

The Use Of Brown Rice Milk In The Making Of Milk Pie

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ABSTRACT

Snack is defined as eating that occurs between the three substantial meals of the day, is convenient, and may be consumed promptly. A pie is a sort of delicacy that is shaped like a cake and filled with cream. Pie is a popular form of pastry in the United States. This roasted dish has been around since ancient Egypt. Meanwhile, pies were frequently used in Roman and medieval periods to wrap meat and other ingredients to keep them wet during cooking. Pies are cakes that are filled with cream, jelly, and other ingredients. Tarte (French) or pie (American), known as pai in Indonesia. The author will employ an experimental research method in the creation of this final project. The goal of this study was to compare the flavor of cow's milk pie to brown rice milk pie, to determine the shelf life of manufacturing cow's milk pie with brown rice milk pie, and to compute the cost of making cow's milk pie with brown rice milk pie.

Keywords: Snack; Pie; Brown Rice Milk; Food

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1. Introduction

Food is a basic human essential that is needed at all times and requires good and correct processing to be beneficial for the body. Food or food product is anything that comes from biological or water sources, both processed and unprocessed, which is designated for food or drink for humans. Food is divided into two types; (main meals) and snacks.

Snack is defined as eating that is consumed at times between the three main meals in a day, is practical and can be consumed immediately. One type of snack in the form of a cake and filled with cream is a pie. Pie is a type of pastry that is popular in America. This dish made by roasting has been around since ancient Egypt. Meanwhile, in Roman and medieval times, pies were often used to wrap meat and other ingredients to keep them moist during cooking.

Pies are cakes filled with cream, jelly, and so on. The cake is called tarte (French) or pie (American), in Indonesia known as pai. The basic ingredients of skin dough vary, one of which is called shortdough pastry. The main ingredient of pie filling is milk, one of which is cow's milk which is a source of essential nutrients for growth. Cow's milk contains carbohydrates, proteins, fats, minerals and vitamins.

Lactose is the only carbohydrate in cow's milk, lactose is the main carbohydrate naturally found in milk and its processed products. Lactose contained in cow's milk needs to be hydrolyzed into glucose and galactose first so that it can be absorbed by the intestinal wall and enter the blood circulation. Rice is the main source of food for people in Indonesia. For a healthy body, maintain a diet by choosing the best types of food, rice also contains carbohydrates, protein, fat, vitamins, minerals and fiber that are good for the body. While the rice itself there are many types and have different nutritional content and taste. The following is a summary of 5 types of rice in Indonesia:

a. White Rice

White rice has a layer of skin that has been removed before, therefore the rice is white. White rice contains less fiber.

b. Glutinous Rice

Glutinous rice itself has two colors, namely white sticky rice and black sticky rice. Glutinous rice also has a sticky texture and a savory taste after cooking.

c. Red Rice

Red rice is often eaten by some people who are on a diet program.

d. Black Rice

Black rice has a lot of nutritional content such as vitamin E, anti-inflammatory substances, and antioxidants that are good for the body.

e. Brown Rice

Brown rice is rice that is processed by removing the rice husk and does not go through a long process like white rice. The texture of this type of rice is coarser and the color is brown. Brown rice is rich in nutrients, and has more fiber than white rice. In addition, brown rice contains phytonutrients, essential fats, magnesium, minerals and vitamins.

Based on the explanation above, the authors are interested in making brown rice milk as a substitute for cow's milk in making milk pies. With these theories and the many benefits contained in brown rice milk the authors intend to provide information and a deeper introduction to the public about brown rice milk.

2. Literature Review

2.1. Comodity Introduction

Rice (*Oryza sativa*) is the main food crop in the world which is rich in carbohydrates so that it becomes a staple food for most people in the world. Rice is a type of grain plant (cereal), based on its classification, rice belongs to the grass family (*Poaceae*) with the genus name *Oryza*. In Indonesia, the characteristics of rice are able to grow throughout the season.

Java Island is an area that has become a national rice granary because most of the national rice consumption is imported from farmers on the island of Java.

Besides white rice, other types of rice that are widely planted are brown rice. The following is a list of rice-producing reas on the island of Java:

Table 1. Java Island Rice Income List

No	Year	EAST JAVA	CENTRAL JAVA	WEST JAVA
1	2018	10.203.213,17 Ton	10.499.588,28 Ton	9.647.358,75 Ton
2	2019	9.580.933,88 Ton	9.655.653,98 Ton	9.084.957,22 Ton
3	2020	9.944.538,26 Ton	9.489.1644,62 Ton	9.016.772,58 Ton

Source: KOMPAS.com (2021)

Unhusked rice that has been removed during milling is called broken husk rice (PK) or commonly referred to as brown rice. The physical appearance of rice is said to be good, if it gets a lot of head rice and minimal broken rice.

Head rice is a grain of rice whose size is larger than 2/3 part of a whole grain of rice, while broken rice is a grain of broken rice measuring 1/3-2/3 of a whole rice grain, if < 1/3 it is called groats. Groats are a continuation of broken rice grains into smaller shapes (Waries, 2006).



Figure 1. Brown Rice (Chandratama,2015)

Brown rice is unpolished brown rice that has been ground and cracked without being ground, retaining all of the goodness of rice contained in the rice husk. This epidermis, also known as bran or aleurone, contains protein, saturated fat, vitamins, minerals, fiber, and antioxidants.

The white rice that we consume on a daily basis actually comes from brown rice which undergoes a process of further grinding or grinding after the skin breaks so that the brown aleurone or bran layer is released and produces white rice. Because brown rice is still covered by a layer of brown rice bran and contains fiber, when consumed, carbohydrates in brown rice are digested into glucose in the digestive tract more slowly, and cause a slow increase in blood glucose levels.

Brown rice is said to have a low glycemic index (37), which is lower than white rice's GI (85). As a result, brown rice is beneficial to diabetics and can help avoid diabetes. According to the findings of a recent study, consuming up to 50 grams of brown rice each day can reduce the risk of diabetes by 13%.

The fiber in brown rice can reduce cholesterol and blood fat levels by inhibiting the absorption of cholesterol and fat from the digestive tract and removing cholesterol and fat into the feces. The properties of brown rice are very good for the prevention of heart disease.

3. Materials and Methods

An experimental research approach will be used by the author in the preparation of this research. The experimental technique is a study approach used to determine the effect of specific treatments on others under controlled settings (Sugiono, 2018). This means that the results of this experiment differ from those of the prior product. This is because one of the ingredients is substituted with another substance that must adhere to the author's recipe guidelines. Using this strategy, the author can demonstrate and learn the outcomes of the substitution of these materials.

To complete the data from the experimental method, hedonic tests and organoleptic tests were carried out. The hedonic test is the most widely used test to measure the level of preference for production. This level of preference is called

a hedonic scale, for example, like very much, like, somewhat like, somewhat dislike, dislike very much, and so on. The hedonic scale can be stretched according to the desired scale range. Endurance test is the testing of a product by observing the product periodically to see the durability of the quality of the product under study. This research was conducted by means of an organoleptic test based on the sensing process, namely color, aroma, texture and taste. The ability of the senses to give impressions and responses can be analyzed or distinguished based on the type of impression. Durability test which involves changes in the color, aroma, texture and taste of a product. Endurance tests are carried out to determine the extent to which the quality of the product survives outdoors. West, Wood and Harger, Gaman and Sherrington and Jones (2012:1) stated that "in general the factors that affect food quality are color, texture, aroma, taste, temperature and appearance."

The types of data in this study are divided into two, namely primary data and secondary data. The primary data sources in this study were obtained directly through observations, interviews, and questionnaires from several parties related to the condition of the company. Meanwhile, secondary data from this research is in the form of demand data and data obtained from various literatures.

4. Results and Discussion

4.1. Result of The Assessment of The Comparative Taste of Milk Pie and Brown Rice Milk Pie

In assessing the taste of the brown rice milk pie, the author assessed 2 types of panelists, namely expert or professional panelists and consumer panelists who judged four aspects, namely aroma, taste, texture and color. The following are five choices of scales used in the panelist assessment format:

Table 2. Panelist Assessment Scale

CRITERIA	VALUE
Flavorful Very crunchy Very Soft Amazing	5
Delicious crispy Soft Interesting	4
Quite delicious Quite dry Quite soft Quite interesting	3
Less Flavor Mushy Quite Hard Unattractive	2
Tasteless Very mushy Hard Very Unattractive	1

Source: Sugiono (2005)

The following are the results of panelists' tests that have been carried out by conducting organoleptic tests in terms of aroma, taste, texture and color aspects. The author conducted a panelist test to 30 consumer panelists from the environment around the author's residence in the Bandung area, including students, entrepreneurs and various other professions.

Table 2. Consumer Panelist Assessment Results On The Taste Of Comparisonal Milk Pie (n=30)

NO	Assesment Aspect	(5)		(4)		(3)		(2)		(1)		Σf(x)	x̄	Category
		f	f(x)	f	f(x)	f	f(x)	f	f(x)	f	f(x)			
1	Aroma	8	40	16	64	6	18	-	-	-	-	122	4,06	Sweet Aroma
2	Flavor	7	35	19	76	4	12	-	-	-	-	123	4,10	flavorful
3	Texture	3	15	20	80	7	21	-	-	-	-	116	3,86	Soft
4	Color	5	25	18	72	6	18	1	2	-	-	115	3,83	Attractive
TOTAL		23	115	73	292	23	69	1	2	-	-	476	3,96	

Source: Authors Documentation (2022)

From the table of results of the assessment of milk pies conducted by the 30 authors above, it can be seen that the value of each aspect is as follows:

a. Assessment Result on Aroma

The comparison value of the milk pie on the aroma aspect from the sum of the results of the consumer panelists got a value of 122 points with an average value of 4.06. Thus

for the assessment of aroma, pies get a delicious rating.

b. Assessment Result on Taste

The comparison value of the milk pie on the taste aspect from the sum of the results of the consumer panelists got a score of 123 points with an average value of 4.10. Thus for the assessment of taste, milk pies get a good rating.

c. Assessment Result on Texture

The comparison value of the milk pie on the texture aspect from the sum of the results of the consumer panelists got a value of 116 with an average value of 3.86. Thus, for texture assessment, milk pies get a crunchy and soft rating.

d. Assessment Result on Color

The comparison value of the milk pie on the color aspect from the sum of the results of the consumer panelists got a score of 115 points with an average value of 3.86. Thus for the color assessment, milk pies get an interesting rating.

The following are the assessment results of 30 consumer panelists to the taste of the brown rice milk pie:

Table 3. Consumer Panelist Assessment Results On The Taste Of Brown Rice Milk Pie (n=30)

NO	Assessment Aspect	(5)		(4)		(3)		(2)		(1)		Σf(x)	\bar{x}	Category
		f	f(x)	f	f(x)	f	f(x)	f	f(x)	f	f(x)			
1	Aroma	14	70	13	52	3	9	-	-	-	-	131	4,36	Very Sweet
2	Flavor	16	80	13	52	1	3	-	-	-	-	135	4,50	Flavorful
3	Texture	10	50	15	60	5	15	-	-	-	-	125	4,16	Crunchy and Soft
4	Color	13	65	14	56	3	9	-	-	-	-	130	4,33	Very Attractive
TOTAL		54		55	220	12	36	-	-	-	-	526	4,33	

Source: Author Documentation (2022)

From the Table of results of the assessment of the brown rice milk pie conducted by the 30 consumer panelists above, it can be seen that the value of each aspect is as follows:

a. Assessment Result on Aroma

The value of the experimental milk pie on the aroma aspect from the sum of the results of the consumer panelists got a score of 131 points with an average value of 4.36. Thus, for the assessment of aroma, brown rice milk pie gets a very tasty rating.

b. Assessment Result on Taste

The value of the brown rice milk pie on the taste aspect from the sum of the results of the consumer panelists got a value of 135 points with an average of 4.50. Thus for the assessment of taste, brown rice milk pie gets a very good rating.

c. Assessment Result on Texture

The value of the brown rice milk pie on the texture aspect from the sum of the results of the consumer panelists got a value of 125 points with an average value of 4.16. Thus, for texture assessment, brown rice milk pie gets a crunchy and soft rating.

d. Assessment Result on Color

The value of the brown rice milk pie on the color aspect from the sum of the results of the consumer panelists got a score of 130 points with an average value of 4.33. Thus, for color assessment, brown rice milk pie gets a very interesting rating.

4.2. Hedonic Test of Milk Pie and Brown Rice Milk Pie

In assessing the hedonic test of milk pie and brown rice milk pie, the authors evaluate consumer panelists or untrained panelists who are judged on the level of preference. Interpretation of results Interval values according to Suharsimi (2010, 279-285)

Seen from the number of classes used, namely 5, then the calculation of the interval is obtained by the following formula:

Table 4. Panelist Assessment Interval On Hedonic Test

Score	Assessment Criteria
4,1 – 5,0	Classified as very like
3,1 – 4,0	Classified as like
2,1 – 3,0	Classified as somewhat like
1,1 – 2,0	Classified as dislike
0 – 1,0	Classified as very dislike

Source: Suharsimi (2010,279-285)

Table 5. Scale Of Assessment On Hedonic Test

CRITERIA	VALUE
Very Like	5
Like	4
Quite Like	3
Dislike	2
Very Dislike	1

Source: Sugiono (2005)

The results of the hedonic test that the author conducted on 30 consumer panelists or untrained panelists and viewed from the criteria for the preference group for dairy products as comparison and brown rice milk pies are as follows:

Table 6. Consumer Panelist's Assessment Of Comparative Milk Pie And Brown Rice Milk Pie (n=30)

PRODUCT	(5)	(4)	(3)	(2)	(1)	TOTAL
Milk Pie	6	18	5	1	-	30
Brown Rice Milk Pie	13	10	7	-	-	30

Source: Author's Results (2022)

From the assessment of 30 consumer panelists or untrained panelists on product preferences, it is known that:

- a. For milk pie products, 6 panelists were classified as very like, 18 panelists were classified as liking, 5 panelists were classified as somewhat like and 1 panelist was classified as disliking.
- b. For brown rice milk pie products 13 panelists were described as extremely similar to the brown rice milk pie product, 10 panelists as like, and 7 panelists as slightly similar.

Table 7. Consumer Panelist Assessment Results On Milk Pie (n=30)

PRODUCT	(5)		(4)		(3)		(2)		(1)		Σf(X)	x̄	Classified
	f	f(x)	f	f(x)	f	f(x)	f	f(x)	f	f(x)			
Comparative Milk Pie	6	30	18	72	5	15	1	2	-	-	119	3,96	Like
Brown Rice Milk Pie	13	65	10	40	7	21	-	-	-	-	126	4,20	Very Like
TOTAL	19	95	28	112	12	36	1	2	-	-	305	4,08	

Source: Author's Results (2022)

From the table of results of the assessment of the comparison milk pies and brown rice milk pies conducted by the 30 consumer panelists above, it can be seen that the respective values are as follows:

a. Assessment Results of Milk Pie

From the sum of the results of the consumer panelists' assessment, they get a value of 119 points with an average value of 3.96. Thus, for evaluating the preference of the milk pies, it can be classified as likes.

b. Assessment Results of Brown Rice Milk Pie

From the sum of the results of the consumer panelists' assessment, they got a score of 126 points with an average of 4.20. Thus, for the assessment of preference for brown rice milk pie, it can be classified as Very Like. Comparative Results of Hedonic Test of Comparative Milk Pie and Brown Rice Milk Pie by 30 Consumer Panelists. The following is a table the detailed results of the combined average panelists' assessments of milk pies and brown rice milk pies, including:

Table 8. Results Of Hedonic Test Comparison Of Milk Pie And Brown Rice Milk Pie (n=30)

PRODUCT	AVERAGE OF PANELIST ASSESSMENT RESULTS	CLASSIFIED
Comparison Milk pies	3,96	Like
Brown rice milk pies	4,20	Very Like
Average	4,08	

Source: Author's Result (2022)

From the table of hedonic test results for milk pies and brown rice milk pies above, the values obtained from the results of the assessment of 30 untrained panelists or consumer panelists, it can be seen that the value of each product is as follows:

- Milk pie got an average value of 3.96 which can be classified as Very Like.
- Brown rice milk pies get an average value of 4.20 which can be classified as very like, brown rice milk pies get an average of 0.24 superior to milk pies.

It can be seen from the statement above that the consumer panelists' assessment of the preference test for milk pie and brown rice milk pie is not much different, both of which fall into the delicious category in the assessment of the preference test for brown rice milk pies, the score was superior to that of milk pies. Based on this statement, it can be concluded that brown rice milk pie is a product that is accepted and deserves to be introduced to the public.

Meanwhile, milk pie did not excel in 4 aspects. The following are the results of the assessment of the pie:

Table 9. Organoleptic Assessment Results Of Milk Pie And Brown Rice Milk Pie

RESULT OF TASTE ASSESSMENT		
ASSESSMENT ASPECT	MILK PIE	BROWN RICE MILK PIE
Aroma	4,05	4,32
Flavor	3,97	4,45
Texture	3,75	3,97
Color	3,87	4,22
Average	3,91	4,24

Source: Author's Results (2022)

It can be seen from the table above that the panelists' assessment of the taste milk pie and brown rice milk pie was not much different, both of which were categorized as delicious. For aspects of aroma, taste and texture, brown rice milk pie got a superior value compared to the milk pie. Therefore, it can be concluded that brown rice milk pie is a product that is accepted and deserves to be

introduced to the public.

5. Conclusions

Based on the results of experiments and changes in previous chapters, the author can formulate several conclusions as follows. Based on the data that has been processed by the author, the taste of brown rice milk pie is superior to the taste of milk pie. Brown rice milk pie is superior in 4 aspects, namely aroma, taste, texture and color.

The following are some research ideas for brown rice milk pies that the author might offer:

- Improve the packaging of the brown rice milk pie product to make it more appealing, efficient, and to raise the selling price.
- It is intended that more producers would create brown rice milk.

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