by 100 samples of tourists at popular tourist destinations in Uttaradit province during the Songkran Festival using a 5-point hedonic scale sensory evaluation form to assess the potential of the recipes to match the tourists' needs and to be used as reference data for the food business entrepreneurs to select for commercialized testing.

The list of the 10 recipes is shown as follows:

- Recipe 1: Riceberry Coconut Crepe with Fruity Tropical Sauce.
- Recipe 2: Crispy Fruit Salad with Spicy Riceberry Dressing.
- Recipe 3: Northern-style Herbal Rice with Black Herbal Sauce.
- Recipe 4: Thai Crepe with Herbal Salad on a Riceberry Crispy Crust.
- Recipe 5: Tha-Nueh Riceberry Cheese Tart.
- Recipe 6: Tha-Nueh Amok Tria with Rice Berry Rice.
- Recipe 7: Khi Lek Cashew Nut Dal with Riceberry Masala Pakora.

- Recipe 8: Uttaradit Riceberry Cracker with Herbal Mango Chutney and Berry Salsa.
- Recipe 9: Fresh Water Escargot Riceberry Cream Soup with Vegetable Puree Sauce.
- Recipe 10: Double Berry Cashew Nut Macaron.

2. All 10 developed recipes were analyzed for the nutritional value of each recipe by using trusted food nutritional databases to determine the nutritional value for each recipe in one serving size. These nutritional data of the recipes were used as reference data for the food business entrepreneur samples to select the recipes for the commercialized testing.

3. The detailed data of all 10 recipes along with the sensory evaluation results and nutritional value data were presented to seven food business entrepreneurs in Uttaradit province, to use as information for selecting the recipes for the commercialized test.

4. The cooking techniques of the selected recipes were demonstrated and taught to the food business entrepreneurs.

5. After one month, all seven entrepreneurs were further investigated to find the results of the commercialized trial test to evaluate the appropriateness of the recipes to use in real commercialization using the adapted Likert-type appropriateness evaluation form (Vagias, 2006).

6. The data were processed, analyzed, and summarized for writing the study's report.

### 3. Result

The sensory evaluation results of 100 tourist samples of all 10 recipes using a 5-point hedonic scale sensory evaluation form are shown in the table 1 below. (The organization of the recipe numbers are arranged as shown in the Study Procedures section.) (Full marks = 5). From the evaluation result of each sensory characteristic, it is shown that for the appearance characteristic, recipe no. 10 had the highest score of  $4.68 \pm 0.56$ , and recipe no. 7 had the lowest score of  $4.27 \pm 0.71$ . For the color characteristic, recipe no. 10 had the highest score of  $4.64 \pm 0.57$ , and recipe no. 7 had the lowest score of  $4.15 \pm 0.85$ . For the smell characteristic, recipe no. 10 had the highest score of  $4.52 \pm 0.73$ , and recipe no. 7 had the lowest score of  $3.90 \pm 0.89$ . For the taste characteristic, recipe no. 10 had the highest score of  $4.61 \pm 0.65$ , and recipe no. 7 had the lowest score of  $3.95 \pm 0.80$ . For the texture

characteristic, recipe no. 10 had the highest score of  $4.55 \pm 0.70$ , and recipe no. 7 had the lowest score of  $3.90 \pm 0.89$ . For the overall acceptance, recipe no. 10 had the highest score of  $4.70 \pm 0.55$  and recipe no. 7 had the lowest score of  $4.15 \pm 0.7$ .

**Table 1: The sensory evaluation results of 100 tourist samples (N=100)**

Sensory Characteristics	Recipe Number			
	1	2	3	
Appearance	4.44±0.59	4.36±0.78	4.34±0.71	
Colour	4.44±0.63	4.34±0.71	4.34±0.83	
Smell	4.12±0.60	4.09±0.86	4.07±0.87	
Taste	4.29±0.68	4.20±0.79	4.16±0.86	
Texture	4.02±0.85	4.11±0.84	4.07±0.79	
Overall Acceptance	4.39±0.54	4.39±0.75	4.39±0.69	
Sensory Characteristics	Recipe Number			
	4	5	6	
Appearance	4.46±0.55	4.46±0.55	4.34±0.71	
Colour	4.29±0.72	4.44±0.59	4.34±0.83	
Smell	4.17±0.80	4.24±0.70	4.07±0.87	
Taste	4.27±0.81	4.37±0.62	4.16±0.86	
Texture	4.24±0.86	4.37±0.73	4.07±0.79	
Overall Acceptance	4.37±0.70	4.46±0.64	4.39±0.69	
Sensory Characteristics	Recipe Number			
	7	8	9	10
Appearance	4.27±0.71	4.41±0.82	4.34±0.71	4.68±0.56
Colour	4.15±0.85	4.52±0.63	4.30±0.76	4.64±0.57
Smell	3.90±0.89	4.43±0.79	4.20±0.85	4.52±0.73
Taste	3.95±0.80	4.43±0.79	4.36±0.81	4.61±0.65
Texture	3.90±0.89	4.43±0.76	4.41±0.62	4.55±0.70
Overall Acceptance	4.15±0.73	4.57±0.73	4.43±0.62	4.70±0.55

The overall sensory evaluation results of the 100 tourist samples of all 10 recipes, using the 5-point hedonic scale sensory evaluation form, were shown as follows: (Full marks = 5)

**Table 2: Overall sensory evaluation results of all 10 recipes by 100 tourist samples (N=100)**

Sensory Characteristics	Average Score	Score Interpretation
Appearance	4.44±0.12	Like
Colour	4.38±0.14	Like
Smell	4.21±0.18	Like
Taste	4.32±0.19	Like
Texture	4.25±0.21	Like
Overall Acceptance	4.44±0.15	Like

From the evaluation results, it is shown that the overall evaluation results in all sensory characteristics were to the level of "Like".

The results on the nutritional value analysis for one serving of all 10 recipes obtained by using the comparison method of the food nutritional value databases of the Bureau of Nutrition, Thailand's Ministry of Public Health and the United States Department of Agriculture (USDA) are shown in Table 3.

**Table 3: Nutritional value of all 10 recipes obtained by using the comparison method with the food nutritional value databases (Bureau of Nutrition, Ministry of Public Health, Thailand 2001; United States Department of Agriculture 2016)**

Recipes	Energy	Protein	Fat	Carbohydrate	Dietary Fiber	Calcium	Phosphorus	Dietary Iron	Sodium	Vitamin E	Vitamin B1	Vitamin B2	Vitamin B3	Vitamin C
	Kcal	G	G	G	G	Mg.	Mg.	Mg.	Mg.	Mg.	Mg.	Mg.	Mg.	Mg.
1	267.61	2.32	11.78	42.24	2.81	20.74	56.71	1.29	217.14	0.61	0.25	0.24	0.992	57.08
2	210.04	5.899	5.94	36.69	2.68	55.22	104.4	1.79	1215.83	0.78	0.17	0.12	2.09	55.36
3	373.30	9.26	5.18	75.14	3.63	435.89	136.71	7.25	1754.10	0.38	0.41	0.87	3.39	10.41
4	270.82	4.22	6.76	50.32	1.15	58.47	62.54	2.19	263.97	0.54	0.14	0.07	0.51	1.95
5	75.58	0.86	4.78	6.72	0.21	4.78	15.96	0.86	76.76	0.16	0.05	0.02	0.044	0.15
6	654.41	21.57	46.87	44.87	4.93	115.71	375.10	8.34	1232.8333	0.52	0.34	0.25	4.47	11.09
7	446.68	11.41	29.53	38.88	4.06	57.55	261.62	8.47	1442.58	0.59	0.41	0.31	2.16	2.48
8	151.92	7.11	2.89	26.78	2.02	106.80	117.999	1.73	893.77	0.56	0.08	0.23	0.92	30.72
9	397.28	10.17	28.66	26.34	1.35	79.41	1448.06	9.04	1152.557	2.42	0.16	0.29	2.333	4.08
10	63.36	1.29	2.69	9.10	0.23	6.34	27.87	1.41	32.33	0.11	0.04	0.03	0.08	1.29

The serving size of each recipe was different, which depended on the serving type of the recipes; the appetizers and desserts might have a smaller serving size than the main courses. The nutritional assessment data were used for the consideration of the food business entrepreneurs to select the recipes; not for comparing which recipe was better than another.

There were four recipes selected by the seven food business entrepreneurs, which are listed below.

- Recipe 2: Crispy Fruit Salad with Spicy Riceberry Dressing.
- Recipe 3: Northern-style Herbal Rice with Black Herbal Sauce.
- Recipe 8: Uttaradit Riceberry Cracker with Herbal Mango Chutney and Berry Salsa.
- Recipe 10: Double Berry Cashew Nut Macaron.

The reasons the entrepreneurs chose these four recipes to use for the commercialized test were 1) the availability of the raw materials during the test-run season, 2) the theme of the food conformed to their styles of food, which they currently serve to customers, 3) the skill of the cooks in their business, 4) the tourist's sensory test result of the recipes, and 5) the nutritional properties that responded to the market demand for healthy food. After one month of commercialized test of the selected recipes by the seven food business

entrepreneurs, the evaluation results of the appropriateness of the recipes to use in actual commercialization are shown in the table below.

**Table 4: Evaluation result of the appropriateness of the recipes to use in actual commercialization. (Full marks = 7)**

Evaluation Issues	Average Score	Score Interpretation
Cost	5.86±0.90	Appropriate
Customer Satisfaction	6.57±0.53	Absolutely Appropriate
Cooking Process	7.00±0.00	Absolutely Appropriate
Raw Materials	6.86±0.38	Absolutely Appropriate
Market Capability	6.29±0.95	Appropriate
Overall Appropriateness	6.57±0.53	Absolutely Appropriate

According to the outcome, the evaluation results by the seven food business entrepreneurs were to the level of "Absolutely Appropriate" in four evaluation issues and the level of "Appropriate" in two evaluation issues. The overall satisfaction was at a level of "Absolutely Appropriate".

#### 4. CONCLUSION AND DISCUSSION

The overall processes of this study aimed to utilize local food wisdom in the context for the local community integrated with the ASEAN and international food context to create Riceberry rice recipes that have the capabilities to utilize for commercialization and tourism promotion. The overall process concept of this study are shown in the figure below.

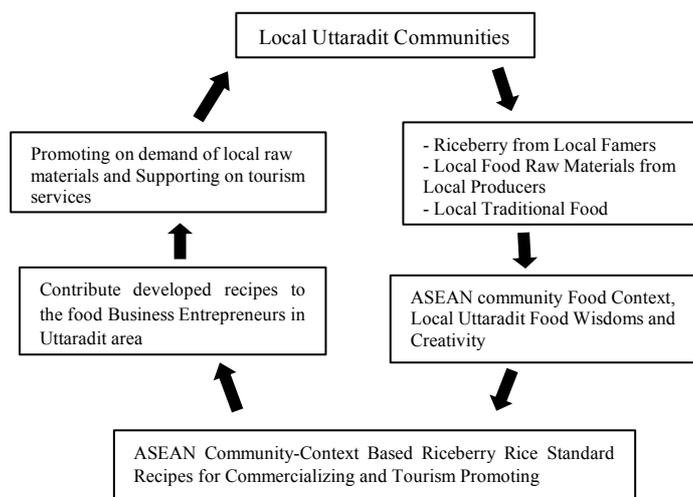


Figure 1: Overall process of the study

From the 100 tourist samples sensory evaluation results of all 10 ASEAN community-based Riceberry rice standard recipes, the results have shown that the average scores of all 10 recipes were to the criteria level of “Like” in all sensory characteristics. These can be concluded that the overall acceptance of tourists to the ASEAN community-based Riceberry rice standard recipes were to a satisfactory level, which indicates that these recipes were acceptable to tourists and had the potential to be utilized for serving to tourists. From these data accompanied with the nutritional data of the recipes, the seven food business entrepreneur samples selected four out of 10 recipes to use for the commercialized test.

After one month of the commercialized trial testing of the selected recipes, the food business entrepreneurs evaluated the appropriateness of the recipes to use in real commercialization. The results showed that most of the evaluation topics were to the level of “Absolutely Appropriate”. According to the evaluation results from a previous study on all of these recipes (Panyayong and Chatjaroenchaikul, 2016), the overall sensory acceptance of these recipes were evaluated to the level of “Moderately Like” and the overall appropriateness of these recipes to promote to international markets were evaluated to the level of “Moderately Appropriate”. This can be concluded that the evaluation results from the experts, tourist samples, and the entrepreneur samples conformed with one another and would indicate that the ASEAN community- based Riceberry rice standard recipes were really appropriate for utilizing in actual commercialization. The reasons behind the conformation of the evaluation results from the experts, tourist samples, and the entrepreneur samples are because the recipes are aligned to the recent real food trend on healthy food and food

with background stories of local cultures. These results are in accordance with the study of Mintel Group Ltd. (2015) and also meet the tourists’ requirements for local food with local cultural uniqueness (Bunnak, 2014; Kawanobe, 2001). Therefore, these can also show an important key to develop successful recipes that are able to be utilized in real commercialization. The recipes should be developed based on the current demands of the market to achieve the customers’ demands by studying the present market trend before developing the recipes. In this case, it could lower the risk of investment in developing a recipe or a product for business purposes.

The results of this study have also shown the possibilities for developing healthy and high nutritive food; such as, Riceberry rice and local community raw food materials to standard food recipes with high potential in commercialization by local food business entrepreneurs, as well as promote the local capability for supporting the increase in the demand of the tourism sector. In addition, the developed recipes could contribute to increasing the demand to local raw food materials, which could also help to support the local raw material producers and local farmers. Moreover, the results of this study could be applied to the food business sectors in other provinces to increase the country’s competitiveness in supporting the expansion of the tourism sector.

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