Utilization of Jackfruit Seed Flour into Pan de Sal

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Abstract

This study focuses on the Utilization of Jackfruit Seed Flour into Pan de sal. There are Fifty (50) community evaluators aged fifteen to sixty years old of Brgy. Sta. Rita, San Joaquin, Iloilo using convenience sampling method to determine the level of acceptability of Utilization of Jackfruit Seed Flour into Pan de Sal into three formulations as to its appearance, aroma, taste, texture and general acceptability. To determine if there are significance in the level of acceptability of Jackfruit seed flour as substitute in making Pan de Sal in three formulation as to its appearance, aroma, taste, texture and general acceptability. The Sensory Evaluation sheet was used to determine the Five-Point Likert Scale to evaluate the sensory characteristics of the product and Five-Point Hedonic Scale for the general acceptability. Mean, Standard Deviation and ANOVA used as statistical tools. Result revealed that there was significant difference in the level of the acceptability of Jackfruit seed flour as substitute in making Pan de Sal to three formulation A, B, and C in terms of appearance, aroma, taste and texture. However, in terms of general acceptability, the result revealed that there was no significant difference in three (3) formulations. As to color, Formulation A (2.42%) results to light brown, Formulation B (3.76%) golden brown, formulation C (4.42%). As to aroma, Formulation A (2.00%) has no jackfruit seed aroma, Formulation B (4.00%) has moderate Jackfruit seed aroma and Formulation C (4.76%) has strong Jackfruit seed aroma. However, the acceptability level in terms of taste, Formulation A (2.00%) indicates there is no Jackfruit seed taste, while Formulation B (4.00%) has moderate Jackfruit seed taste and Formulation C (4.72%) indicates strong Jackfruit seed taste. As to texture, Formulation A (4.60%) is smooth, Formulation B (3.98%) is moderately smooth and Formulation C (3.44%) is moderately rough. As to its general acceptability, Formulation A (4.48%) like slightly, Formulation B (4.52%) liked very much and Formulation C (4.62%) as the highest. The following are the recommendations the farmers are recommended in giving significant value and importance for the full potential of Jackfruit tree plantation. The researchers are encouraged to do more research about the acceptability of Jackfruit seed flour that would supply with awareness and knowledge about the health benefits. Consumers are recommended to make snacks

at home made of Jackfruit seed flour. Lastly, bakers are encouraged to use the Jackfruit seed flour because the result of this study would provide them new ideas and learning about the usage of it in creating a new product like Pan de Sal, cupcakes, cookies and among other baked products in the market.

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1. Introduction

1.1 Background of the Study

Bread is the oldest food known to the human kind. In the Philippines "Pan de Sal" is a favorite type of bread of Filipinos. It is the ultimate "tinapay" staple food during breakfast or snack. Filipinos love Pan de Sal and will always be the number one bread for the Filipinos hearts.

Due to global crisis, the war between Ukraine and Russian affecting the world wheat supply in the market. The world's more than half of wheat supply unable to go to export. Philippines a country mostly relying from importing wheat flour from several countries. For this reason, the prices of flour in country rise as the domino effects of the global issue. Since flour the staple ingredient use in making Pan de Sal and any type of bread are expected to become more expensive. Does it have significant effect to the local bakers consuming flour, the number ingredient in making Pan de Sal and any bread.

In view of this matter, Philippines is abundant of tropical fruits that could be found in the surrounding that could utilized into a new produce product to minimize the use of commercial products. For instance, having knowledge and ideas in using jackfruit seeds into flour, can minimize the use of the commercial flour in making Pan de Sal, and therefore increasing the income. The usage of jackfruit seed is not that pricy in fact people such as bakers could utilize it in making flour. Thus, many researchers keep on studying and figuring different high potential raw materials and resources available within the locality.

For most of us, the only part of jackfruit that is consumed is only the flesh, or fruit pods, which are edible both when ripe and unripe. However, the flesh isn't the only part of the fruit you can eat; a single jackfruit may contain 100-500 edible and nutritious seeds. It contains a high level of starch, protein, vitamins, and minerals. Jackfruit seed is a potential local food source, which can be processed into flour. But, as we all know, only a few numbers of this fruit are used in cooking and as a result, a large quantity of this plant remains unused, which will eventually after a couple of days, ripen and will end up as raw waste material in the community (Elliot, 2018).

In this study, the researchers aim to develop a new source of flour with the use of raw materials available. The researchers found out a good source of starchy component could be found in the jackfruit seed. With this study, seek to support the local bakers and other bread makers that jackfruit seed flour could be substitute for commercial flour. With this research study, utilization of the jackfruit seed flour into Pan de Sal aim to test if there is a significant difference in into three formulations. Also, to test what is the acceptability level as to its appearance, aroma, taste, texture and general acceptability.

1.2 Statement of the Problem

The researchers aimed to determine the acceptability level of Jackfruit (Artocarpusheterophyllus) seed flour as a substitute in making Pan de Sal. Specifically, this study sought answers to the following questions:

1. What is the acceptability level of Jackfruit seed flour as a substitute in making Pan de Sal in three formulations as to its appearance, aroma, taste, texture and general acceptability?

2. Is there a significant difference in the acceptability level of Jackfruit seed flour as substitute in making Pan de Sal in three formulations as to its appearance, aroma, taste, texture and general acceptability?

1.3 Hypothesis

There is no significant difference in the acceptability level of Jackfruit seed flour as substitute in making Pan de Sal in three formulations as to its appearance, aroma, taste, texture and general acceptability.

1.4 Theoretical Framework

This study was anchored in the idea of Diffusions of Innovation Theory by Rogers (2003). The theory gives a basis for understanding how innovations are adopted as well as the variables that affect a person's decision regarding an innovation. Rogers' diffusion theory has four basic parts: the invention, the channels used to disseminate knowledge about the innovation, the social network that surrounds adopters and non-adopters of the innovation, and the amount of time it takes for people to go through the adoption process.

Due to global crisis, commercial flour is increasingly in the market affecting the production of bread. Through this innovation technique, give ways to the study of developing a new source of flour was innovated. The use of Jackfruit seed flour as a new improve product with the good source of nutrition. Through this innovation, bakers would gain knowledge and idea for the new source of flour. That is more accessible, cost efficient and cheaper. The utilization of jackfruit seed flour would be tested to see starchy component as a new source of flour. The researchers believed that through the result of this study, it could help and give awareness to the people that Jackfruit seeds could be utilized as substitute to commercial flour in making Pan de Sal. And this newly innovated Pan de Sal with the use of Jackfruit seed as the main ingredient could be adopted and embraced by the people.

1.5 Conceptual Framework

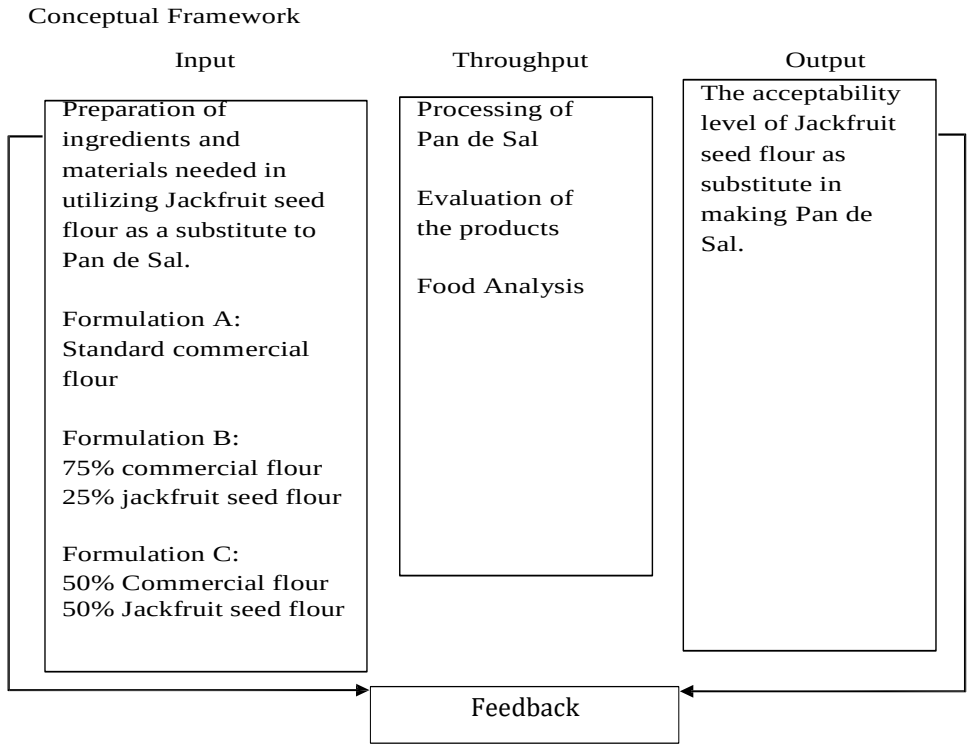

Fig 1. Paradigm of the Study

This study followed the input, throughput, output model. The input of the study includes; the preparation of the ingredients and materials needed in utilizing Jackfruit seed flour as a substitute in making Pan de Sal and formulations A, B and C. The finished product was evaluated using the sensory evaluation to determine the acceptability level of Jackfruit seed flour as a substitute in making Pan de Sal that was evaluated in terms of appearance, aroma, taste, texture and general acceptability.

1.6 Scope and Limitation of the Study

This study on the utilization of Jackfruit (Artocarpusheterophyllus) seed flour into Pan de Sal aimed to determine the acceptability level of Jackfruit seed flour as a substitute in making Pan de Sal and its significant differences in the level of acceptability of jackfruit seed flour in making Pan de Sal in three formulations. The seeds that were utilized to create flour were collected from jackfruits that had been purchased from the local market. Fifty Filipino aged 15 to 60 years old, regardless of gender who are residents of Brgy. Sta. Rita, San Joaquin, Iloilo is recruited for this study. The participants are selected using the non-random and convenience sampling method. The research was conducted in the second semester of AY 2021-2022

1.7 Significance of the Study

This study demonstrated the utilization of Jackfruit seed flour into Pan de Sal as the main ingredient. This study may be beneficial to the following person.

Students. The result of this study may inspire the student and explore to Jackfruit seed flour as substitute for commercial flour that challenge them to be innovative. In return, they were able to create a new baked product.

Teachers. The result of this study may supplement them with new learnings and knowledge about the Jackfruit seed flour as substitute for commercial flour in using for pastry production and other baked products. This new idea will enhance their skills and better understanding about the Jackfruit seed flour.

University/Institutions. This research may add to the extensive research collection of the university.

Parents. This study may help the parent to be aware of the nutritional value of the Jackfruit seed flour that is beneficial to the body. It may help them to guide their children to consume healthier food rather than junk foods. This study will enlighten the mind of the parents so that they could be able to let their children understand the importance of Jackfruit seed flour. The involvement of the parent will help their children gain knowledge and understanding.

Consumers. This study may help consumers to appreciate the pan de sal made from Jackfruit seed flour. Its uses and nutritional value that is beneficial.

Farmers. This study may encourage the farmers the potential of Jackfruit plantation. This study may inspire farmers to plant more Jackfruit tree plant and utilized it uses. Thus, it helped farmers improve their source of income and standard of living.

Entrepreneurs. This study may made them to re-evaluate their choices when it comes to investing in novel raw materials such as the jackfruit seed flour and also helped come up with new products. This study would be used as the baseline information that Jackfruit seed flour can be used to other baked products such as pan de sal.

Future Researchers. This study may add to the array of literature that can use as reference for their future research endeavors. This may encourage the researchers to researcher further more about the other ways on how to improve the use of Jackfruit seed flour to other baked products. This may supplement researchers the knowledge and awareness of the nutritional value that may use for other experimental study.

Local Government of San Joaquin. This study may encourage the local government of San Joaquin about the awareness of Jackfruit seed flour. Its uses and benefits to the people and to the local famers. It may encourage them to provide assistance and guidance for the plantation of Jackfruit tree in San Joaquin.

Department of Agriculture. This study may encourage the Department of Agriculture participating in further developing of Jackfruit Seed Flour to be marketable and as source of income to the local farmers.

2. Research Methods

Research Design

This study utilized an experimental research design to test the hypothesis by reaching valid conclusions about independent and dependent variables. The independent variable or the controlled variable by the researchers was the Jackfruit seed flour into Pan de Sal given the proper procedure being followed. While, the dependent

variable was its acceptability level of Jackfruit seed flour as a substitute in making Pan de Sal in terms of appearance, aroma, taste, texture and general acceptability. The said variable is the outcome of manipulating the independent variable to test the hypothesis formulated by the researchers.

Evaluators of the Study

The evaluators of the study were the fifty (50) community members aged from 15- 60 years old from Brgy. Sta. Rita, San Joaquin, Iloilo. These evaluators were identified through convenience sampling. Convenience sampling design is the basic sampling method assumed in this study for statistical method and computation.

Research Instrument

The study utilized a sensory evaluation as the main instrument of the study. The researchers created a Pan de Sal for testing, using the jackfruit seed flour as the main ingredient. The 5-point Likert scale (5 as the highest and 1 as the lowest) was employed to measure the level of acceptability of jackfruit seed flour as substitute in making Pan de Sal in terms of appearance aroma, taste, texture and the 5-point Hedonic scale (5 as the highest and 1 as the lowest) level of general acceptability in using jackfruit seed flour as substitute in making Pan de Sal in three formulations. The participants were given an evaluation for them to assess the finished product.

Data Gathering Procedure

The researcher wrote a permission letter address to the Campus Administrator to conduct a study in Utilization of Jackfruit Seed Flour into Pan de Sal in Brgy. Sta. Rita San Joaquin Iloilo. Then, researchers provided a copy of instrument to the fifty (50) selected community members aged 15-60 years old, regardless of gender using the convenience sampling method. After the distribution of the questionnaires, the researcher gave instructions to the evaluators on the process of the evaluation. The data were collected and processed after the retrieval of the administered instruments.

Data Gathering Techniques

The data was tabulated using SPSS. In addition, to check for the reliability and validity of the test results, the data was further analyzed and interpreted by utilizing varying statistical analysis methods. The Mean and the Standard deviation of each formulation in terms of appearance, aroma, taste, texture and general acceptability were utilized for the descriptive analysis of the data.

Lastly, ANOVA was used to determine whether there is significant differences and variances in the three formulations in terms of appearance, aroma, taste, texture and general acceptability.

Analysis of Variance (ANOVA), a test that compares more than two groups, enables researchers to determine if there is a significant difference or none at all.

3. Result and Discussion

This chapter presented the results of data and followed by a discussion of the research findings. The findings relate to the research questions that guided the study.

Descriptive Data Analysis

The objectives of this are to calculate and differentiate the acceptability level the evaluators on the three formulations in the utilization of Jackfruit seed flour into Pan de Sal in terms of appearance, aroma taste, texture and general acceptability. Mean and standard deviation were used to describe the data.

Acceptability of Utilization of Jackfruit Seed Flour into Pan de Sal

With the use of sensory evaluation sheet, fifty (50) community members of Barangay Sta. Rita, Iloilo City aged from 15 – 60 yrs. old were chosen non-randomly and were given the sensory evaluation sheet and asked to further assess the utilization of Jackfruit Seed Flour into Pan De Sal using a five-point likert scale in terms of appearance, aroma, taste and texture, and a five-point hedonic scale for the general acceptability.

Fig 2 The Acceptability Level of Evaluators on Identified Characteristics of the Different Formulation of the Utilization of Jackfruit Seed Flour into Pan de Sal.

Characteristics	*M (SD)*	Description
Appearance		
Formulation A	2.42 (1.126)	Light brown
Formulation B	3.76 (.797)	Golden brown
Formulation C	4.42 (.905)	Golden brown
Aroma		
Formulation A	2.00 (.000)	No Jackfruit seed Aroma
Formulation B	4.00 (.728)	Moderate Jackfruit Seed Aroma
Formulation C	4.76 (.591)	Strong Jackfruit Seed Aroma
Taste		
Formulation A	2.00 (.000)	No Jackfruit Seed Taste
Formulation B	4.00 (.782)	Moderate Jackfruit Seed Taste
Formulation C	4.72 (.572)	Strong Jackfruit Seed Taste
Texture		
Formulation A	4.60 (.782)	Smooth
Formulation B	3.98 (.844)	Moderately Smooth
Formulation C	3.44 (1.500)	Moderately Rough
General Acceptability		
Formulation A	4.48 (.762)	Liked Slightly
Formulation B	4.52 (.071)	Liked Very Much
Formulation C	4.62 (.697)	Liked Very Much

The Fig 2 shows the acceptability level of Jackfruit seed flour as a substitute in making Pan de Sal in three formulations as to its appearance, aroma, taste, texture and general acceptability.

In terms of appearance, Formulation C as the highest with M= 4.42; SD= .905 which corresponds to golden brown in the five-point likert scale, followed by Formulation B with M= 3.76; SD= .797 which also corresponds to golden brown in the scale. Lastly, Formulation A has the lowest score in evaluation in terms of appearance with M= 2.42; SD= 1.126 which means that it exhibits a light brown color.

In terms of aroma, Formulation C as the highest score obtained from the evaluators with M= 4.76; SD= .591which corresponds to strong Jackfruit seed aroma, followed by Formulation B with M= 4.00; SD= .728 which means that it has moderate Jackfruit seed aroma. Finally, Formulation A obtained M= 2.00; SD= .000which implies that it has no Jackfruit seed aroma.

In terms of taste, Formulation C obtained M= 4.72; SD= .572 which suggests that it has a strong Jackfruit seed taste. On the other hand, formulation B obtained M= 4.00; SD= .782which means that it has moderate Jackfruit seed taste. Ultimately, Formulation A obtained M=2.00; SD= .000 which indicates that it has no Jackfruit seed taste.

In terms of texture, Formulation A as the highest with M= 4.60; SD= .782 as a smooth texture, Formulation B with M= 3.98; SD= .844 has moderately smooth texture and Formulation C is the lowest with M= 3.44; SD= 1.500 as moderately rough texture.

In terms of general acceptability, Formulation C as the highest with M= 4.62; SD= .697liked very much, the second is Formulation B, with M= 4.52; SD= .071, liked very much and Formulation A like slightly with M= 4.48; SD= .762 to the lowest.

Inferential Analysis

Fig 3 Differences of Three (3) formulations in Utilization of Jackfruit Seed Flour into Pan de Sal in terms of appearance, aroma, taste, texture and general acceptability.

Characteristics		*MF (149.2)*	p
Appearance			
	Formulation A	2.42a	
	Formulation B	3.76b	57.186	.000*
	Formulation C	4.42c	
Aroma			
	Formulation A	2.00a	
	Formulation B	4.00b	346.455	.000*
	Formulation C	4.76c	
Taste			
	Formulation A	2.00a	
	Formulation B	4.00b	316.799	.000*
	Formulation C	4.72c	
Texture			
	Formulation A	4.60a	
	Formulation B	3.98b	14.127	.000*
	Formulation C	3.44c	
General Acceptability			
	Formulation A	4.48	
	Formulation B	4.52	.590	.555
	Formulation C	4.62	

Note: Means with the same subscript are not statistically different at $a = 0.05$ according to LSD procedure.
**significant* at $p < 0.05$

Results of this study, based on significant difference in the acceptability level of Jackfruit seed flour as substitute in making Pan de Sal in three formulations. Specifically, Formulation A has a significant difference with formulation B and C in terms of appearance, with a P-value of .000, which is lower than the probability value of 0.05 alpha levels. Therefore, we reject the null hypothesis which states that there is no significant difference in the acceptability level of Jackfruit seed flour as substitute in making Pan de Sal in three formulations in terms of appearance.

Based on the study conducted by Hasan (2010), revealed that intensity of the brown color was increasing with the increased of the percentage of the Jackfruit seed flour in the biscuit was observed. Such the biscuit crumb color containing jackfruit seed flour from 40%, 50%, 60%, 70% and 80%. Thus, the 40% to 50% color was desirable.

On the other hand, based on significant difference in the acceptability level of Jackfruit seed flour as substitute in making Pan de Sal in three formulations in terms of aroma, results of the study revealed that Formulation A was significantly different from formulation B and C with a P-value of .000, which is lower than the probability value of 0.05 alpha levels. This implies that in terms of aroma we also reject the null hypothesis which states that there is no significant difference in the acceptability level of Jackfruit seed flour as substitute in making Pan de Sal in three formulations.

According to (Gadainggan, 2020) in the study of "Assessment on Level of Acceptability of Cupcake made from Jackfruit Seed Flour" found that in the terms of aroma, the jackfruit seed flour is highly acceptable with no bitter aftertaste.

Moreover, in this study, it was revealed that based on significant difference in the acceptability level of Jackfruit seed flour as substitute in making Pan de Sal in three formulations in terms of taste. There was a significant difference between Formulation A, B and C, with a P-value of .000, which is lower than the probability value of 0.05 alpha levels. The null hypothesis which states that there is no significant difference in the acceptability level of Jackfruit seed flour as substitute in making Pan de Sal in three formulations as to taste was thereof rejected.

Based on the study conducted by Hasan (2010), about the Preparation of Biscuit from Jackfruit Seed Flour Blended with Wheat Flour revealed that flavour for sample D (50% JSF) was the most preferred and there is no significant difference among other sample B (70% JSF), C (60% JSF) and E (40% JSF) were flavours accepted.

In addition, based on significant difference in the acceptability level of Jackfruit seed flour as substitute in making Pan de Sal in three formulations, results of this study indicated that in terms of texture, there was a significant difference between the three formulations with a P-value of .000, which is lower than the probability value of 0.5 alpha levels. The null hypothesis which states that there is no significant difference in the acceptability level of Jackfruit seed flour as substitute in making Pan de Sal in three formulations as to texture was therefore rejected.

The result of Hossain (2014) as cited on the study of Development and Quality Evaluation of Bread Supplemented with Jackfruit Seed Flour revealed that the percentage of used in applying the Jackfruit seed flour for ideal bread mixture were 25%,35%, 45%, and 55% were found more nutrient-dense that the control sample. However, it was shown that the more utilization and formulation increased the bread's over color, flavour, texture and general acceptability decreases.

Ultimately, in terms of general acceptability, this study obtained a P-value of .555, which is higher than the probability value added 0.05 alpha levels. Therefore, Formulation A was not significant with Formulation B and C. This means that there was no significant difference in the acceptability level of Jackfruit seed flour as substitute in making Pan de Sal in three formulations. Thus, the researchers fail to reject the null hypothesis which states that there are no significant difference in the acceptability level of Jackfruit seed flour as substitute in making Pan de Sal in three formulations in terms of general acceptability.

According to Hasan (2010), about the Preparation of Biscuit from Jackfruit Seed Flour Blended with Wheat Flour Biscuits were evaluated by hedonic, results revealed as to its colour, flavour, taste, texture and overall acceptability; the sample containing 50% Jackfruit seed flour and 50% wheat flour secured the highest score for overall acceptability.

4. Conclusions

In view of the findings the following conclusion were made:

Based on the findings, the researchers found out that jackfruit seed flour can be substitute in the existing commercial flour in the market. There was a significant difference in the acceptability level of Jackfruit seed flour as substitute in making Pan de Sal in three formulations as to its appearance, aroma, taste and texture. However, there is no significant difference in the acceptability level of Jackfruit seed flour as substitute in making Pan de Sal in three formulations for general acceptability. The evaluators concluded that the jackfruit seed flour in making Pan de Sal found to be like very much. The null hypothesis which stated that there are no significant differences in the acceptability level of Jackfruit seed flour as substitute in making Pan de Sal in three formulations in term of appearance, aroma, taste and texture, was rejected. However, for general acceptability the null hypothesis was accepted.

Implications

According to the result and study explained, Jackfruit seed was not utilized and become food waste, despite the truth that it would be use for flour and it contains health benefit for the body. Commercial flour was always utilized in making pan de sal and other baked products than any flour made from other source of raw materials such as fruit or vegetables. The implementation of the Utilization of Jackfruit Seed Flour as substitute for flour could be a game changer and positively improved other baked good such as pan de sal. As an implication, Jackfruit Seed Flour is suitable to substitute flour that boost health benefits and the welfare of the community.

Recommendations

Based on the findings and conclusions of the study the recommendations are the following:

1. Students are encouraged to use Jackfruit seed flour that would challenge them to be innovative. In return, they were able to create a new baked product.

2. Teachers expand their knowledge and ideas about the acceptability of Jackfruit seed flour. To be used for the awareness of the students and guide them in making baked good from Jackfruit seed flour.

3. This research study added to the extensive research collection of the university. Thus, it would benefit for the preservation of the study and future use.

4. Parents would be knowledgeable with the use of Jackfruit seed flour. Therefore, it would encourage creating a snack out of Jackfruit seed flour.

5. The consumers became more aware of the other nutritional benefits and other uses of jackfruit seed. Therefore, recommended to buy pan de sal and other baked products made of Jackfruit Seed Flour.

6. Farmers are encouraged to give value and importance about of the Jackfruit tree plantation regarding its full potential to cultivate and produce more Jackfruit. This would help them to produce huge volume of flour and a great source of income.

7. The entrepreneurs are encouraged to sell Jackfruit seed flour for the use of the public. Also, they can sell pan de sal and other baked goods made from Jackfruit seed flour.

8. The researchers should do further research more about the other ways on how to improve the use of Jackfruit seed flour to other baked products. This would supplement researchers the knowledge and awareness of the nutritional value that would use for other experimental study.

9. This study encouraged the local government of San Joaquin about the awareness of Jackfruit seed flour. Its uses and benefits to the people and to the local famers. It encouraged them to provide assistance and guidance for the plantation of Jackfruit tree in San Joaquin.

10. The Department of Agriculture encouraged participating in further developing of Jackfruit Seed Flour to be marketable and as source of income to the local farmers.

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