# STUDY ON THE SUBSTITUTION OF RICE FLOR WITH RICEBERRY FLOUR IN RICE NOODLE.

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## ABSTRACT

This research aimed to study the production of noodle from riceberry flour instead of rice flour. The ratio of riceberry flour to rice flour was equal to 0: 100, 10:90, 20:80, 30:70, 40:60 and 50:50. The experiment result of the sensory quality assessment using 9-point hedonic method scale found that the rice noodle varies rice flour ratio to rice flour equal to 50:50 was the most accepted recipe with statistically significant ($p \leq 0.05$) when compared with the standard rice noodle recipe, which the noodles have a dark purple color, giving the toughness, softness and good elasticity. The chemical composition it was found that rice noodles from riceberry flour contained moisture content, protein, fat, ash, fiber and carbohydrates equal to 66.22, 2.67, 3.61, 0.31, 1.46 and 27.19 grams / 100 grams, respectively. The antioxidant activity using FRAB and DPPH methods resulted in the values equal to 209.74 μmoles TE / 100g and 28.55 mgAA / 100 grams respectively.

**Keywords:** Rice noodles, rice flour, Riceberry flour

## INTRODUCTION

Noodle is a product that is processed from rice flour produced by milling white rice into the water until getting fine flour; spread the powder on a thin white cloth; steamed in hot steam, when cooked, will get the dough sheets stick together then cut into strips to the desired size; most of them are about 1 inch wide. Thai people like to consume noodles as food after rice because of high energy, cheap prices, and raw materials that can be grown in Thailand. There are many types of rice noodle, such as big rice noodle and small rice noodle. According to the survey of Thai people's behavior, 88.2 percent of consumers like to eat noodle which the frequency of consuming noodles is 3-4 times per week; accounting for 60.2 percent and consuming noodles for lunch at 90.0 percent (Arisara Rodmui, 2010) [1]. For the nutritional value of 100 grams of noodles, 220 kilocalories of energy, 2.5 grams of protein, 27.5 grams of carbohydrates and 1.3 grams of fat.

Thai rice has a variety of varieties and colors are different, including black, dark purple, ruby yellow, brown and white. Rice color provides different benefits and nutrients such as polyphenol, anthocyanin, vitamins, lutein, beta carotene, gamma oryzanol. These nutrients have direct antioxidant properties; antioxidants that cause cancer and many diseases such as coronary artery disease, cataracts, arthritis, etc; various consumption of rice variety on a regular basis is to help prevent disease. Riceberry is a newly developed Thai rice obtained from crossbreeding between Hom Nil rice, which is known for its antioxidant properties, and White Jasmine Rice 105, which has characteristics the distinctive color is almost purple (black) (Sirichokworrakit et al., 2015) [2]. The nutritional quality of Riceberry is antioxidant, such as Anthony Cyanin, beta carotene, gamma oryzanol and high vitamin E, etc. There is also a high iron content and index Low to medium sugar, therefore, it is suitable

for consumers with anemia; reduce the risk of cancer and diabetic patients (Pornrat Sinchaipanitet al, 2017) [3]. They are also taken orally to enhance good health and medicine is also used for nutritional therapy food products (Sompong et al, 2011) [4].

## METHODOLOGY

***1. Study the ratio of riceberry flour to rice flour making in noodles.***

The preparation of riceberry flour was to take riceberry seeds; come to remove dirt and dry in a hot air dryer at a temperature of 60 degrees Celsius for 8 hours. After that, take out, dry and grind thoroughly with an electric stone grinder and sifted; sifting the flour and pack it in a plastic bag, tightly seal the bag and store at 4 ° C for use.

The standard recipes Adapted from Arisara Rodmui (2010) [1] were used to determine the appropriate quantity of rice milk substitution for ice cream production. The ratio of riceberry flour to rice flour was equal to 0: 100, 10:90, 20:80, 30:70, 40:60 and 50:50. Evaluate the sensory by 9 – Point Hedonic scale to assess the appearance, color, odor, taste, texture and overall preference; the experimental study used testers who were not trained 50 peoples, the experimental design was Randomized Complete Block Design: RCBD, analysis of variance, and compared the difference between the average by Duncan's New Multiple Range Test method at the 95% confidence level.

***2. Study the chemical composition of the noodles with riceberry flour substituted for rice flour.***

Brought the noodles which got the most acceptance from the consumers, to study the chemical composition based on a method of AOAC (2016) [5]. The antioxidant activity using FRAB and DPPH methods.

## RESULTS

***The results of Study the ratio of riceberry flour to rice flour in the production of noodles.***

The experiment results showed that the increased amount of riceberry flour resulted in the considering the ratio of riceberry flour to rice flour in the production of noodles more than 20:80, the score of Odor, texture and overall preference scores increased, there is an average score in all aspects ranged from 6.16 to 6.85 which is in the level of like slightly to moderate. noodles having the preference scores on appearance and color of all ratios were similar. When

Therefore, from the above experiment, the researcher has selected the ratio of riceberry flour to rice flour equal to 50:50 as the appropriate ratio in the production of rice noodles. The noodles are dark purple, soft, tough, flexible and good stability. This is because adding quantity of rice berry flour impacted to make the bread to be more firm and has not risen. Moreover it made the bread to have more dark colour (Jiraporn, 2018) [6].

**Table 1**
**Sensory characteristics of noodles using ratio of riceberry flour to rice flour**

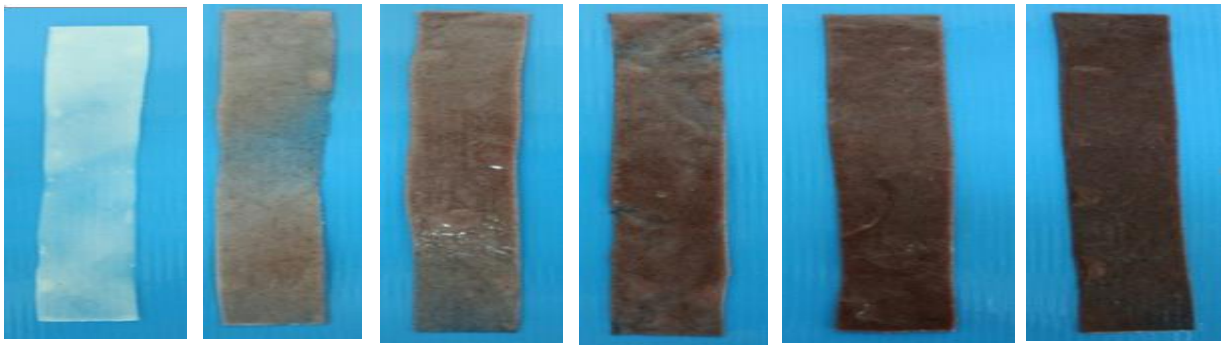
| Sensory Characteristics | The ratio of riceberry flour to rice flour | | | | | |
|---|---|---|---|---|---|---|
| | control | 10:90 | 20:80 | 30:70 | 40:60 | 50:50 |
| Appearance | $6.27\pm1.54^{ab}$ | $5.88\pm2.26^{b}$ | $6.11\pm1.88^{ab}$ | $6.33\pm1.64^{ab}$ | $6.56\pm1.32^{a}$ | $6.47\pm1.77^{ab}$ |
| Color | $6.22\pm1.72^{b}$ | $6.45\pm1.43^{ab}$ | $6.85\pm1.29^{a}$ | $6.53\pm1.39^{ab}$ | $6.47\pm1.77^{ab}$ | $6.58\pm1.32^{ab}$ |
| Odor | $5.08\pm2.19^{b}$ | $6.00\pm1.66^{a}$ | $6.16\pm1.57^{a}$ | $6.37\pm1.42^{a}$ | $6.43\pm1.75^{a}$ | $6.57\pm1.48^{a}$ |
| Taste$^{ns}$ | 6.13±1.48 | 6.01±1.58 | 6.53±1.67 | 6.28±1.56 | 6.26±1.71 | 6.15±1.77 |
| Texture | $6.18\pm1.36^{b}$ | $6.17\pm1.58^{b}$ | $6.75\pm1.55^{a}$ | $6.42\pm1.62^{ab}$ | $6.38\pm1.70^{ab}$ | $6.33\pm1.84^{ab}$ |
| Overall preference | $6.31\pm1.56^{b}$ | $6.30\pm1.30^{b}$ | $6.68\pm1.52^{a}$ | $6.28\pm1.37^{b}$ | $6.41\pm1.58^{ab}$ | $6.72\pm1.55^{a}$ |

Remark : Mean ± Standard Deviation

$^{a,b,c\cdots}$ Means with the different letters are significantly different ($p\leq0.05$).

$^{ns}$ Means are not significantly different ($p>0.05$).

**Figure 1**
**Characteristic of appropriate ratio of riceberry flour substituted for rice flour in making noodle at 0:100, 10:90, 20:80, 30:70, 40:60, 50:50**



**control** **10:90** **20:80** **30:70** **40:60** **50:50**

***The results of Study the chemical composition of noddle.***

The results of the chemical composition of rice noodle from riceberry flour shown in Table 2, it was found that moisture, protein, fat, ash and carbohydrates were 66.22 grams, 2.67 grams, 3.61 grams, 0.31 grams and 27.19 grams / 100 grams, respectively, with high dietary fiber up to 1.46 grams / 100 grams. When analyzed for antioxidant activity using FREB and DPPH methods, it was equal to 209.74 µmoles TE / 100g and 28.55 mgAA / 100g, respectively, because riceberry is the source of Anthocyanin, which has the ability to fight free radicals. There is a research report found that Anthocyanin is a substance that is beneficial to the body; it helps to circulate the bloodstream, prevents cancer, diabetes, atherosclerosis and heart disease etc., (Hiemori et al, 2009) [7].

**Table 2**
**The chemical composition of the rice noodles from riceberry flour**

| Chemical composition | Quantity per 100 gram | Unit |
|---|---|---|
| Moisture | 66.22 | gram |
| Protein | 2.67 | gram |
| Fat | 3.61 | gram |
| Ash | 0.31 | gram |
| Fiber | 1.46 | gram |
| Carbohydrate | 27.19 | gram |
| **Antioxidant activity** | | |
| FRAB | 209.74 | µmoles TE/100g |
| DPPH | 28.55 | mgAA/100g |

**Note**: Analysis value by company "Central Laboratory (Thailand) and Institute of Nutrition".

## CONCLUSION

The results of the ratio of riceberry flour to rice flour in rice noodle production found that the ratio of right to produce noodles was 50:50. The resulting noodles were dark purple which were sticky, soft and flexible, and close to the standard noodle recipe.

The analysis results of the chemical composition, it was found that rice noodles from rice berry flour contained moisture content, protein, fat, ash, fiber and carbohydrates equal to 66.22, 2.67, 3.61, 0.31, 1.46 and 27.19 grams / 100 grams, with the amount of dietary fiber

higher than the standard formula noodles and when Antioxidant activities were analyzed by FRAB and DPPH method, which was equal to 209.74 μmoles TE / 100g and 28.55 mgAA / 100g, respectively, because riceberry is an anthocyanin source which has these antioxidants.

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