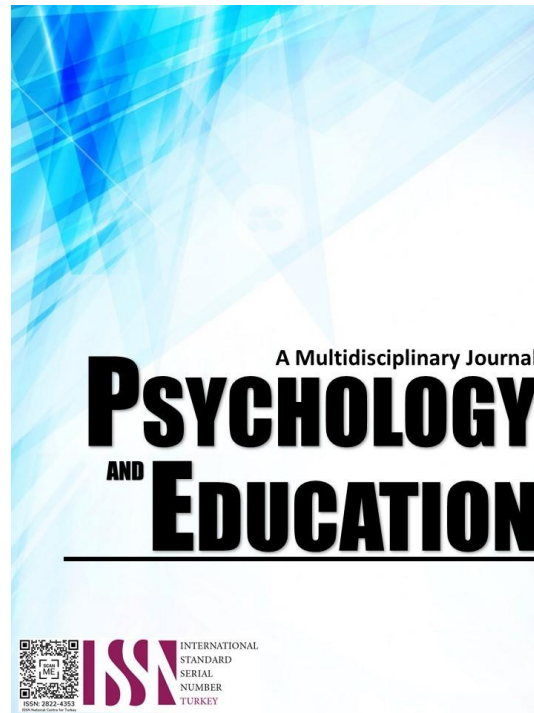


**ACCEPTABILITY AND MARKETABILITY OF PUTO
WITH POWDERED INSULIN (COSTUS IGEUS) AND
PANDAN (PANDANUS AMARYLLIFOLIUS
LEAVES POWDER AS INGREDIENTS**



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Acceptability and Marketability of Puto with Powdered Insulin (*Costus Igeus*) and Pandan (*Pandanus Amaryllifolius*) Leaves Powder as Ingredients

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Abstract

This study attempted to determine the acceptability and marketability of puto with insulin and pandan powder in three different proportions during the school year 2021-2022 in Barangay Ampid I, San Mateo, Rizal. The study used the experimental method of research which involved 60 respondents grouped into two who were selected through purposive sampling. The puto with three different proportions of insulin and pandan powder was evaluated using the 9-point Hedonic Rating Scale and 5 Point Likert Scale for the marketability of the product. The data were personally gathered and statistically treated using the Weighted Mean and Z test. Based on the findings, the food expert respondents evaluated the acceptability of the puto with 5 grams, 10 grams and 15 grams for each proportion of insulin and pandan powder as Very Acceptable, while the food enthusiast evaluated the product as Extremely Acceptable in terms of appearance, aroma, color, taste, and texture. On the other hand, the respondents evaluated the marketability of the puto Very High Potential in terms of supply availability, affordability, and production cost. They also gave comments and suggestions for further improvement of the product.

Keywords: *puto, powdered insulin, pandan leaves powder*

Introduction

Amidst the COVID-19 pandemic, eating well is still crucial for preserving one's health. While there are no specific foods that can guard against the virus, a healthy diet can boost the immune system or assist treat symptoms. Even while it's not always possible to eat with friends and family, there are still many alternative strategies to maintain good health during this trying time. There is no need for complicated healthy eating regimens. There is no reason why a person cannot be alone if they feel overwhelmed by the contradicting nutrition and diet recommendations available. While some meals or minerals have been demonstrated to improve mood, the overall dietary pattern is really more significant. Real food should always be preferred above processed food as the cornerstone of a balanced diet. Eating food that is as near to how nature intended it may have a profound impact on how individuals think, look, and feel.

Due to the pandemic at this time, innovations and modernization are now unsurmountable in all businesses, particularly the food and beverage sector and domestically. The present study is to design, develop, and improve novel, nutritious snacks that will benefit people and spark vigorous debate in the lucrative fields of education and the culinary industry. In this study, the researcher will develop Puto using insulin and pandan plant powder. In other nations, it is also utilized as a herbal medication. to get further information about the primary elements. A year-round

snack in the Philippines is called puto. Puto is an easy-to-eat and portable snack that is great for potlucks and gatherings. And it represents and celebrates the feast of San Mateo, puto is also one of the local delicacies in our town.

Insulin plant (*Costus igneus*) is renowned for its beautiful green vegetation. Others were unaware of this, but several investigations and trials have demonstrated that the plant's leaves are bursting with a chemical that reduces the dangers of diabetes. Chemicals in the leaves of the insulin plant, which is frequently used as a beneficial medicinal plant, lower blood sugar levels that have increased. The insulin leaf is not only limited to that. The thick, emerald-green leaves are a storehouse of priceless nutrients. The advantages of insulin plants are astounding. The wealthy green leaves contain corosolic acid in addition to other nutrient-rich ingredients. When consumed, this ingredient works its magic by increasing the pancreas' production of insulin. It stimulates high or low blood glucose levels and treats the problem.

According to the article of Nera (2021) Controlling blood sugar is one of the benefits of insulin plants. Additionally, it can be a source of iron, protein, and antioxidants. Although originally from Brazil, the plant eventually spread to other regions of South and Central America, including India. Usually, the blossom is a vivid orange color with broad, dark-green leaves that are purple on the underside. Because it can effectively decrease blood sugar levels, just like synthetic insulin used in injections and endogenous

insulin produced by the body, the insulin plant earned its name. People with diabetes, obesity, and other metabolic diseases shouldn't be adversely affected by this. Its phytochemical richness is what gives insulin plants their benefits.

On the other hand, another plant used by the researcher is Pandan leaves. Pandan (*Pandanus*) is a highly regarded aromatic plant known for its adaptability and cherished flowery scent. Its fan-shaped bundles of prickly leaves flourish in tropical conditions. Additionally, certain clutters produce fruits that resemble reddish-orange pinecones. Although pandan is widely utilized in South and Southeast Asian cuisines, Western interest in the plant is exploding because of its rumored culinary and health benefits. A wide variety of culinary applications exist for pandan fruit and leaves. While the fruit may be consumed raw or transformed into marmalade, the leaves are frequently cooked, juiced, or used to wrap and flavor meats. A staple meal in a few regions of the world, pandan fruit is also cooked and mashed into a palatable, highly fortified paste. In order to create an emerald-green extract, pandan leaves are often powdered. The color and taste of a leaf increase in intensity as it matures. Additionally, savory and sweet meals can be flavored with pandan leaf powder. It is said to have a grassy vanilla flavor with a tinge of coconut.

Brennan (2020) stated that in Thailand, Malaysia, and the rest of Southeast Asia, pandan is a common plant and spice. It is cultivated frequently because to the unique flavor and aroma it imparts to food, but it also has a variety of other purposes. In Vietnam, cab drivers are especially keen to obtain pandan leaves since they may use them to refresh the air in their vehicles. The most popular forms of pandan consumption include paste, powder, infused water extract, and essential oil. Except in a few special recipes, the leaf is rarely consumed directly. Since pandan will develop into a small tree with leaves around two meters long if left unattended, many people choose to plant their own pandan. It has been known for generations that pandan has therapeutic effects, but contemporary science has only just started to thoroughly investigate these capabilities. A number of significant vitamins, minerals, and antioxidants known to benefit health have been established prior to pandan studies. For instance, vitamin A, an essential substance for eye health that may potentially help with cancer prevention, is abundant in pandan.

With the abovementioned asseveration, the researcher was persuaded to carry out an experimental study on

the usage of pandan and insulin as ingredients in puto production. For the Filipino family, the product might be offered as a tasty and nourishing meal for breakfast and snacks. What you eat directly affects your ability to fully enjoy life. The two plants' health advantages can serve as a sustaining diet for my family and other individuals who have diabetes and other disorders. Also, the two additional ingredients are readily available in our place, and this innovation aims to raise awareness among homemakers, food processors, and business owners about the use of insulin and pandan powder in puto. It also encourages people to consume natural foods that are also used as herbal medicines.

Research Questions

This study attempted to determine the acceptability and marketability of puto with insulin and pandan leaves powder in three different proportions as perceived by the food experts and food enthusiasts during the school year 2021-2022 in Barangay Ampid I, San Mateo, Rizal. More specifically, the study sought answers to the following questions:

1. What is the physicochemical analysis of proposed puto with insulin and pandan powder in terms of the following?
 - 1.1 Carbohydrates
 - 1.2 Moisture
 - 1.3 Potential for Hydrogen (pH)
2. What is the level of acceptability of puto with 5 grams, 10 grams, and 15 grams of insulin and pandan powder as evaluated by the two groups of respondents in terms of the following criteria?
 - 2.1 Appearance
 - 2.2 Aroma
 - 2.3 Color
 - 2.4 Taste
 - 2.5 Texture
3. Is there significant difference on the level of acceptability of puto with 5 grams, 10 grams, and 15 grams of insulin and pandan powder as evaluated by the groups of respondents in terms of the above-mentioned criteria?
4. What is the level of marketability of puto with 5 grams, 10 grams, and 15 grams of insulin and pandan powder in terms of the following aspects as perceived by the two group respondents?
 - 4.1 Supply availability
 - 4.2 Affordability
 - 4.3 Production cost
5. Is there significant difference between the evaluations of the two groups of respondents on the level of acceptability and marketability of puto with 5 grams, 10 grams, and 15 grams of insulin and pandan

powder in terms of the above cited criteria?

6. What are the comments and suggestions of the respondents to improve the product?

Literature Review

As stated in the article, Flowerlet et.al (2019). A Review on Medicinal Exploration of *Costus igneus*: The Insulin plant, *Costus igneus* (or insulin plant) is a Southeast Asian native herb that has been used medicinally for centuries. The plant was very recently brought to India, where south India grows it as an attractive plant. Different phytochemical components found in insulin plants include steroids, alkaloids, flavonoids, triterpenes, glycosides, and saponins. As a food supplement for diabetic mellitus therapy, its leaves are employed. In a review by Buchake (2018), 14 Health Benefits of Insulin Plant (*Costus*), the use of insulin plant can treat diabetes, dissolve kidney stones, lower blood pressure, simulate the function of the bladder, prevent cancer, and strengthen immunity. Additionally, it aids in lowering blood cholesterol, enhancing digestion, and managing asthma. The *Costus igneus* plant often called the insulin plant, is a member of the Costaceae family. The adage "a leaf of insulin plant a day keeps diabetes at bay" is quite well known. However, there are many more uses for the plant in addition to helping those who have diabetes. Every herb will inevitably have some negative effects.

According to Vecchio, et.al (2018) The Discovery of Insulin: An Important Milestone in the History of Medicine, the discovery of insulin is a genuine scientific advance that is concurrently marked by academic differences, disagreements, and conflicts as well as by enormous disappointments, failures, and hopes. It tells the tale of serendipities, discoveries, and rediscoveries as well as of renowned, nearly famous, and little-known individuals. Diabetes is one of the most researched diseases in the history of medicine, and the first mentions of it can be found in a number of ancient Egyptian, Indian, and Chinese textbooks. The discovery of insulin has been a turning point and has truly revolutionized both the therapy and the prognosis of diabetes.

As stated in the review article of Bhuyan et.al (2021), the *Pandanus amaryllifolius* Roxb. ex Lindl. plant is a member of the Pandanaceae family and is mostly indigenous to South-east Asian nations. As a result of their distinctive and enticing perfume, pandan leaves are frequently used throughout South East Asia to flavor a variety of foods, including baked goods, desserts, and even home cooking. Another research

study was conducted by Vijayalakshmi (2020) entitled, "Evaluation of the Cookies Formulated with *Costus igneus* Plant Material for Antidiabetic Activity". The goal of the study is to create a nutritionally dense cookie using *Costus igneus* leaf extract and to ascertain how eating cookies affects type 2 diabetes patients' blood glucose levels. The cookies prepared from *Costus igneus* plant material can be utilized as a therapeutic and functional food source for the treatment of overweight, obesity, and diabetes because they have strong antibacterial, antioxidant, and antidiabetic activity.

More so, Murtini, et.al (2020) conducted a study entitled "Pandan leaf powder: characteristics and its application in Pandan sponge cake making. In order to completely use the pandan leaves, the study tried to powderize them. This study particularly analyzed the pandan powder produced by various drying techniques and determined the ideal concentration for pandan sponge cake production. The greatest results were from pandan sponge cake with a 2.5% dried pandan leaf powder addition. Pandan sponge cake's nutritional breakdown was as follows: 60.30% carbohydrates, 12.73% protein, 5.28% fat, 20.24% water, 1.45% ash, 0.032% salt, and 6.38% crude fiber.

Another reviewed study was done by Suryani, et.al (2020) entitled "The potential of mature pandan leaves as a source of chlorophyll for natural food colorants. The study aimed to identify the optimal pandan leaf maturity level as a possible source of chlorophyll for natural food colorants. According to the findings, 96.4% of the plants had a maximum of 24 leaves, and the average number of leaves per plant varied from 20 to 24 leaves (with a 95% confidence interval). Based on the amount of chlorophyll and the size of the mesophyll, it was determined that mature pandan leaves were the greatest source of chlorophyll, with 623.08mg of chlorophyll per 100g of dry weight (DW).

Methodology

This study utilized the experimental method of research. According to Harland (2015), this is a study that strictly adheres to a scientific research design. It includes a hypothesis, a variable that can be manipulated by the researcher, and variables that can be measured, calculated, and compared. Most importantly, experimental research is completed in a controlled environment. The researcher collects data, and the results will either support or reject the hypothesis. This method of research is referred to as

hypothesis testing or deductive research method. The study used the experimental technique because it thought it was the best approach for determining the acceptability and marketability of insulin and powdered pandan leaves as components in manufacturing puto in terms of appearance, aroma, color, taste, and texture.

Participants of the Study

The main source of data in this study is the questionnaire-checklist which contains the responses of the respondents on the acceptability of the product based on certain criteria. A total of 60 respondents consisted of 30 food experts and 30 food enthusiasts from the residents of Barangay Ampid, San Mateo, Rizal. They were selected through purposive random sampling.

Instruments of the Study

The data gathering instrument used was the evaluation questionnaire prepared by the researcher and checked by the expert respondents. It consisted of three parts. Part I was on the respondent's profile in terms of group, Part II was on the level of acceptability of puto with insulin and pandan powder, while Part III was on the level of marketability and the respondents' comments and suggestions. The 9- Point Hedonic Rating Scale will be used to determine the acceptability of puto with three different proportions of insulin and pandan powder in terms of the following criteria: a.) Appearance; b.) Aroma; c.) Color; d.) Taste; and e.) Texture. Also, the 5-Point Likert Scale was utilized to determine its marketability.

Procedure

The data gathering procedure began with the experiment itself. The insulin and pandan leaves powder was prepared which was utilized as an ingredients of the puto.

Then, the researcher emailed the Bureau of Plant Industry to authenticate the insulin and pandan leaves. The result indicated that the submitted leaves utilized in the study are authentic and edible for the production of puto and could be used as ingredients in the preparation of food. The researcher also went to the Department of Science and Technology, FNRI Division on June 15, 2022 to determine the carbohydrates, moisture and pH contents of puto with insulin and pandan powder in three different proportions. The result was released on August 4, 2022 indicating the the puto with 5 grams, 10 grams, and 15

grams of insulin and pandan powder are high in carbohydrates, moisture and pH contents. Next, the researcher asked the permission from the Barangay Chairman through a formal letter requesting that she be allowed to conduct the study and gather relevant data from the Barangay Ampid residents chosen as respondents.

After the permission was granted, the researcher conducted the taste test of the prepared puto with 5 grams, 10 grams, and 15 grams of insulin and pandan powder at Barangay Ampid, San Mateo, Rizal. The researcher personally administered the questionnaires to get some feedback about the product from the respondents. The questionnaires were then gathered, tallied, analyzed, and interpreted.

Ethical Considerations

The researcher herself explained and gave the informed consent to each participant before the conduct of the study. She ensured them that the information would be used with utmost confidentiality and within the purpose of the study only

Results and Discussion

This section presents the findings according to the study's research questions.

Physicochemical Analysis of Proposed Puto with Insulin and Pandan Powder

Table 1. *Carbohydrate Contents of Puto with Insulin and Pandan Powder With 5 grams, 10 grams, and 15 grams proportion*

<i>Proportions</i>	<i>Methods</i>	<i>Carbohydrate Content</i>	<i>Remarks</i>
5 grams	Computed by difference	43.3 g	Presence of Carbohydrates
10 grams	Computed by difference	44.8 g	Presence of Carbohydrates
15 grams	Computed by difference	46.2 g	Presence of Carbohydrates

As presented in the table the puto with different proportions of insulin and pandan powder through the computation of ash, protein, and energy analysis the puto contains carbohydrates with mean values of 43.3 for the 5 grams proportion, 44.8 for the 10 grams proportion and 46.2 for 15 grams proportion. This indicates that the puto with different proportions of insulin and pandan with different proportion is a good



source of energy because of its carbohydrates content. Therefore, it can be better insight of selling this to public schools because of healthy and nutritious puto.

Table 2. *Moisture Contents of Puto with Insulin and Pandan Powder with 5 grams, 10 grams, and 15 grams proportions*

Sample Description	Method	Moisture Content	Remarks
Puto with 5 grams of insulin and pandan powder	Gravimetric AOAC 925.09	39.7 g	High moisture
Puto with 10 grams of insulin and pandan powder	Gravimetric AOAC 925.09	38.9 g	Moderate moisture
Puto with 15 grams of insulin and pandan powder	Gravimetric AOAC 925.09	37.8 g	Less moisture

As shown in table, the puto with insulin and pandan powder with 5 grams has the highest moisture content of 39.7 compared to the other two proportions, which have 38.9 and 37.8 moisture content. This indicates that it has the highest risk of food spoilage. Therefore, appropriate packaging should be used, and it should be refrigerated to last longer. The amount of free hydrogen ions contained in a meal directly affects its pH level. Food acids produce free hydrogen ions, which are responsible for the unique sour flavor of acidic meals. In this way, free acidity may be measured by pH. In more detail, the hydrogen ion concentration's negative logarithm is used to determine pH. The pH scale ranges from 0 to 14. Because pure water has a pH of exactly 7, a pH value of 7 is considered neutral. Values under 7 are considered acidic, whereas those over 7 are considered basic or alkaline.

Table 3. *pH Contents of Puto with Insulin and Pandan Powder with 5 grams, 10 grams, and 15 grams proportions*

Sample Description	Method	Ph Content	Remarks
Puto with 5 grams of insulin and pandan powder	AOAC 981.12	6.77	Less Acid
Puto with 10 grams of insulin and pandan powder	AOAC 981.12	6.91	Less Acid
Puto with 15 grams of insulin and pandan powder	AOAC 981.12	6.80	Less Acid

As shown in the table, the puto with insulin and pandan powder with 5 grams, 10 grams and 15 grams proportion contain 6.77, 6.91, and 6.80 pH level. This indicates that the puto with insulin and pandan powder in three different proportions has less acid and it figure

it out in the Figure 7 pH level scale. Therefore, it is recommended for those who suffer in Hypochlorhydria. Level of Acceptability of Puto with 5 Grams, 10 Grams, and 15 Grams of Insulin and Pandan Powder as Evaluated by the Food Experts and Food Enthusiast Respondents

Table 4. *Respondents' Evaluations on the Level of Acceptability of Puto with 5 Grams of Insulin and Pandan Powder as to Appearance*

Appearance	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
The insulin and pandan puto . . .				
1. is tempting to eat.	7.73	VA	8.40	EA
2. has convincing appearance.	7.47	VA	8.20	EA
3. has desirable shape.	7.97	VA	8.50	EA
4. has uniform shape.	7.00	MA	8.47	EA
5. is free from shape defects.	7.83	VA	8.30	EA
Overall Weighted Mean	7.60	VA	8.37	EA

It can be seen in the table that the other group respondents have the same level of evaluation on the appearance of puto with insulin and pandan powder which was rated as Extremely Acceptable (EA) as proven by the overall weighted mean ratings of 8.37 for food enthusiasts. On the other hand, the food experts' respondents rated the appearance of puto with 5 grams of insulin and pandan powder as Very Acceptable (VA) as evidenced in the overall weighted mean of 7.60. The Food experts, however, rated item 4, "has uniform shape" as Moderately Acceptable only. These data imply that all the two groups of respondents liked very much the appearance of puto with 5 grams of insulin and pandan powder except the food expert who were not yet fully contented with the shape of the puto.

Table 5. *Respondents' Evaluations on the Level of Acceptability of Puto with 5 Grams of Insulin and Pandan Powder as ingredients in Terms of Aroma*

The insulin and pandan puto . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
1. has aromatic smell.	7.60	VA	8.30	EA
2. has appetizing aroma.	7.47	VA	8.20	EA
3. has no herbaceous, leafy aroma.	7.97	VA	8.33	EA
4. has delicate sweet smell.	7.63	VA	8.20	EA
5. The puto has freshly cooked	7.40	VA	8.57	EA
Overall Weighted Mean	7.61	VA	8.32	EA

It can be seen in the table that the other group of respondents have the level of evaluation on the aroma of puto with insulin and pandan powder which was rated as Very Acceptable (VA) as proven by the



overall weighted mean ratings of 7.61 for food experts. On the other hand, the food enthusiast respondents rated the aroma of puto with 5 grams of insulin and pandan powder as Extremely Acceptable (EA) as evidenced in the overall weighted mean of 8.32. These findings imply that though the food experts rated the product as Very Acceptable (VA), generally, the two groups of respondents are satisfied in the aroma of puto with 5 grams of insulin and pandan powder.

Table 6. Respondents' Evaluations on the Level of Acceptability of Puto with 5 Grams of Insulin and Pandan Powder as an Ingredient in Terms of Color

The insulin and pandan puto . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
has consistent color.	7.70	VA	8.50	EA
has appetizing and attractive color.	7.23	VA	8.13	EA
has herbaceous green color.	6.83	MA	8.13	EA
has distinctive color.	7.20	MA	8.20	EA
has luscious color that is very appealing.	7.03	MA	8.07	VA
Overall Weighted Mean	7.20	MA	8.21	EA

It can also be seen in the table that the food expert respondents, rated item 1, "has consistent color" and item 2, "has appetizing and attractive color" as Very Acceptable (VA) while food enthusiast respondents rated as Extremely Acceptable (EA). These imply that the respondents agreed that the product has a consistent, appetizing and attractive color. Food enthusiasts rated item 3, "has herbaceous green color", item 4, "has distinctive color" as Extremely Acceptable (EA), while the food expert respondents rated it as Moderately Acceptable (MA). This item can still be improved to satisfy the food expert respondents.

Table 7. Respondents' Evaluations on the Level of Acceptability of Puto with 5 Grams of Insulin and Pandan Powder as an Ingredient in Terms of Taste

The insulin and pandan puto . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
has appetizing taste.	7.90	VA	8.53	EA
has slight herbaceous taste.	7.50	VA	8.10	VA
has delightful and satisfying taste.	7.67	VA	8.33	EA
has well-blended flavor.	7.90	VA	8.33	EA
has palatable taste.	7.70	VA	8.37	EA
Overall Weighted Mean	7.73	VA	8.33	EA

It can be seen from the table the level acceptability of the puto with 5 grams of insulin and pandan powder was rated as Extremely Acceptable (EA) by the food enthusiast respondents by the overall weighted means

of 8.33 and was rated as Very Acceptable (VA) by the food expert respondents by the overall weighted means of 7.73 respectively. The data also show that item 2, "has slight herbaceous taste" were rated by the two groups of respondents as Very Acceptable (VA). These only imply that the taste of puto with 5 grams of insulin and pandan powder was very much liked by the two groups of respondents.

Table 8. Respondents' Evaluations on the Level of Acceptability of Puto with 5 Grams of Insulin and Pandan Powder as to Texture

The insulin and pandan puto . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
has smooth texture.	7.67	VA	8.33	EA
has dense texture.	7.63	VA	8.20	EA
has soft and fluffy texture.	8.17	EA	8.53	EA
has sticky texture.	7.53	VA	8.27	EA
has soft mouthful.	8.03	VA	8.43	EA
Overall Weighted Mean	7.81	VA	8.35	EA

As shown in the table, the food enthusiast respondents' evaluation regarding the acceptability of insulin and pandan powder as ingredients of puto in terms of texture as it was evident on the overall weighted mean rating of 8.35, respectively described as Extremely Acceptable (EA), while the food experts rated it as Very Acceptable (VA) with an overall weighted mean rating of 7.81.

More specifically, the two groups of respondents rated item 3, "has soft and fluffy texture", as Extremely Acceptable (EA). This may be because of its softness and fluffiness which appear to be what the respondents accepted and loved in the product. It also shows that the respondents like the product's texture. These data imply that all the evaluators were very satisfied with the texture of puto with 5 grams proportion of insulin and pandan powder.

Table 9. Respondents' Evaluations on the Level of Acceptability of Puto with 10 Grams of Insulin and Pandan Powder as an Ingredients in Terms of Appearance

The insulin and pandan puto . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
is tempting to eat.	7.47	VA	8.53	EA
has convincing appearance.	7.63	VA	8.40	EA
has desirable shape.	7.87	VA	8.43	EA
has uniform shape.	7.83	VA	8.50	EA
is free from shape defects.	7.63	VA	8.50	EA
Overall Weighted Mean	7.69	VA	8.47	EA



It can be seen that all the items were rated as Extremely Acceptable (EA) as proven by the overall weighted mean ratings of 8.47 for the Food Enthusiasts. On the other hand, the food expert rated the appearance as Very Acceptable (VA) as evidenced by the overall weighted mean rating of 7.69. These signify that in terms of appearance, the 10-gram proportion was highly acknowledged by the two groups of respondents based on the results of the evaluation.

Table 10. Respondents' Evaluations on the Level of Acceptability of Puto with 10 Grams of Insulin and Pandan Powder as an Ingredients in Terms of Aroma

The insulin and pandan puto . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
has aromatic smell.	7.50	VA	8.53	EA
has appetizing aroma.	7.43	VA	8.37	EA
has no herbaceous, leafy aroma.	7.83	VA	8.57	EA
has delicate sweet smell.	7.97	VA	8.37	EA
The puto has freshly cooked	7.63	VA	8.70	EA
Overall Weighted Mean	7.67	VA	8.51	EA

It can be seen that all the items were rated as Extremely Acceptable (EA) as proven by the overall weighted mean ratings of 8.51 for the Food Enthusiasts. On the other hand, the food expert rated the appearance as Very Acceptable (VA) as evidenced by the overall weighted mean rating of 7.67. These signify that in terms of aroma, the 10-gram proportion was highly acknowledged by the two groups of respondents based on the results of the evaluation.

Table 11. Respondents' Evaluations on the Level of Acceptability of Puto with 10 Grams of Insulin and Pandan Powder as an Ingredients in Terms of Color

The insulin and pandan puto . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
has consistent color.	8.10	VA	8.60	EA
has appetizing and attractive color.	7.77	VA	8.50	EA
has herbaceous green color.	7.90	VA	8.40	EA
has distinctive color.	7.87	VA	8.47	EA
has luscious color that is very appealing.	7.67	VA	8.23	EA
Overall Weighted Mean	7.86	VA	8.44	EA

It can be seen that all the items were rated as Extremely Acceptable (EA) as proven by the overall weighted mean ratings of 8.44 for the Food Enthusiasts. On the other hand, the food expert rated the appearance as Very Acceptable (VA) as evidenced by the overall weighted mean rating of 7.86. These signify that in terms of color, the 10-gram proportion

was highly acknowledged by the two groups of respondents based on the results of the evaluation.

Table 12. Respondents' Evaluations on the Level of Acceptability of Puto with 10 Grams of Insulin and Pandan Powder as to Taste

The insulin and pandan puto . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
has appetizing taste.	7.97	VA	8.67	EA
has slight herbaceous taste.	8.00	VA	8.50	EA
has delightful and satisfying taste.	8.00	VA	8.47	EA
has well-blended flavor.	7.93	VA	8.47	EA
has palatable taste.	8.20	EA	8.37	EA
Overall Weighted Mean	8.02	VA	8.49	EA

It can be seen from the table that the food enthusiast respondents evaluated the Puto with 10 grams of Insulin and Pandan powder in terms of taste verbally interpreted as Extremely Acceptable (EA) as evidenced by the overall weighted means of 8.49. On the other hand, the food expert respondents rated it with a weighted mean rating of 8.02 verbally interpreted as Very Acceptable (VA). The data also revealed that the food expert and food enthusiast respondents rated item 5, "has palatable taste" as Extremely Acceptable (EA). These results imply that the two groups of respondents like the taste of the puto with 10 grams of insulin and pandan powder.

Table 13. Respondents' Evaluations on the Level of Acceptability of Puto with 10 Grams proportion of Insulin and Pandan Powder as an Ingredients in Terms of Texture

The insulin and pandan puto . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
has smooth texture.	7.40	VA	8.57	EA
has dense texture.	7.57	VA	8.37	EA
has soft and fluffy texture.	7.97	VA	8.60	EA
has sticky texture.	7.43	VA	8.43	EA
has soft mouthful.	7.93	VA	8.57	EA
Overall Weighted Mean	7.66	VA	8.51	EA

It can be seen that all the items were rated as Extremely Acceptable (EA) as proven by the overall weighted mean ratings of 8.51 for the Food Enthusiasts. On the other hand, the food expert rated the texture as Very Acceptable (VA) as evidenced by the overall weighted mean rating of 7.66. These signify that in terms of texture, the 10-gram proportion was highly acknowledged by the two groups of respondents based on the results of the evaluation.



Table 14. Respondents' Evaluations on the Level of Acceptability of Puto with 15 Grams proportion of Insulin and Pandan Powder as an Ingredients in Terms of Appearance

The insulin and pandan puto . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
is tempting to eat.	7.87	VA	8.40	EA
has convincing appearance.	7.97	VA	8.33	EA
has desirable shape.	7.77	VA	8.40	EA
has uniform shape.	7.87	VA	8.47	EA
is free from shape defects.	7.47	VA	8.37	EA
Overall Weighted Mean	7.79	VA	8.39	EA

It can be seen that all the items were rated as Extremely Acceptable (EA) as proven by the overall weighted mean ratings of 8.39 for the Food Enthusiasts. On the other hand, the food expert rated the appearance as Very Acceptable (VA) as evidenced by the overall weighted mean rating of 7.79. These signify that in terms of appearance, the 15-gram proportion was highly acknowledged by the two groups of respondents based on the results of the evaluation.

Table 15. Respondents' Evaluations on the Level of Acceptability of Puto with 15 Grams proportion of Insulin and Pandan Powder as an Ingredients in Terms of Aroma

The insulin and pandan puto . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
has aromatic smell.	7.77	VA	8.67	EA
has appetizing aroma.	7.57	VA	8.53	EA
has no herbaceous, leafy aroma.	7.80	VA	8.40	EA
has delicate sweet smell.	8.17	EA	8.43	EA
The puto has freshly cooked	8.10	VA	8.63	EA
Overall Weighted Mean	7.88	VA	8.53	EA

It can be seen from the table that the food enthusiast respondents evaluated the Puto with 10 grams of Insulin and Pandan powder in terms of aroma verbally interpreted as Extremely Acceptable (EA) as evidenced by the overall weighted means of 8.53. On the other hand, the food expert respondents rated it with a weighted mean rating of 7.88 verbally interpreted as Very Acceptable (VA). The data also revealed that the food expert and food enthusiast respondents rated item 4, "has delicate sweet smell" as Extremely Acceptable (EA). These results imply that the two groups of respondents like the aroma of the

puto with 15 grams of insulin and pandan powder.

Table 16. Respondents' Evaluations on the Level of Acceptability of Puto with 15 Grams proportion of Insulin and Pandan Powder as an Ingredients in Terms of Color

The insulin and pandan puto . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
has consistent color.	8.17	EA	8.53	EA
has appetizing and attractive color.	7.90	VA	8.43	EA
has herbaceous green color.	7.67	VA	8.43	EA
has distinctive color.	8.20	EA	8.40	EA
has luscious color that is very appealing.	8.10	VA	8.33	EA
Overall Weighted Mean	8.01	VA	8.43	EA

It can be seen from the table that the food enthusiast respondents evaluated the Puto with 15 grams of Insulin and Pandan powder in terms of color verbally interpreted as Extremely Acceptable (EA) as evidenced by the overall weighted means of 8.43. On the other hand, the food expert respondents rated it with a weighted mean rating of 8.01 verbally interpreted as Very Acceptable (VA). The data also revealed that the food expert and food enthusiast respondents rated item 1, "has consistent color" and item 4, "has distinctive color" as Extremely Acceptable (EA). These results imply that the two groups of respondents like the color of the puto with 15 grams of insulin and pandan powder.

Table 17. Respondents' Evaluations on the Level of Acceptability of Puto with 15 Grams proportions of Insulin and Pandan Powder as an Ingredients in Terms of Taste

The insulin and pandan puto . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
has appetizing taste.	7.97	VA	8.63	EA
has slight herbaceous taste.	8.10	VA	8.50	EA
has delightful and satisfying taste.	8.20	EA	8.40	EA
has well-blended flavor.	8.20	EA	8.43	EA
has palatable taste.	8.23	EA	8.33	EA
Overall Weighted Mean	8.14	EA	8.46	EA

It can be gleaned from the table that the respondents have the same evaluation with regard to the acceptability of puto with insulin and pandan powder in terms of taste as it was evident on the average weighted means of 8.14 and 8.46 described as Extremely Acceptable (EA) for food expert and food enthusiast respondents. However, the food expert respondents showed a rating of Very Acceptable (VA) taste for item 1, "has appetizing taste", and item 2,



“has slight herbaceous taste”. These results imply that the taste with 15 grams proportion of insulin and pandan powder has a positive result and is much preferred by all the respondents.

It can be seen in the next table that all the items were rated as Extremely Acceptable (EA) as proven by the overall weighted mean ratings of 8.54 for the Food Enthusiasts. On the other hand, the food expert rated the texture as Very Acceptable (VA) as evidenced by the overall weighted mean rating of 7.95. These signify that in terms of texture, the 15-gram proportion was highly acknowledged by the two groups of respondents based on the results of the evaluation.

Table 18. Respondents' Evaluations on the Level of Acceptability of Puto with 15 Grams proportion of Insulin and Pandan Powder as an Ingredients in Terms of Texture

The insulin and pandan puto . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
has smooth texture.	7.90	VA	8.47	EA
has dense texture.	7.83	VA	8.40	EA
has soft and fluffy texture.	8.03	VA	8.70	EA
has sticky texture.	7.87	VA	8.43	EA
has soft mouthful.	8.10	VA	8.70	EA
Overall Weighted Mean	7.95	VA	8.54	EA

Test of Difference in the Respondents' Evaluations on the Level of Acceptability of Puto with 5 Grams, 10 Grams, and 15 Grams of Insulin and Pandan Powder

Table 19. Test of Significant Difference in the Respondents' Evaluations on the Level of Acceptability of Puto with 5 Grams, 10 Grams, and 15 Grams of

P	Respondents	N	OFTN	s	z-computed Value	z-critical value	Decision	Interpretation
	Food Enthusiasts	30	8.37	0.70				
	Food Experts	30	7.69	1.33	2.79	1.96	Reject the Ho	Significant
	Food Enthusiasts	30	8.47	0.79				
	Food Experts	30	7.79	1.18	2.28	1.96	Reject the Ho	Significant
	Food Enthusiasts	30	8.39	0.85				

At a 5% level of significance, the critical z value is 1.96, and the computed z values are 3.08, 2.79 and 2.28 as reflected in the table as the computed z values are greater than the critical z value, thus the statistical decision is to reject the null hypothesis. This suggests that there is a significant difference in the evaluation of the two groups of respondents on the level of acceptability of puto with 5 grams, 10 grams, and 15

grams of insulin and pandan powder in relation to appearance. This implies that the two groups of respondents have different views on the acceptability of puto with insulin and pandan powder considering its different proportions.

Table 20. Test of Difference in the Respondents' Evaluations on the Level of Acceptability of Puto with 5 Grams, 10 Grams, and 15 Grams of Insulin and Pandan Powder as an Ingredients in Terms of Aroma

P	Respondents	N	OFTN	s	z-computed Value	z-critical value	Decision	Interpretation
5 g	Food Experts	30	7.61	1.54	2.09	1.96	Reject the Ho	Significant
	Food Enthusiasts	30	8.32	1.02				
10 g	Food Experts	30	7.67	1.32	2.89	1.96	Reject the Ho	Significant
	Food Enthusiasts	30	8.51	0.87				
15 g	Food Experts	30	7.88	0.96	2.81	1.96	Reject the Ho	Significant
	Food Enthusiasts	30	8.53	0.84				

As depicted in the table, the computed z values (2.09, 2.89, 2.81) are above the critical z value (1.96). This leads that the null hypothesis should be rejected at a 5% level of significance. As a result, there is a significant difference in the evaluation of the two groups of respondents on the level of acceptability of puto with 5 grams, 10 grams, and 15 grams of insulin and pandan powder in relation to aroma. This implies that the two groups of respondents have different views on the acceptability of puto with insulin and pandan powder considering its different proportions.

Table 21. Test of Difference in the Respondents' Evaluations on the Level of Acceptability of Puto with 5 Grams, 10 Grams, and 15 Grams of Insulin and Pandan Powder as an Ingredients in Terms of Color

P	Respondents	n	OFTN	s	z-computed Value	z-critical value	Decision	Interpretation
5 g	Food Experts	30	7.20	1.49	3.05	1.96	Reject the Ho	Significant
	Food Enthusiasts	30	8.21	1.02				
10 g	Food Experts	30	7.86	1.15	2.18	1.96	Reject the Ho	Significant
	Food Enthusiasts	30	8.44	0.89				
15 g	Food Experts	30	8.01	1.20	1.53	1.96	Fail to Reject the Ho	Not Significant
	Food Enthusiasts	30	8.43	0.92				

It can be viewed in the table that the computed z values of 5 grams and 10 grams proportions (3.05, 2.18) are greater than the critical z value (1.96). Hence, at a 5% significance level, the statistical decision is to reject the null hypothesis. This implies that the two groups of respondents have different views on the acceptability of puto with insulin and



pandan powder with 5- and 10-gram proportion in terms of color. However, there is no significant difference on the evaluation of the respondents in the 15-gram proportion.

Table 22. Test of Difference in the Respondents' Evaluations on the Level of Acceptability of Puto with 5 Grams, 10 Grams, and 15 Grams of Insulin and Pandan Powder as an Ingredients in Terms of Taste

P	Respondents	n	OWN	s	z-computed Value	z-critical value	Decision	Interpretation																					
5 g	Food Experts	30	7.73	1.27	2.07	1.96	Reject the Ho	Significant																					
	Food Enthusiasts	30	8.33	0.96					10 g	Food Experts	30	8.02	0.87	2.09	1.96	Reject the Ho	Significant	Food Enthusiasts	30	8.49	0.89	15 g	Food Experts	30	8.14	0.99	1.33	1.96	Fail to Reject the Ho
10 g	Food Experts	30	8.02	0.87	2.09	1.96	Reject the Ho	Significant																					
	Food Enthusiasts	30	8.49	0.89					15 g	Food Experts	30	8.14	0.99	1.33	1.96	Fail to Reject the Ho	Not Significant	Food Enthusiasts	30	8.46	0.87								
15 g	Food Experts	30	8.14	0.99	1.33	1.96	Fail to Reject the Ho	Not Significant																					
	Food Enthusiasts	30	8.46	0.87																									

As displayed in the table, the computed z values (2.07, 2.09) of 5 grams and 10 grams proportions are higher than the critical z value (1.96). Thus, the statistical decision is to reject the null hypothesis at a 5% level of significance. This suggests that there is a significant difference in the evaluation of the two groups of respondents on the level of acceptability of puto with 5 grams, and 10 grams of insulin and pandan powder in relation to taste. Except for the 15 grams proportion, the two groups of respondents have the same evaluation. This implies that the two groups of respondents have different views on the acceptability of puto with insulin and pandan powder with 5- and 10-gram proportion in terms of taste. However, there is no significant difference on the evaluation of the respondents in the 15-gram proportion.

Table 23. Test of Difference in the Respondents' Evaluations on the Level of Acceptability of Puto with 5 Grams, 10 Grams, and 15 Grams of Insulin and Pandan Powder as an Ingredients in Terms of Texture

P	Respondents	n	OWN	s	z-computed Value	z-critical value	Decision	Interpretation																					
5 g	Food Experts	30	7.81	1.08	2.35	1.96	Reject the Ho	Significant																					
	Food Enthusiasts	30	8.35	0.68					10 g	Food Experts	30	7.66	1.53	2.65	1.96	Reject the Ho	Significant	Food Enthusiasts	30	8.51	0.85	15 g	Food Experts	30	7.95	1.14	2.27	1.96	Reject the Ho
10 g	Food Experts	30	7.66	1.53	2.65	1.96	Reject the Ho	Significant																					
	Food Enthusiasts	30	8.51	0.85					15 g	Food Experts	30	7.95	1.14	2.27	1.96	Reject the Ho	Significant	Food Enthusiasts	30	8.54	0.86								
15 g	Food Experts	30	7.95	1.14	2.27	1.96	Reject the Ho	Significant																					
	Food Enthusiasts	30	8.54	0.86																									

It is apparent in the table that the computed z values (2.35, 2.65, 2.27) of the three proportions are more than the critical z value (1.96). Therefore, at a 5% significance level, the statistical decision is to reject the null hypothesis. This shows that there is a significant difference in the evaluation of the two groups of respondents on the level of acceptability of puto with 5 grams, 10 grams, and 15 grams of insulin and pandan powder in relation to texture. This implies that the two groups of respondents have different views on the acceptability of puto with insulin and pandan powder considering its different proportions. Level of Marketability of Puto with 5 Grams, 10 Grams, and 15 Grams of Insulin and Pandan Powder as Perceived by the Food Experts and Food Enthusiast Respondents

Table 24. Respondents' Evaluations on the Level of Marketability of Puto with 5 Grams of Insulin and Pandan Powder in Terms of Supply Availability

The insulin and pandan puto ingredients . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
are available all year round.	4.17	HP	4.37	VHP
are locally available.	4.27	VHP	4.47	VHP
could be produced easily.	4.27	VHP	4.57	VHP
The product requires less effort to prepare and can easily be propagated in the backyards.	4.23	VHP	4.47	VHP
Minimal amount of ingredient is needed for the product	4.27	VHP	4.43	VHP
Overall Weighted Mean	4.24	VHP	4.46	VHP

The table shows that the marketability of puto with 5 grams for each proportion of insulin and pandan powder in terms of supply availability was evaluated as Very High Potential (VHP) by the food expert and food enthusiast respondents as evidenced by the overall weighted means of 4.24, and 4.46, respectively. However food expert respondents rated item 1, "are available all year round" as High Potential (HP). These findings imply that the supply availability of puto with 5 grams for each proportion of insulin and pandan powder has a very high potential because are locally available all year round and the product requires less effort to prepare and can easily be propagated in the backyards and could be produced easily.



Table 25. Respondents' Evaluations on the Level of Marketability of Puto with 5 Grams of Insulin and Pandan Powder in Terms of Affordability

The insulin and pandan puto is . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
cheaper than the other brands in the market.	4.10	HP	4.60	VHP
easy to sell.	4.00	HP	4.50	VHP
very affordable.	4.20	VHP	4.70	VHP
cost effective and cost-efficient.	4.17	HP	4.57	VHP
is with reasonable price.	4.23	VHP	4.57	VHP
Overall Weighted Mean	4.14	HP	4.59	VHP

As shown in the table, the marketability of puto with 5 grams for each proportion of insulin and pandan powder in terms of affordability was rated all the criteria as Very High Potential (VHP) as evidenced by the overall weighted mean of 4.59 by the food enthusiast respondents. On the other hand the food expert respondent was evaluated as High Potential (HP) as evidenced by the overall weighted means of 4.14. These findings imply that the affordability of puto with 5 grams for each proportion of insulin and pandan powder is very affordable; hence, it will not be a reason for not buying this product.

Table 26. Respondents' Evaluations on the Level of Marketability of Puto with 5 Grams of Insulin and Pandan Powder in Terms of Production Cost

The insulin and pandan puto . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
economically cheap ingredients.	4.37	VHP	4.50	VHP
needs less manpower to make the puto.	4.40	VHP	4.53	VHP
needs little capital for production.	4.27	VHP	4.43	VHP
cost of the product is cheaper than other varieties of puto.	4.13	HP	4.53	VHP
can be easily prepared in your own kitchen.	4.43	VHP	4.53	VHP
Overall Weighted Mean	4.32	VHP	4.51	VHP

As shown in the table, the marketability of puto with 5 grams for each proportion of insulin and pandan powder in terms of production cost was evaluated as Very High Potential (VHP) by the food expert respondents, with an average weighted mean of 4.32, 4.51 for food enthusiasts.

Table 27. Respondents' Evaluations on the Level of Marketability of Puto with 10 Grams of Insulin and Pandan Powder in Terms of Supply Availability

The insulin and pandan puto ingredients . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
are available all year round.	4.40	VHP	4.73	VHP
are locally available.	4.40	VHP	4.70	VHP
could be produced easily.	4.50	VHP	4.63	VHP
the product requires less effort to prepare and can easily be propagated in the backyards.	4.53	VHP	4.63	VHP
minimal amount of ingredient is needed for the product	4.30	VHP	4.57	VHP
Overall Weighted Mean	4.43	VHP	4.65	VHP

The table shows that the marketability of puto with 10 grams for each proportion of insulin and pandan powder in terms of supply availability was evaluated as Very High Potential (VHP) by the food experts, and food enthusiasts, as evidenced by the overall weighted means of 4.43, 4.65, respectively. These findings could imply that the supply availability of puto with 10 grams for each proportion of insulin and pandan powder is Very High Potential since all the ingredients are always available throughout the year in this country.

Table 28. Respondents' Evaluations on the Level of Marketability of Puto with 10 Grams of Insulin and Pandan Powder in Terms of Affordability

The insulin and pandan puto is . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
cheaper than the other brands in the market.	4.27	VHP	4.67	VHP
easy to sell.	4.17	HP	4.53	VHP
very affordable.	4.33	VHP	4.77	VHP
cost effective and cost-efficient.	4.20	VHP	4.60	VHP
is with reasonable price.	4.37	VHP	4.60	VHP
Overall Weighted Mean	4.27	VHP	4.63	VHP

The table shows that the marketability of puto with 10 grams for each proportion of insulin and pandan powder in terms of affordability was evaluated as Very High Potential (VHP) by the food expert, food enthusiast respondents as evidenced by the overall weighted means of 4.27, and 4.63, respectively. These findings imply that puto with 10 grams of insulin and pandan powder has a very high potential of availability in the market because it is cost effective and cost-efficient.



Table 29. Respondents' Evaluations on the Level of Marketability of Puto with 10 Grams of Insulin and Pandan Powder in Terms of Production Cost

The insulin and pandan puto . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
economically cheap ingredients.	4.37	VHP	4.60	VHP
needs less manpower to make the puto.	4.53	VHP	4.63	VHP
needs little capital for production.	4.20	VHP	4.57	VHP
cost of the product is cheaper than other varieties of puto.	4.17	HP	4.67	VHP
can be easily prepared in your own kitchen.	4.27	VHP	4.70	VHP
Overall Weighted Mean	4.31	VHP	4.63	VHP

The table shows that the marketability of puto with 10 grams for each proportion of insulin and pandan powder in terms of production cost was evaluated as Very High Potential (VHP) by the food expert, food enthusiast respondents as evidenced by the overall weighted means of 4.31, and 4.63, respectively. These findings imply that the two group of respondents equally agree that product, considering the enough supply materials/ingredients, will not cost much production of this puto with such easy to find ingredients may be given consideration of those who may want to start a business with have not much capital.

Table 30. Respondents' Evaluations on the Level of Marketability of Puto with 15 Grams of Insulin and Pandan Powder in Terms of Supply Availability

The insulin and pandan puto ingredients . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
are available all year round.	4.47	VHP	4.50	VHP
are locally available.	4.37	VHP	4.50	VHP
could be produced easily.	4.47	VHP	4.50	VHP
the product requires less effort to prepare and can easily be propagated in the backyards.	4.53	VHP	4.47	VHP
minimal amount of ingredient is needed for the product	4.30	VHP	4.37	VHP
Overall Weighted Mean	4.43	VHP	4.47	VHP

The table shows that the marketability of puto with 15 grams for each proportion of insulin and pandan powder in terms of supply availability was evaluated as Very High Potential (VHP) by the food experts, and food enthusiasts, as evidenced by the overall weighted means of 4.43, 4.47, respectively. All item for supply availability rated as Very High Potential. These findings could imply that the supply availability of puto with 15 grams for each proportion of insulin and pandan powder is Very High Potential since all the ingredients are always available throughout the year in this country.

Table 31. Respondents' Evaluations on the Level of Marketability of Puto with 15 Grams of Insulin and Pandan Powder in Terms of Affordability

The insulin and pandan puto is . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
cheaper than the other brands in the market.	4.13	HP	4.53	VHP
easy to sell.	4.17	HP	4.53	VHP
very affordable.	4.33	VHP	4.73	VHP
cost effective and cost-efficient.	4.20	VHP	4.63	VHP
is with reasonable price.	4.43	VHP	4.57	VHP
Overall Weighted Mean	4.25	VHP	4.60	VHP

It can be gleaned that the marketability of puto with 15 grams for each proportion of insulin and pandan powder in terms of affordability was evaluated as Very High Potential (VHP) by the food experts, and food enthusiasts, as evidenced by the overall weighted means of 4.25, 4.60 respectively. These findings imply that the puto with 15 grams of insulin and pandan powder has a very high potential of availability in the market because the plants are produced all year round.

Table 32. Respondents' Evaluations on the Level of Marketability of Puto with 15 Grams of Insulin and Pandan Powder in Terms of Production Cost

The insulin and pandan puto . . .	Respondents			
	Food Experts		Food Enthusiasts	
	WM	VI	WM	VI
economically cheap ingredients.	4.40	VHP	4.53	VHP
needs less manpower to make the puto.	4.40	VHP	4.53	VHP
needs little capital for production.	4.17	HP	4.40	VHP
cost of the product is cheaper than other varieties of puto.	4.07	HP	4.57	VHP
can be easily prepared in your own kitchen.	4.33	VHP	4.53	VHP
Overall Weighted Mean	4.27	VHP	4.51	VHP

It can be shows that the food expert and the food enthusiast respondents evaluated the production cost with an average mean of 4.25, and 4.60, respectively verbally interpreted as Very High Potential (HP). This implied that the two groups of respondents equally agree that product, considering the enough supply materials/ingredients, will not cost much. Production of this puto with such easy to find ingredients may be given consideration of those who may want to start a business with have not much capital.

Significant Difference Between the Evaluations of the Two Groups of Respondents on the Level of Acceptability and Marketability of Puto with 5 Grams, 10 Grams, and 15 Grams of Insulin and Pandan Powder



Table 33. Test of Difference in the Respondents' Evaluations on the Level of Marketability of Puto with 5 Grams, 10 Grams, and 15 Grams of Insulin and Pandan Powder Regarding Supply Availability

P	Respondents	n	OWN	s	z-computed Value	z-critical value	Decision	Interpretation
5 g	Food Experts	30	4.24	0.79	1.11	1.96	Fail to Reject the Ho	Not Significant
	Food Enthusiasts	30	4.46	0.75				
10 g	Food Experts	30	4.43	0.53	1.67	1.96	Fail to Reject the Ho	Not Significant
	Food Enthusiasts	30	4.65	0.51				
15 g	Food Experts	30	4.43	0.63	0.24	1.96	Fail to Reject the Ho	Not Significant
	Food Enthusiasts	30	4.47	0.69				

It is implied in the table that the computed z values (1.11, 1.67, 0.24) of the three proportions are smaller than the critical z value (1.96). At a 5% significance level, this signifies that the null hypothesis cannot be rejected. Hence, there is no significant difference in the evaluation of the two groups of respondents on the level of marketability of puto with 5 grams, 10 grams, and 15 grams of insulin and pandan powder in terms of supply availability. This implies that the two groups of respondents have the same evaluation on the marketability of puto with insulin and pandan powder considering its different proportions.

Table 34. Test of Difference in the Respondents' Evaluations on the Level of Marketability of Puto with 5 Grams, 10 Grams, and 15 Grams of Insulin and Pandan Powder Regarding Affordability

P	Respondents	n	OWN	s	z-computed Value	z-critical value	Decision	Interpretation
5 g	Food Experts	30	4.14	0.91	2.14	1.96	Reject the Ho	Significant
	Food Enthusiasts	30	4.59	0.70				
10 g	Food Experts	30	4.27	0.73	2.10	1.96	Reject the Ho	Significant
	Food Enthusiasts	30	4.63	0.61				
15 g	Food Experts	30	4.25	0.62	2.26	1.96	Reject the Ho	Significant
	Food Enthusiasts	30	4.60	0.57				

It can be examined in the table that the computed z values (2.14, 2.10, 2.26) of the three proportions are above the critical z value (1.96). This means that the null hypothesis should be rejected. Therefore, there is a significant difference in the evaluation of the two groups of respondents on the level of marketability of puto with 5 grams, 10 grams, and 15 grams of insulin and pandan powder in terms of affordability. This implies that the two groups of respondents have different views on the marketability of puto with insulin and pandan powder considering its different proportions.

Table 35. Test of Difference in the Respondents' Evaluations on the Level of Marketability of Puto with 5 Grams, 10 Grams, and 15 Grams of Insulin and Pandan Powder Regarding Production Cost

P	Respondents	n	OWN	s	z-computed Value	z-critical value	Decision	Interpretation
5 g	Food Experts	30	4.32	0.58	1.14	1.96	Fail to Reject the Ho	Not Significant
	Food Enthusiasts	30	4.51	0.68				
10 g	Food Experts	30	4.31	0.60	2.22	1.96	Reject the Ho	Significant
	Food Enthusiasts	30	4.63	0.54				
15 g	Food Experts	30	4.27	0.61	1.43	1.96	Fail to Reject the Ho	Not Significant
	Food Enthusiasts	30	4.51	0.68				

The table revealed that the computed z values (1.14, 1.43) are lower than the critical z value (1.96). Thus, the null hypothesis should not be rejected statistically. At a 5% level of significance, this implies there is no significant difference in the evaluation of the two groups of respondents on the level of marketability of puto with 5 grams, and 15 grams of insulin and pandan powder in terms of production cost. However, respondents' evaluations to the 15 grams proportions vary significantly. These imply that the two groups of respondents have different views on the 10 grams proportions in marketability.

Comments and Suggestions of the Respondents to Improve the Product

The comments and suggestions of the two group of respondents on the produced puto with insulin and pandan powder.

Comments: (a) The product has a pleasant taste and is healthy for our health. (b) It places more emphasis on the additional components than standard puto, it may be introduced to the market. (c) Highly recommended for all ages due to its affordable and delicious nutritious puto. (d) Great idea for a puto lover without risking our health.

Suggestions: (a) The puto must improve its fluffiness and smoothness. (b) Add more cheese. (c) The puto should be sticky and should be more appealing to attract consumers.

Conclusion

Based on the findings of the study, the following are

the conclusions: (1) The physicochemical analysis revealed that the puto with different proportions of insulin and pandan contained nutritional value based on the percentage of carbohydrates, moisture, and pH from FNRI – DOST. Furthermore, the test made gave a positive feedback that the insulin and pandan are excellent for our body (2) The puto with insulin and pandan powder with three different proportions are all very acceptable in terms of appearance, aroma, color, taste and texture of food experts and extremely acceptable by the food enthusiast respondents. (3) The marketability of Puto with different proportion of insulin and pandan powder was rated very high potential by the two groups of respondents, which makes it cost effective and efficient and available all year round. (4) The two groups of respondents positively accepted the utilization of insulin and pandan powder as an ingredient in making puto.

Based on the findings and conclusions of the study, the following recommendations are offered: (1) The puto with 15 grams proportion of Insulin and Pandan plant powder should be introduced as an innovative Filipino delicacy in the market and can be featured in Kakanin Festival in San Mateo. (2) The school where the researcher practices her profession should make a project proposal on the production of Puto with pandan and insulin for the income generating project and can be included in the School Supplementary Feeding Program. (3) To promote the products' nutritional worth, more experimental research should be done.

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