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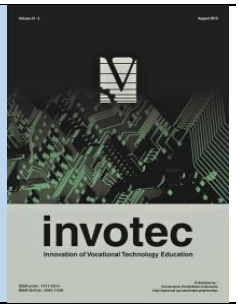

The Influence of Proportion of Yellow Pumpkin (*Cucurbita Moschata*) Flour and Red Rice (*Oryza Glaberrima*) Flour towards Organoleptic Properties of Food Bar

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ABSTRACT

Food bar is food with a bar-like shape which contains adequate energy and nutrition. This study aims to determine the right proportion between red rice flour and yellow pumpkin flour as well as to analyze the influence of said proportion towards organoleptic properties of the food bar. The proportions between red rice flour and yellow pumpkin flour used in this study are 40% and 60%, 50% and 50%, and 60% and 40%. With those varying proportions, the food bars are organoleptically tested based on their color, smell, taste, blendability and favorite level. The study shows that the proportion of red rice flour and yellow pumpkin flour has an impact on the organoleptic properties of the food bar such as the taste, blendability, and favorite level. However, the proportion has no effect on the color and smell of the food bar. The best food bar product contains the proportion of 50% red rice flour and 50% yellow pumpkin flour. Nutrions found per 100g are 144.2 kcal energy, 26g carbohydrate, 15.38mg calcium, 4.56g fat, 2.18g protein, 34.32mg phosphor, 83.04 RE vitamin A, 0.04mg vitamin B1, 13.26mg vitamin C.

1. Introduction

Food bar is a solid food product which has a bar-like shape. It is a mixture various dry ingredients such as cereal, nuts, dried fruits which are combined into a binder. The binder can be made from syrup, nougat, caramel, chocolate, etc (Ekafitri and Faradilla, 2011). According to Kusumastuty, et. al (2015) food bar is originally a food distributed in case of natural disaster; this ready to eat food has enough energy and nutrition which can also be improved to supply calorie, protein, fat and other nutritional needs to serve as a functional food. All in all, food bar is a solid bar-shaped ready-to-eat food containing adequate energy and nutrition.

In the process of making this food bar, a combination of red rice flour and yellow pumpkin flour is used. Nuryani (2013) states that fiber found in the husk of rice type such as red rice is very effective in preventing gastrointestinal diseases as well as diseases related to cholesterol. The anthocyanin pigment in red rice which gives red rice the color it has acts as an antioxidant to prevent various diseases such as coronary heart, cancer, diabetes, and hypertension.

Fiber found in red rice is at 5.4%, but only 2.7% in wheat flour. The capacity of antioxidant red rice has is 6.08mg AEAC/100g (bk) (Goufo and Trindade, 2014). One of the most common product of processed red rice is flour. The aim of producing flour from local food is to make the product last

longer, easier to store, to be more practically verified, to serve as additional way of processing red rice, and to reduce the consumption of wheat flour (Silfia, 2012; Suismono and Hidayah, 2011).

Yellow pumpkin has substantial amount of fiber, vitamin and carbohydrate. In Addition, there are also 34 calories, 0.8 fat, 45mg calcium and 0.8 mineral within the pumpkin. It is why this fruit is very good both for children and the elderly since it gives so much benefits to the human body. In children's case, it is very useful to increase appetite and for dealing with intestinal worms (Pendong, et. al, 2017). Its flour has its own specific attribute and smell. Generally, yellow pumpkin flour can readily go side by side with wheat flour and rice flour to be used in various menus. The quality of yellow pumpkin flour depends on its substance which affects the functional attribute of the batter, the finished product of the flour as well as its water suspension. Yellow pumpkin is a good ingredient for a flour as it has a good gelatinization which results in consistent and spongy batter with great viscosity and elasticity. High amount of carbohydrate can also be found in yellow pumpkin flour. This substance plays a major role in making dough. The starch granules would remain attached to protein while making the dough. This attachment then creates a continuity of the structure of the dough (Imanningsih, 2012).

As a result, red rice and yellow pumpkin are used in making food bar in order to suffice the energy and nutrition needs of human being. Red rice and yellow pumpkin are also relatively easy to find and beneficial for diversification of food. These two ingredients are to be combined with other kinds of ingredients (butter, milk, sugar, beans, and dried fruits) to produce food bar for consumers. The food bar will then be organoleptically tested in terms of color, smell, taste, blendability and favorite level in order to achieve the best kind of food bar.

2. Method

The type of this research is experiment. Several ratios will be applied into the combination (Table 1) between red rice flour and yellow pumpkin flour, namely 40%:60%, 50%:50% and 60%:40% respectively.

Table 1. Experiment Design

Ingredients	S1	S2	S3
Red Rice Flour	40%	50%	60%
Yellow Pumpkin Flour	60%	50%	40%

The technique of data collection is observation. The observation is conducted by testing the organoleptic properties of the three different ratios in term of color, smell, taste, blendability and acceptance. Data is gathered from 35 panelists and the analysis is based on one-way ANOVA test and Duncan's multiple range test (DMRT). The best product is then tested to analyze the nutrition within the food bar by using DKBM (list of ingrdients list composition).

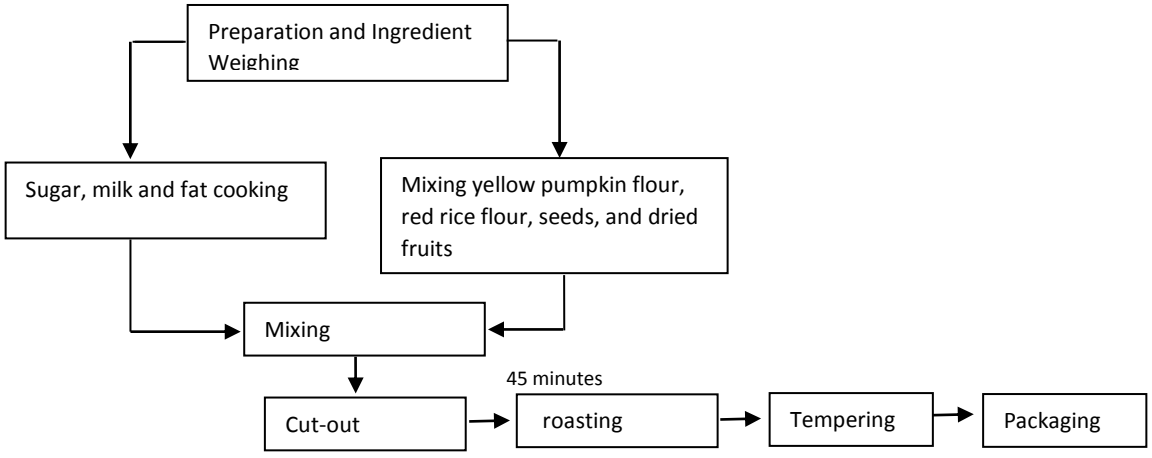

Figure 1. Process of making Food Bar

The ingredients used in the making of food bar are red rice flour and yellow pumpkin flour. On one hand, the red rice flour is made by soaking red rice in water for 12 hours, which is then ground and dried. The total red rice flour used for the 40%, 50% and 60% ratios are 50g. The yellow pumpkin flour used, on the other hand, is made by boiling yellow pumpkin for 5 minutes, which is then sliced, dried, and ground. The same amount of yellow pumpkin flour is used for the 40%, 50%, and 60% from total flour which is 50g. Other ingredients used are sugar, hollmann butter, sweetened condensed milk, dried yellow pumpkin seed, dried sunflower seed, dried cranberry sweets. The process of making food bar can be seen Figure 1.

3. Result and Discussion

Based on the result of organoleptic the highest average is in the treatment with the proportion of 60% red rice flour and 40% yellow pumpkin flour which is 3.77 with light brown food bar color. The results of one-way ANOVA test shows that the proportion of red rice flour and yellow pumpkin flour does not affect the color of the food bar. It does not affect the color of the food bar since the finished product turns out to have the same color that is light brown color. The color is created from cooking sugar. Sugar which is cooked experiences caramelization process that changes its color to brown. Table 2 is the result of one-way ANOVA test on food bar color:

Tabel 2. One-way ANOVA test on color

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.267	2	.633	.748	.476
Within Groups	73.633	87	.846		
Total	74.900	89			

The highest average is in the treatment with the proportion of 40% red rice flour and 60% yellow pumpkin flour which is 2.47. The result of one-way ANOVA test (Table 3) shows that the proportion of red rice flour and pumpkin flour does not affect the food bar smell. The proportion of red rice flour and yellow pumpkin flour does not affect the smell of the food bar as yellow pumpkin flour has specific properties with a distinctive aroma (Hendrasty, 2003), so the resulting product has a distinctive aroma of red rice flour and yellow pumpkin flour.

Table 3. One-way ANOVA test result on smell

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.800	2	.400	.439	.646
Within Groups	79.200	87	.910		
Total	80.000	89			

The highest average is in the treatment with the proportion of 60% red rice flour and 40% yellow pumpkin flour which is 2.43 with sweet enough taste. The taste of red rice flour and yellow pumpkin flour can still be felt. The result of one-way ANOVA test (Table 4) shows that the proportion of red rice flour and yellow pumpkin flour influences the taste of the food bar. Thus, Duncan's multiple range test (DMRT) is done which can be seen below.

Table 4. One-way ANOVA test on taste

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.956	2	3.478	4.815	.010
Within Groups	62.833	87	.722		
Total	69.789	89			

The result of one-way ANOVA test shows that the proportion of red rice flour and yellow pumpkin flour influences the taste of the food bar. Thus, Duncan's multiple range test (DMRT) is done (Table 5). Based on DMRT, a food bar with a proportion of 50:50 and 60:40 both have similar mild sweet taste and the taste of red rice flour and yellow pumpkin flour themselves can still be felt. The proportion of red rice flour and pumpkin flour does affect the taste of the food bar. The more yellow pumpkin flour is used, obviously, the more dominant the yellow pumpkin taste on the food bar. This is because the pumpkin flour has a very distinctive flavor.

Table 5. DMRT result on food bar taste

Food Bar	N	Subset for alpha = 0.05	
		1	2
BM (40%) LK (60%)	30	1.800	
BM (50%) LK (50%)	30		2.333
BM (60%) LK (40%)	30		2.433
Sig.		1.000	.650

The highest average is in the treatment with the proportion of 50% red rice flour and 50% yellow pumpkin flour which is 3.1 as the structure of the food bar is quite dense. The result using ANOVA test for blendability on Table 6.

Table 6. One-way ANOVA test on blendability

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	12.422	2	6.211	5.838	.004
Within Groups	92.567	87	1.064		
Total	104.989	89			

The result of one-way ANOVA test shows that the proportion of red rice flour and yellow pumpkin flour does influence the blendability of the food bar. Further analysis based on DMRT is done in Table 7.

Table 7. DMRT result on blendability of the food bar

Food Bar	N	Subset for alpha = 0.05	
		1	2
BM (60%) LK (40%)	30	2.267	
BM (40%) LK (60%)	30		3.000
BM (50%) LK (50%)	30		3.100
Sig.		1.000	.708

Based on DMRT result, food bar with a proportion of 40% red rice flour and 60% yellow pumpkin flour and the proportion of 50% red rice flour and 50% yellow pumpkin flour make a more solid food bar compared to 60% rice flour and 40%. The proportion of red rice flour and pumpkin flour really does affect the blendability of food bar. Yellow pumpkin flour has good flour quality because it has good gelatinization properties, so it can form a dough with good consistency, elasticity, and viscosity. The carbohydrate of yellow pumpkin flour is also quite high. This carbohydrate is very crucial in process of making starch dough. Starch granules will be attached to the protein during dough creation. The attachment between starch granules and protein will lead to continuity of the dough structure (Hendrasty, 2003).

The highest average acceptance is food bar with the proportion of 50% red rice flour and 50% yellow pumpkin flour which is 3.17. This average score is categorized as ‘quite favorable’. The result of one-way ANOVA test (Table 8) shows that the proportion of red rice flour and yellow pumpkin flour does influence the food bar's favorite level.

Table 8. One-way ANOVA test on favorite level

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.489	2	3.244	3.421	.037
Within Groups	82.500	87	.948		
Total	88.989	89			

The result of one-way ANOVA test shows that the proportion of red rice flour and yellow pumpkin flour does influence the food bar's favorite level. Based on DMRT, panelists prefer food bar with the proportion of 50% red rice flour and 50% yellow pumpkin flour. Food bar with a proportion of 50% red rice flour and 50% yellow pumpkin flour has a light brown color, smells just like red rice and yellow pumpkin, tastes quite sweet and just red rice and yellow pumpkin, and also quite solid.

Table 9. DMRT result on favorite level of the food bar

Food Bar	N	Subset for alpha = 0.05	
		1	2
BM (40%) LK (60%)	30	2.567	
BM (60%) LK (40%)	30	2.633	
BM (50%) LK (50%)	30		3.167
Sig.		.792	1.000

Based on DMRT, panelists prefer food bar with the proportion of 50% red rice flour and 50% yellow pumpkin flour. Food bar with a proportion of 50% red rice flour and 50% yellow pumpkin flour has a light brown color, smells just like red rice and yellow pumpkin, tastes quite sweet and just red rice and yellow pumpkin, and also quite solid. The best results of food bars of red rice flour and yellow pumpkin flour are obtained based on organoleptic tests that have been done as well as one-way ANOVA test and DMRT (Table 10).

Table 10. Best Average Score of Organoleptic Properties of Food Bar with DMRT

Criteria	Proportion of red rice flour and yellow pumpkin flour
Color	No effect
Smell	No effect
Taste	50%:50% = 2,33 60%:40% = 2,43
Blendability	40%:60% = 3 50%:50% = 3,1
Favorite Level	50%:50% = 3,17

The best result of the food bar from the DMRT is the food bar with a proportion of 50% red rice flour and 50% yellow pumpkin flour. Food bars with a 50:50 proportion produce a color that tends to be darker than other samples due to the warming of the Millard reaction that occurs during the food bar maturation process due to the high carbohydrate content of the red rice flour and the yellow lust. This is in line with Farida, et.al (2016) asserting that Millard reaction occurs because yellow pumpkin flour has high carbohydrate content that can make colored product tends to darken. From the result of the organoleptic test, variation of formula have no significant effect on panelist's favorite level to aroma. While variation formula gives a real effect on the level of panelist preferences to taste parameters.

The formula with the highest amount of pumpkin flour that is 60% has the highest favorite value that is 2.43 while 50% pumpkin flour has a favorite value of 2.33. From the data, it can be seen that there is a growing trend of adding pumpkin flour tends to increase the value of the panelist's fondness. This is in line with Farida, et.al (2016) assertion that yellow pumpkin flour has specific properties with typical aromas, colors, and flavors favored by the panelists. Overall the formula that has the best acceptance level is the 50:50 formula because it gives a combination of sweet and tasty flavor. Based on the best resulting product, nutritional content of food bar made from red rice flour and yellow pumpkin flour (Table 11). Food bar with selected formula then analyzed its nutritional content at Research Laboratory Jl. Ketintang. Formula with 50% yellow pumpkin flour and 50% brown rice has a high enough energy of 144.2 kcal and contains vitamins A and C. Yellow, yellow and brown rice pumps have a dye that signifies vitamin A (Kulkani et .al. 2017) and vitamin C (Sharma, et al., 2013).

Table 11. Nutrient Content of Food Bar made from Red Rice Flour and Yellow Pumpkin Flour per 100 grams

No.	Nutrition	Total	
1.	Energy	144,2	kcal
2.	Carbohydrate	26	gram
3.	Calsium	15,38	mg
4.	Fat	4,56	gram
5.	Protein	2,18	gram
6.	Phosphor	34,32	mg
7.	Vitamin A	83,04	RE
8.	Vitamin B1	0,04	mg
9.	Vitamin C	13,26	mg

4. Conclusion

The effects of the proportion of red rice flour and yellow pumpkin flour on the organoleptic properties of the food bar which include color, smell, taste, blendability, and favorite level are as follow: there is a significant influence of the proportion of red rice flour and yellow pumpkin flour on the organoleptic properties of taste, blendability, and favorite level of the food bar, and there is no significant effect of the proportion of red rice flour and yellow pumpkin flour on the organoleptic properties of color and smell of the food bar. The best resulting product is the food bar with proportion of 50% red rice flour and 50% yellow pumpkin flour. Criteria of the food bar include a light brown color and an average score of 3.27; smell like red rice and yellow pumpkin with an average score of 2.27; quite sweet and taste quite like red rice and yellow pumpkin with an average score of 2.33; quite solid with an average score of 3.1; the favorite level is 'quite favorable' with the average score of 3.17.

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