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Acceptability and Desirability in Making Macaroons Enriched with Coconut Curd (LATIK)

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Abstract

The baking industry in the Philippines is vast. The demand for baked goods has developed and evolved into a huge sector, opening up and providing more business and job options. Baked goods have become a regular component of the diet, with some serving them as dessert-like macaroons. The study investigated another food item as an option in generating a product with nutritional value and health advantages; it may also be a great aid to the community to use the availability of products to earn more money and give a better product to the public. However, this is also in reaction to the Department of Science and Technology's initiative (DOST). The experimental research design underpins the study. The experimental design theory is based on assessing the connections between and among variables; in general, one variable, the independent variable. The purpose of this study was to make macaroons with coconut curd (latik) and determine the level of acceptance and attractiveness of the macaroons with coconut curd (latik) in Bugallon Proper, Ramon, Isabela. The Independent Variable-Dependent Variable (ID) model was used as the assessment model in this study. The mean was used to establish the attractiveness of macaroons supplemented with coconut curd (latik) in terms of sensory value and acceptability, and the Wilcoxon Signed Test was used to determine the significant difference between varied quantities of the components. The macaroons supplemented with coconut curd (latik) were found to be attractive and highly praised by the responders. Treatment 2 received the highest mean and best quality ratings from the three groups of responders in terms of sensory acceptance. There is, however, a considerable variation in how responders rate the texture of treatments 2 and 3.

Keywords: baked-goods, baking industry, production, food development, product innovation

INTRODUCTION

The baking culture in the Philippines is undeniably rich, owing to the abundance of baking products available in the country. As a result, the panaderia industry is thriving across the country. The demand for baked goods has increased, resulting in the growth of a large industry that opens up and provides more business and employment opportunities. With continued growth and demand for baked goods, food specialists and bakers continue to create and market new baked delicacies. Baked goods have become an integral part of every Filipino's daily life. Some people eat it for breakfast, snacks, and even as ingredients in their dishes.

Bread, cakes, pastries, pies, and other 'perishable' bakery products accounted for the most manufacturing establishments in the formal sector of the Philippine economy, accounting for 6,618 or 26.3 percent of the total, according to the Philippine Statistics Authority's (PSA) 2013 Annual Survey of Philippine Business and Industry. With 74,406 workers, it ranked second among other sub-classes in the manufacturing industry in terms of job creation.

In light of this survey, the researcher wishes to consider other food ingredients as an alternative in producing a product with nutritive value and health benefits. It can also be of great assistance to the

community to use the availability of products to generate additional income and to provide an improved product to the customers. However, this is also in response to the Department of Science and Technology's program (DOST). Part of the program, as announced on January 5, 2017, is to develop the competence of Food Innovation Center (FIC) managers and technical personnel, particularly in product development and innovation. The Department of Science and Technology (DOST) hopes to achieve this by providing more in-depth training on critical aspects of science and technology.

Bakery items are popular and appealing due to their nutritional value as well as sensory and textural qualities. They do, however, produce through a variety of processes such as baking, molding, and mixing. People of all income levels and ages consume these items in massive amounts (Peris et al., 2019). In most countries, both children and adults consume a significant amount of bakery products such as cakes, buns, biscuits, muffins, and cookies (Doménech et al., 2016). Bakery products produced from cereal flours are to be held responsible for childhood obesity and adolescent overweight because they contain a high concentration of fats and simple sugars, posing the aforementioned health risk.

Gluten-free bread is bread which has been made without the use of gluten (Capriles & Ares, 2013). Other studies have explored the use of high-nutrient plant-based ingredients to improve baked goods. For instance, legume flours rich in proteins and amino acids are used in bread enrichment (Bresciani & Mart, 2019); oilseeds contain protein, fiber, omega-6 and omega-3 essential fatty acids, and natural antioxidants (beta-carotene, chlorogenic acid, tocopherol, flavonoids, and caffeic acids) (Martinez & Gomez, 2019); sunflower seed flour defatted for cookie enrichment (Codina et al., 2019; Grasso et al, 2016). Doménech et al. (2016) conducted a study on the addition of new ingredients to baked goods, such as cookies, sponge cake, croissants, and muffins, such as high oleic sunflower oil/HOSO (instead of margarine or sunflower oil) and inulin (acting as fat replacer, adding sensorial properties, replacer of simple sugar, source of fiber), in order to achieve healthier characteristics and determine consumer acceptability. Baked goods with altered recipes have been considered to have greater nutritional properties. Furthermore, their findings indicate that cookies with healthy fatty acid profiles and low-calorie profiles have the potential to be produced with market acceptance, as well as that other recipes for sponge cake, croissants, and muffins should be explored.

Miranti and Wahini's (2021) research on the nutritional value and consumer acceptance of biscotti (a bar biscuit) prepared with rambutan seed flour rather than the standard ingredient - flour. Their study revealed that the amount of rambutan seed flour to be used should be more than half the amount of the flour commonly used to achieve the best biscotti formula. Protein, energy, fat, carbs, vitamin C, ash, antioxidants, and fiber were also discovered in the formula in question. Biscotti were accepted based on the optimal formula, which included texture, odor, flavor, crunchiness, and overall acceptability, according to their findings.

Bread is also recommended in all dietary standards, according to Rosell and Garzon (2015), and the food pyramid's base is made up of bread and cereal-based goods. Pobar (2018) tested the acceptability of dessert ingredients such as Calamay (a Filipino delicacy made of coconut curds or latik), Butter Scotch, Fried Dessert, and Boat Tart.

Cauvain and Clark (2019) investigated the acceptability of enriched bread products. They posited that there are economic, social, and legislative barriers. The texture of the product, its flavor, which may differ from that of traditional products, and a low-quality perception all work against customer perception of product innovation or enhancement. The consumer barrier differs depending on the local market's expectations. Technological barriers to healthier bakery products can range from minor recipe changes to changes in processing technology.

Challacombe et al. (2011) investigated the sensory characteristics and consumer acceptance of red and white wheat bread and cracker products. The authors indicated that customers favored red wheat products over white wheat products. Furthermore, the sensory qualities of the goods were influenced by the size of the fiber wheat particles, but consumer acceptance was unaffected.

Consumers choose baked goods in the market because of their taste, healthiness, and freshness. It is also more convenient to serve at the table, especially for people who have a lot of responsibilities. They may, however, reject baked goods with lower physical quality as a result of using plant-based ingredients such as legume flour in place of whole flour (Martinez and Gomez, 2019). It is essential to improve simple and clean methods in order to develop clean label flour with optimal physical properties and economic viability (Belorio et al., 2019). Fresh baked treats are popular with customers because they are a reliable indicator of overall product quality. Aside from freshness, the taste and variety of baked goods are important considerations.

According to Digiorgio (2019), each bakery enterprise must consider three criteria to be successful in the market: taste, health, and freshness. For baking companies, the flavor of baked goods must be the most crucial component, as it may make or break a business. If baked goods seem appetizing, consumers are willing to buy them and spend money on them. Consumers are willing to spend a slightly higher price for a slightly healthier product. Furthermore, consumers link freshness with product quality. They enjoy baked foods that are still warm. They are constantly on the lookout for better snacks and baked goods, as well as healthier choices that don't sacrifice taste, texture, or enjoyment (Tate & Tyle, n.d.)

The acceptance of baked goods by consumers is more crucial than ever. Seeds (like chia seeds) are also used in baking to increase the nutritional value of baked goods. The texture and crustiness of baked goods are equally significant. According to a Mintel study, up to 47% of customers are willing to pay a premium for healthy and natural breads (Novozymes, n.d.)

When buying baked products, price, quality, and freshness are all important factors to consider. When purchasing pre-packaged baked goods, the most crucial factor to consider is price (71%), followed by quality (60%), and finally freshness (47%). When it comes to freshly baked foods, quality (67 percent) is the most significant criterion, followed by freshness (66 percent) and price (59 percent), demonstrating that buyers are willing to pay a premium for high-quality baked goods. Furthermore, natural – 22%, reduced sugar – 22%, limited ingredients – 22%, and no artificial components (organic) – 19% are the most commonly considered product features for pre-packaged baked products. People that eat freshly baked dishes require these characteristics/attributes as well. Consumers also choose gluten-free items over all others (50 percent of consumers want bakery goods with better-for-you attributes).

Because the demand for baked goods is expanding at an increasing rate, the researcher has decided to undertake a study to improve a presently available product, specifically macaroons. It's a chance to increase the sensory appeal of Macaroons by using coconut curd (Latik), which is created from coconut meat.

Coconut, coco, coco-da-bahia, and coconut-of-the-beach are all common names for "Cocos nucifera" (L.), a member of the Arecaceae (palm) family (Lima et al., 2015). The Philippine economy relies heavily on coconut. The coconut sector contributed PhP77.4 billion to the Philippine economy in 2013, placing it fourth among crops behind rice, bananas, and corn (Javier, 2015). The Philippines produces the second-largest amount of coconut goods in the world (Estal, 2014). Coconut provides several natural goods, including food. Every part of the coconut, including the meat, is extremely beneficial. Coconut water can either be bottled and sold as a beverage or microbiologically developed into "nata de coco."

Coconut is a high-fat fruit with a long list of health benefits. These include providing disease-fighting antioxidants, bettering blood sugar regulation, and decreasing some risk factors for heart disease. Coconut meat, whether fresh, dried, or ground, is delicious and easy to include into sweet and savory dishes like macarons and sweet pastries. However, because coconut is high in fat and calories, it is not recommended for persons who are attempting to lose weight.

Coconut husk can be used to manufacture carpets, upholstery, insulation, potting medium, geo-nets, and decorations for homes and schools' backyards. Coconut toddy obtained from the spathe (inflorescence) is converted into coconut wine, spirits, sugar, and vinegar in the same way. Coconut meat is also used to make coconut oil, coconut flour, coconut milk, and dried coconut, which are all used as macaroon toppings.

Macaroons are made from desiccated (dry) coconut, which contains 60-70 percent fat. Coconut oil is one of nature's richest sources of medium-chain triglycerides also known as fatty acids (MCTs). Shorter chain fatty acids have been shown to absorb easier and faster in the digestive tract than longer chain fatty acids found in other fats like vegetable oils. Polyunsaturated oils (soy, corn, and other vegetable oils) contain longer chain fatty acids, which have been demonstrated to be the most harmful to those with Crohn's disease and other inflammatory bowel illnesses (Tate & Lyle, n.d.).

Macaroons originated in Italy and are traditionally made with almond paste, sugar, and egg whites (original three-ingredient recipe). Due to the abundance and availability of coconuts, as well as their practical use in the home, notably in making baked goods, macaroons were later infused with coconuts. The iconic coconut macaroons now available in a multitude of flavors, including chocolate dip, chocolate chip, coffee flavor, and chocolate flavor. Another technological (processing) breakthrough is the availability of macaroons in a can. In his study, Pister (2021) concluded that consumers favor bakery macarons or even homemade macarons, and gluten-free macarons.

The first macaroons were almond meringue cookies with a crisp surface and a soft interior, not coconut macaroons. Egg whites and almond paste, which was formed by mixing equal parts pulverized

blanched almonds and sugar with egg whites, were initially used to make them. Glucose or maize syrup can now be substituted. As a result, the name of the cookie comes from the Italian word "maccarone," which means "paste".

The basic parts of the macaron are usually made with flour as a substrate. Before baking, these are mixed and seasoned with vanilla and salt. With a pastry bag, pipe the final dough onto a cookie sheet and set aside. Before baking, it's usually coated in gum Arabic or covered with chopped almonds, walnuts, raisins, or cherry pieces. Macaroon crumbs are commonly seen in ice creams, pie fillings, and puddings. Frangipane is a cream filling made by combining butter and crushed macaroons with lemon extract, rum, sherry, or brandy.

According to Foale (2014), while baking and topping cakes and pastries like macarons, desiccated coconut is almost usually used in conjunction with massive amounts of sugar. The harmful effects of excessive sugar consumption, which include diabetes, renal disease, and heart failure, are one of the most pressing issues in today's diet. The search for coconut products that are appealing and palatable without sugar has begun. Desiccated coconut is produced from flaked and dried coconut meat purchased at a supermarket. There are two varieties: sweetened and unsweetened. However, it gives the product more flavor and nutritional value. Desiccated coconut is an excellent source of healthy fat that is cholesterol-free. Each desiccated coconut has 80 percent saturated fats. It contains selenium, which aids in the development of enzymes that help the immune system and thyroid function. It has copper which boosts energy, metabolism, and the synthesis of red blood cells and collagen. An ounce of desiccated coconut contains 5 grams of fiber. A daily protein intake of 38 grams for men and 25 grams for women is recommended. Macaroons are a popular coconut-based food that can be found in smoothies, salads, and sautéed vegetables.

When preparing macaroons, eggs can be used to add structure, color, and assist leave a precise volume. Because their amino acid makeup is similar to that of human bodies, egg white proteins are the best of all types of protein. 2014 (San Gabriel & Figueras). Condensed milk is used to sweeten and lend flexibility to macaroons, which aids in achieving the best results (Santiago et al., 2017). When compared to ordinary milk, condensed milk has a longer shelf life and contains less moisture.

Butter is an essential ingredient in any cuisine, particularly macaroons. By serving as a fat and leavening agent, butter gives baked foods structure, flakiness, and moistness. It also imparts a rich and delightful flavor to the macaroons. (cakedecorist.com). It contains polyunsaturated fatty acids, which are essential for the healthy functioning of all cells in our bodies, as well as vitamin A, which is good for vision and skin health (Valley, 2013).

Sucrose or sugar is used in bakery items such as macaroons to offer sweetness, control moisture retention, impact air incorporation, stabilize air bubbles, and prevent starch swelling during baking, all of which contribute to a finer texture, color, and flavor (Gao et al., 2008). (2017). It is the body's most important source of energy, with glucose being the most important. The brain requires roughly 130 grams of sugar (glucose) per day to function correctly (Global, n.d.).

Curd coconut (CC) is an uncommon variation of coconut meat that is thicker than typical, frothy, and squishy, like curd. Curd coconut, like macaroons, is favored by individuals who eat it as a dessert because it is more delightful than ordinary coconut (Chomchalow, 2013).

A product that is improved by adding new ingredients to the existing product is referred to as product innovation. The mastery of complexity, in which ingredients, texture, and taste combine to create complexity, should be factored into the innovation process to provide a significant and obvious benefit to consumers: it broadens the range of options available by varying the combinations of ingredients, texture, taste, and product shapes and sizes (Palczak et al., 2020).

The process of adding additional components to a product in order to create new variations that can enhance or improve the product's sensory value is known as product enrichment. This innovation, on the other hand, can help with the use of raw materials, notably coconut, which is widely available in the community. It is noteworthy in the context of this study because coconut is widely available locally. Furthermore, the supply of coconut in the area has increased year after year. The community members merely utilized this as ordinary snacks and drinks after that. It is subsequently discovered that, despite their nutritional worth, only a few individuals of the community are interested in consuming coconut fruit. In addition, the minerals in coconut have a beneficial effect on the human body. It aids in the increase of manganese, proteins, and carbs, all of which are necessary for good health.

Given these factors, the proponent wants to explore how to enrich coconut curd to be used in macaroons. The study's premise is that coconut curds can be processed into a product that can be consumed

by the community. On the other hand, it's likewise imperative to come up with a product that combines coconut curd with another dish to make macaroons. This inspired the proponent to propose this research.

Conceptual Framework

Baking is a type of cooking that uses dry heat and is often done in an oven. It is most likely the oldest cooking method. Bread, rolls, cookies, pies, pastries, and muffins are common bakery dishes produced with flour or meal derived from grains. Humans benefit greatly from bread, which was already a common food item in prehistoric times. The key ingredients that give most baked goods their look, texture, and flavor are flour, water, and leavening agents. Eggs, milk, salt, shortening, and sugar are examples of minor components that can be used to improve these attributes.

Coconut (Cocos nucifera) is a widely distributed plant with pharmacologically significant qualities and minimal toxicity (Braz, 2015). It has medical use. This plant has environmental appeal because it is commonly used in the food industry and the utilization of wasted plant components will reduce waste and pollution. The pharmacological effects of the plant differ depending on which part of the plant or fruit is consumed. The endocarp and coconut water components both had high antioxidant activity. In addition, the fiber has antibacterial, antiparasitic, and anti-inflammatory effects. Only the ethanol extract of the root has a depressing and anticonvulsant effect on the central nervous system. Coconut water has anti-inflammatory, antioxidant, and hypoglycemic qualities, as well as kidney-protective properties.

Macaroons are a sort of baked good that can be found in almost every supermarket and bakery. Macaroons have become the new favorite delicacy due to its soft, chewy, and coconut-flavored texture, which makes them very addictive to anyone (Respicio, 2020).

Paradigm of the study

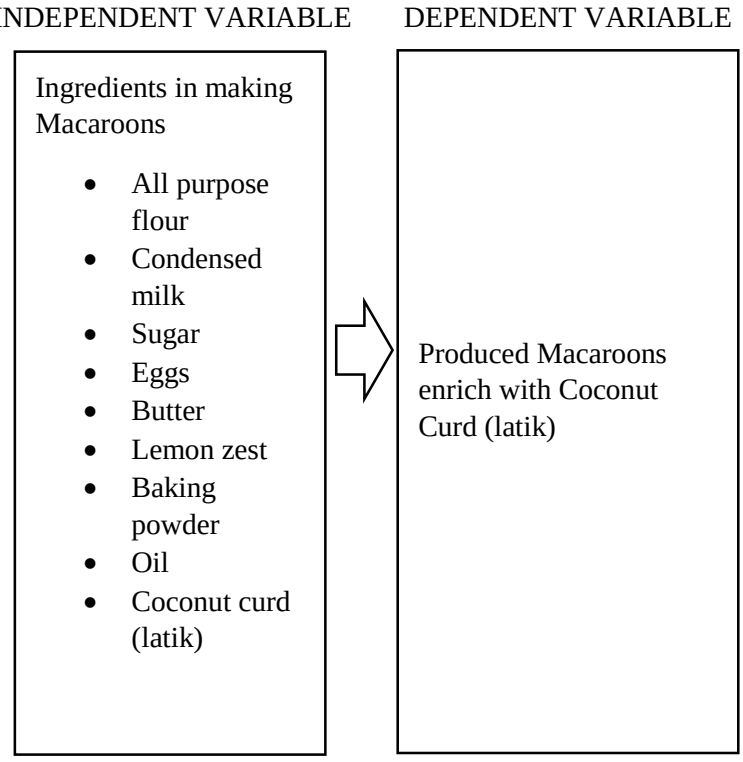

Fig 1. Paradigm of the study

Figure 1 depicts the study's paradigm. Because these are the factors that the investigator changed in the study, the ingredients used to make macaroons are the independent variables. The dependent variable is the generated macaroons enhanced with coconut curd, as these are the variables being examined in the study.

Objectives

Generally, this study aimed to produce macaroons enriched with coconut curd (latik) and to determine the significant difference in sensory acceptability level in making macaroons enriched with coconut curd (latik).

Specifically, this study aims to:

1. Determine the desirability in making macaroons enriched with coconut curd (latik) in terms of:

    1.1 appearance;
    1.2 color;
    1.3 flavor;
    1.4 taste; and
    1.5 texture.

2. Determine the acceptability and desirability in making macaroons enriched with coconut curd (latik).

3. Determine the significant difference in sensory acceptability level in making macaroons enriched with coconut curd (latik).

4. Produce macaroons enriched with coconut curd (latik).

Research Methodology

This chapter discusses the study method, research environment, respondents, data collection tool, data collection processes, and statistical analysis.

Research Method

The experiment study design was utilized to investigate the acceptability and desirability of the coconut curd-enriched macaroons (latik). The core of experimental design is the precision with which the relationship between and among variables can be analyzed, and hence generating an objective results. The experimental design is based on testing the correlations between and among variables; one variable is designated as the independent variable.

The researcher selected an intervention associated with the dependent variables, and controls how that intervention were applied, or introduced, into the research setting. If the experiment is applied correctly, then a causal relationship can be established between the independent variable and dependent variable(s).

Research Environment

With the approval of the School Principal, this study was carried out at Raniag High School's Technical-Vocational-Livelihood (TVL) Laboratory. As a result, the production and documentation were completed in the aforementioned facility. Furthermore, data collecting in respect to the research goals was carried out at Bugallon Proper, Ramon, Isabela. However, before conducting the study, the researcher reviewed the Inter-Agency Task Force (IATF) health protocols and requested clearance from barangay officials.

Source: Google Maps
Fig 2. Map of Bugallon Proper, Ramon, Isabela

Respondents

This study's respondents included ten food specialists, ten bakers, and fifteen primary customers from the study's location. The study employed purposive sampling. The researcher considered health standards in conducting the study due to the limits imposed by the health crisis and to prevent the spread of the COVID virus. Wearing protective equipment and using alcohol or sanitizer were strictly enforced. The evaluators and responses are shown in the table below.

Table 1. Distribution of Respondents

Respondents	No. of Respondents	No. of Percentage
Food experts	10	28.57%
Bakers	10	28.57%
Primary Consumers	15	42.86%
TOTAL	**35**	**100%**

Data Gathering Tool

A survey questionnaire with a nine-point hedonic scale adapted from Respicio (2020) is the main tool used in the study. It is used to gather data with regards to the acceptability and desirability of the macaroons made with coconut curd (latik). The first part is used to gather the profile of the respondents. The second part zeroed on the acceptability and desirability of the product with regards to its taste, texture, appearance, color, and aroma.

Table 2. Nine-Point Hedonic Rating Scale

Range	Rating Score	Descriptive Rating
8.5- 9.00	9	Like Extremely (LE)
7.5-8.49	8	Like Very Much (LVM)
6.5-7.49	7	Like Moderately (LM)
5.5-6.49	6	Like Slightly (LS)
4.5-5.49	5	Not Like nor Dislike (NL/ DL)
3.5-4.49	4	Dislike Slightly (DS)
2.5-3.49	3	Dislike Moderately (DM)
1.5-2.49	2	Dislike Very Much (DVM)
1.0-1.49	1	Dislike Extremely (DM)

Data Gathering Procedure

The researcher requested permission from the school administration to perform the study once the research proposal was approved. The processes followed by the researcher in the preparation of the experimental baked product (macaroons) and the evaluation of those products are outlined below.

Selection and Preparation

The materials and components required for the experiment were chosen with consideration. Each treatment's component quantities were carefully examined. Table 3 shows the methods for developing the coconut curd for producing macarons.

Table 3. The Varied Treatments in the Preparation of Coconut Curd (latik) in Making Macaroons

Treatments	Formulation	Production/Yield
T_1	1 cup of coconut curd 1 ½ All-purpose flour 1 ¼ sugar ½ condensed Milk ¼ oil 1 tbsp zest ½ cup butter melted 3 eggs 1 tsp baking powder	4 dozen

T_2	1 ½ cup of coconut curd 1 ½ All-purpose flour 1 ¼ sugar ½ condensed Milk ¼ oil 1 tbsp zest ½ cup butter melted 3 eggs 1 tsp baking powder	6 dozen
T_3	2 cups of coconut curd 1 ½ cup All-purpose flour 1 ¼ sugar ½ condensed Milk ¼ oil 1 tbsp zest ½ cup butter melted 3 eggs 1tsp baking powder	8 dozen

Component 1-Mise en place

All the needed tools and equipment were prepared, i.e. mixing bowl, measuring cups, shifter, measuring spoon, spatula, baking sheets, and molder.

Component 2-Preparation of Coconut Curd (LATIK)

A pot was filled with coconut milk or cream. It was heated on low to medium heat. The milk was repeatedly swirled until it was completely dry and the curd separated from the coconut oil. The mixture was simmered until the curd had darkened in color. The curd was cooked on low heat.

Component 3- Baking process

The components were mixed using the creaming process. To avoid overflowing, the baking pan was filled up to ½ full with the liner. The coconut curd was included into the mix. It was baked in an oven that had been preheated (350 degrees Celsius for 15-20 minutes).

Component 4- Testing and Evaluation

The study was conducted during the School Year 2021-2022. To perform the study, the researcher sought approval from the appropriate authority.

The study was subjected to certain ethical issues. Before the study was conducted, respondents were assured that their identities would be kept private and that the results would be used solely for academic purposes. Likewise, the target respondents were given the option to refuse or withdraw. All respondents signed a consent form indicating their willingness to participate.

Sensory testing was performed on the finished products. The completed product was tasted by the respondents. Data on each variable's appearance, aroma, taste, texture, and general acceptability and desirability are collected and analyzed statistically. The results were totaled, consolidated, and summarized in a table for analysis and interpretation.

Statistical Treatment

Mean was used to determine the acceptability and desirability of the macaroons enriched with coconut curd (latik).

Wilcoxon Signed Test was used to determine the significant difference in sensory acceptability level in making macaroons enriched with coconut curd (latik).

Results and Discussion

This chapter discusses the presentation, analysis, and interpretation of the study's data.

Evaluation of Food Experts, Bakers and Primary Consumers on the Desirability in of Macaroons Enriched with Coconut Curd (latik).

Tables 4 to 8 presents the summary of evaluation with regards to the desirability and acceptability of the macaroons with coconut curd (latik).

Table 4. The Desirability in Making Macaroons Enriched with Coconut Curd (LATIK) in Terms of Appearance

Appearance	1 Cup		1 ½ Cups		2 Cups	
	Mean	**Description**	**Mean**	**Description**	**Mean**	**Description**
1.The macaroons has a smooth rounded shape	8.67	LE	8.56	LE	8.43	LE
2.It has a good shape	8.60	LE	8.39	LE	8.33	LE
3.The Macaroons is slightly moist	7.99	LVM	8.40	LE	8.13	LE
4.It has even sizes.	8.40	LE	8.46	LE	8.27	LE
Overall Mean	**8.41**	**LE**	**8.45**	**LE**	**8.29**	**LE**

Legend: Like Extremely (LE); Like Very Much (LVM)

Appearance. Table 4 summarizes the evaluation results of three groups of respondents on the desirability of the macaroons enriched with coconut curd (latik) in terms of appearance with three replications: 1 cup, 1 ½ cups, and 2 cups.

As shown in the table above, the appearance of the macaroons enriched with (latik) was rated as Like Extremely (LE) by food experts, bakers, and primary consumers, with overall means of 8.41, 8.45, and 8.29 in replications of 1 cup, 1 ½ cups, and 2 cups, respectively. This means that the macaroons enriched with coconut curd (latik) look better than the macaroons available in the market.

The respondents ranked 1 ½ cups replication Like Extremely (LE) with the highest overall mean of 8.45, as shown in the table. This indicates that the percentage of 1 ½ cups coconut curd (latik) in making macaroons was preferred by responders. With a mean of 7.99, respondents assessed indicator 3: The

Macaroons are slightly moist under the proportion of 1 cup as Like Very Much (LVM). This indicates that the moisture content of the finished macaroons has increased slightly.

The findings backed up the study of Santiago et al., (2017). They came to the conclusion that condensed milk offers macaroons a pleasant taste, flexibility, and a richer appearance.

Table 5. The Desirability of Macaroons Enriched with Coconut Curd (LATIK) in terms of Color

Color	1 Cup		1 ½ Cups		2 Cups	
	Mean	**Description**	**Mean**	**Description**	**Mean**	**Description**
1.It has pleasing golden brown edges.	8.64	LE	8.61	LE	8.44	LE
2.It has pleasing contrasting color.	8.51	LE	8.51	LE	8.36	LE
3.It has light golden brown in color.	8.66	LE	8.69	LE	8.46	LE
4. It has aesthetically pleasing appearance.	8.49	LE	8.47	LE	8.43	LE
Overall Mean	**8.58**	**LE**	**8.57**	**LE**	**8.42**	**LE**

Legend: Like Extremely (LE); Like Very Much (LVM)

Color. Table 5 displays the three groups of respondents' opinions on the color attractiveness of the macaroons supplemented with coconut curd (latik) in the three replications: 1 cup, 1 ½ cups, and 2 cups.

As shown in the table, food experts, bakers, and primary consumers all score the color of the manufactured macaroons enhanced with coconut curd (latik) as Like Extremely (LE), with overall means of 8.58, 8.57, and 8.42 in the three replications, respectively. Replication 1 (1 cup) had the highest mean, though (8.58). This indicates that respondents preferred replication 1 (1 cup). The color of the macaroons enriched with coconut curd is approved throughout all three replications, according to the results. This is related to the study of Comfort (2006). The presence of eggs in macaroons, according to the author, might contribute to the structure, color, and volume of the finished product.

Table 6. The Desirability of Macaroons Enriched with Coconut Curd (LATIK) in terms of Aroma

Aroma	1 Cup		1 ½ Cups		2 Cups	
	Mean	**Description**	**Mean**	**Description**	**Mean**	**Description**
1. The macaroon has creamy smell.	8.57	LE	8.64	LE	8.59	LE
2. It has aromatic savor	8.43	LE	8.56	LE	8.46	LE
3. The macaroon has no foul odor	8.64	LE	8.63	LE	8.47	LE
4. The macaroon has fresh herby smell.	8.57	LE	8.51	LE	8.40	LE
Overall Mean	**8.55**	**LE**	**8.59**	**LE**	**8.48**	**LE**

Legend: Like Extremely (LE); Like Very Much (LVM)

Aroma. Table 6 illustrates how the three groups of respondents rated the aroma of the macaroons supplemented with coconut curd (latik) in the three replications: 1 cup, 1 ½ cups, and 2 cups.

As shown in table 6, the aroma of the generated macaroons enriched with latik was assessed as Like Extremely (LE) by food experts, bakers, and primary consumers, with overall averages of 8.55, 8.59, and 8.48, respectively. This means that the macaroons filled with coconut curd (latik) have a pleasant aroma similar to store-bought macaroons.

Table 7. The desirability of Macaroons Enriched with Coconut Curd (LATIK) in terms of Taste

Taste	1 Cup		1 ½ Cups		2 Cups	
	Mean	**Description**	**Mean**	**Description**	**Mean**	**Description**
1. It has sweet taste.	8.60	LE	8.73	LE	8.47	LE
2. It has no after taste.	8.40	LE	8.57	LE	8.39	LE
3. It has a well-blended flavor	8.40	LE	8.49	LE	8.40	LE
4. It has creamy taste	8.54	LE	8.76	LE	8.54	LE
Overall Mean	**8.49**	**LE**	**8.64**	**LE**	**8.45**	**LE**

Legend: Like Extremely (LE); Like Very Much (LVM)

Taste. Table 7 demonstrates the taste preferences of the three groups of respondents for macaroons enhanced with coconut curd (latik) across the three replications: 1 cup, 1 ½ cups, and 2 cups.

Food experts, bakers, and primary consumers assessed the taste of the macaroons enhanced with coconut curd as Like Extremely across the three replications (1 cup, 1 ½ cups, and 2 cups), with overall mean ratings of 8.49, 8.64, and 8.45, respectively, as shown in the table.

However, the percentage of 1 ½ cups coconut curd (latik) was scored as Like Extremely (LE) by the respondents, with an aggregate mean of 8.64, the highest of the three proportions. These results showed that the taste of the proportion 1 ½ cups of latik in making macaroons was preferred by the respondents.

Table 8. The Desirability of Macaroons Enriched with Coconut Curd (LATIK) in terms of Texture

Texture	1 Cup		1 ½ Cups		2 Cups	
	Mean	**Description**	**Mean**	**Description**	**Mean**	**Description**
1. The Macaroons has smooth and firmly texture.	8.41	LE	8.59	LE	8.33	LE
2. It has slightly moist texture.	8.21	LE	8.37	LE	8.04	LVM
3. The macaroon is soft.	8.24	LE	8.37	LE	8.10	LVM
4. The macaroon is chewy.	8.39	LE	8.57	LE	8.30	LE
Overall Mean	**8.31**	**LE**	**8.48**	**LE**	**8.19**	**LE**

Legend: Like Extremely (LE); Like Very Much (LVM)

Texture. In terms of texture, Table 8 shows how the three groups of respondents rated the macaroons enhanced with coconut curd (latik) throughout the three replications, 1 cup, 1 ½ cups, and 2 cups.

The overall means of 8.31 (1 cup), 8.48 (1 ½ cups), and 8.19 (2 cups), demonstrated that food experts, bakers, and primary consumers rated the macarons as Like Extremely (LE) throughout the three replications. However, under replication 3 (2 cups), the respondents rated indicators 2, It has a little moist feel, and 3, The macaron is soft, as Like Very Much, with averages of 8.04 and 8.20, respectively. This indicates that the respondents did not prefer the texture of the replication 3 (2 cups). The respondents, on the other hand, preferred the texture of replication 2 (proportion of 1 ½ cups), as evidenced by a mean score of 8.48. (Like Extremely [LE]).

The findings backed up the research of Estacion et al., (2019). In terms of texture, 80 percent of their respondents claimed they prefer the chewy texture of macaroons, while the remaining 20% disagreed.

Table 9. Summary of Respondents' Evaluation on the Desirability of Macaroons Enriched with Coconut Curd (LATIK) in terms of Sensorial Value

Criteria	1 Cup		1 ½ Cups		2 Cups	
	OVM	**Description**	**OVM**	**Description**	**OVM**	**Description**
a. Appearance	8.41	LE	8.45	LE	8.29	LE
b. Color	8.58	LE	8.57	LE	8.42	LE
c. Aroma	8.55	LE	8.59	LE	8.48	LE
d. Taste	8.49	LE	8.64	LE	8.45	LE
e. Texture	8.31	LE	8.48	LE	8.19	LE
Grand Overall Mean	**8.47**	**LE**	**8.55**	**LE**	**8.37**	**LE**

Legend: Like Extremely (LE); Like Very Much (LVM); Overall Mean (OVM)

The table above summarizes respondents' assessments on the desirability of macaroons supplemented with coconut curd (latik) in terms of sensory value.

As can be gleaned from Table 9, respondents rated the desirability of the macaroons enhanced with coconut curd (latik) as Likely Extreme (LE), with an overall mean of 8.47 (1 cup), 8.55 (1 ½ cups), and 8.37 (2 cups). However, with the grand aggregate mean of 8.55, the respondents indicated replication 2 (1 ½ cups) as the greatest. It means that the respondents preferred replication 2 in terms of desirability.

Respondents' Evaluations of the Sensory Acceptability Level of Macaroons enriched with Coconut Curd (latik)

Table 10. Sensory Acceptability Level of Condensed Milk in Macaroons Enriched with Coconut Curd (LATIK) in terms of Appearance

APPEARANCE	Trial 1		Trial 2	
	Mean	Description	Mean	Description
Treatment 1	8.31	LE	8.40	LE
Treatment 2	8.40	LE	8.43	LE
Treatment 3	8.11	LVM	8.26	LE
Overall Mean	**8.28**	**LE**	**8.36**	**LE**

Legend: Like Extremely (LE); Like Very Much (LVM)

Appearance. Table 10 indicates the sensory acceptability of the macaroons rich with coconut curd (latik) in proportions of 1 cup, 1 ½ cups, and 2 cups in terms of appearance for the three groups of respondents.

In trials 1 and 2, culinary experts, bakers, and primary consumers all rated the appearance of macarons as Like Extremely (LE), with overall averages of 8.28 and 8.36, respectively, as shown in Table 10. Respondents rated the baked goods in treatment 3 trial 1 as Like Very Much (LVM) on average, whereas trial 2 was rated as Like Extremely (LV) on average. This shows that the second experiment, which the respondents liked, was superior. The table displayed also the progress of trial 1 and 2 which signifies that the respondents appreciated and preferred most the trial 2 with the over mean of 8.36 compared to trial 1 with the overall mean of 8.28.

According to Table 10, respondents rated treatment 2 as Like Extremely (LE) the most, with a mean of 8.40 for trial 1 and 8.43 for trial 2. This illustrates their preference for treatment 2. However, the overall evaluation reveals that the baked product was very acceptable in terms of appearance in all of the treatments by the respondents.

Table 11. Sensory Acceptability Level of Macaroons Enriched with Coconut Curd (latik) in terms of Color

COLOR	**Trial 1**		**Trial 2**	
	Mean	**Description**	**Mean**	**Description**
Treatment 1	8.51	LE	8.51	LE
Treatment 2	8.54	LE	8.57	LE
Treatment 3	8.31	LE	8.40	LE
Overall Mean	**8.46**	**LE**	**8.50**	**LE**

Legend: Like Extremely (LE); Like Very Much (LVM)

Color. In terms of color, Table 11 shows how respondents rated the sensory acceptability of the macaroons infused with coconut curd (latik) across the three treatments in the two trials.

The aggregate mean of the three treatments in trial 1 is 8.46, which is interpreted as Extremely Like (LE). The rating for trial 2 is significantly higher, with an aggregate mean of 8.50 interpreted as Like Extremely (LE). This demonstrates that the baked items were favored by the responders in the second testing. Treatment 2 also had the highest mean in both trials, 8.54 in trial 1 and 8.57 in trial 2. This suggests that the macaroons' color under treatment 2 was highly valued and approved by the responders.

Table 12. Sensory Acceptability Level of Macaroons Enriched with Coconut Curd (LATIK) in terms of Aroma

AROMA	Trial 1		Trial 2	
	Mean	Description	Mean	Description
Treatment 1	8.51	LE	8.57	LE
Treatment 2	8.51	LE	8.60	LE
Treatment 3	8.46	LE	8.43	LE
Overall Mean	**8.50**	**LE**	**8.53**	**LE**

Legend: Like Extremely (LE); Like Very Much (LVM)

Aroma. Table 12 illustrates the respondents' sensory acceptance of the macaroons enhanced with coconut curd (latik) across the three treatments in both trial 1 and 2 in terms of aroma.

As can be gleaned from Table 12, respondents in trial 1 and trial 2 evaluated the three treatments as Like Extremely (LE) with an overall mean of 8.50 and 8.53, respectively. It is also worth noting that in experiment 2, respondents liked the aroma of the baked goods. Furthermore, respondents favored the aroma of macaroons in treatment 2. Treatment 2 has the highest mean in both trials, with 8.51 in trial 1 and 8.60 in trial 2.

Table 13. Sensory Acceptability Level of Macaroons Enriched with Coconut Curd (LATIK) in terms of Taste

TASTE	Trial 1		Trial 2	
	Mean	Description	Mean	Description
Treatment 1	8.46	LE	8.54	LE
Treatment 2	8.51	LE	8.66	LE
Treatment 3	8.43	LE	8.40	LE
Overall Mean	**8.47**	**LE**	**8.53**	**LE**

Legend: Like Extremely (LE); Like Very Much (LVM)

Taste. Table 13 illustrates the respondents' sensory acceptance of the macaroons enhanced with coconut curd (latik) across the three treatments in both trial 1 and 2 in terms of taste.

Table 13 illustrates that the macaroons in the three treatments were rated as Like Extremely (LE) by the three groups of respondents, with overall averages of 8.47 in trial 1 and 8.53 in trial 2. Furthermore, the table demonstrates that respondents regarded treatment 2 as the best tasting of the three proportions. It has an excellent flavor when compared to other treatments and is more delectable than the macaroons available on the market.

Table 14. Sensory Acceptability Level of Macaroons Enriched with Coconut Curd (LATIK) in terms of Texture

TEXTURE	Trial 1		Trial 2	
	Mean	Description	Mean	Description
Treatment 1	8.37	LE	8.34	LE
Treatment 2	8.46	LE	8.43	LE
Treatment 3	8.20	LE	8.17	LE
Overall Mean	**8.34**	**LE**	**8.31**	**LE**

Legend: Like Extremely (LE); Like Very Much (LVM)

Texture. Table 14 demonstrates the respondents' sensory acceptance of the macaroons enhanced with coconut curd (latik) across the three treatments in both trial 1 and 2 in terms of texture.

The three groups of respondents rated the three macaroon treatments in trials 1 and 2 as Like Extremely (LE), with overall averages of 8.34 and 8.31, respectively. There is a modest reduction in the overall mean in trial 2, suggesting that respondents preferred the texture of the baked items in trial 1. Overall, the data show that respondents in both trials accept the texture of the macaroons in all treatments. The table

15 shows the summary of respondents' evaluation on the sensory acceptability in making macaroons enriched with coconut curd (latik) in terms of sensorial value.

Table 15. Summary of Respondents' Evaluation on the Sensory Acceptability Level of Macaroons Enriched with Coconut Curd (LATIK) in terms of Sensorial Value

	Criteria	Trial 1		Trial 2	
		Mean	Description	Mean	Description
Treatment 1	a. Appearance	8.31	LE	8.40	LE
	b. Color	8.51	LE	8.51	LE
	c. Aroma	8.51	LE	8.57	LE
	d. Taste	8.46	LE	8.54	LE
	e. Texture	8.20	LE	8.17	LE
	Overall Mean	8.40	LE	8.47	LE
Treatment 2	a. Appearance	8.40	LE	8.43	LE
	b. Color	8.54	LE	8.57	LE
	c. Aroma	8.51	LE	8.60	LE
	d. Taste	8.51	LE	8.66	LE
	e. Texture	8.46	LE	8.43	LE
	Overall Mean	8.48	LE	8.54	LE
Treatment 3	a. Appearance	8.11	LE	8.26	LE
	b. Color	8.31	LE	8.40	LE
	c. Aroma	8.46	LE	8.43	LE
	d. Taste	8.43	LE	8.40	LE
	e. Texture	8.20	LE	8.17	LE
	Overall Mean	8.30	LE	8.33	LE

Legend: Like Extremely (LE); Like Very Much (LVM)

Table 15 summarizes the respondents' sensory acceptance of the macaroons enhanced with coconut curd (latik) across the three treatments in both trial 1 and 2.

Respondents favored baked items in the second treatment the most, with overall means of 8.48 and 8.45 in trials 1 and 2, respectively. It is followed by the baked goods in the first treatment, with an overall mean of 8.40 in trial 1 and 8.47 in trial 2. Finally, the macaroons in the third treatment were assessed the least favorably, with an overall mean of 8.30 in trial 1 and 8.33 in trial 2.

Respondents' Evaluations on the Significant Differences in the Sensory Acceptability Level of Macaroons Enriched with Coconut Curd (latik)

Table 16. Differences in the Sensory Acceptability Level of Condensed Milk in Macaroons Enriched with Latik in terms of Appearance

Appearance			Z	Asymp. Sig. (2-tailed)	Description
Treatment 1 - Treatment 2			-.359[b]	.720	Not Significant
Treatment 1 - Treatment 3			-.962[c]	.336	Not Significant
Treatment 2 - Treatment 3			-1.874[c]	.061	Not Significant

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.
c. Based on positive ranks.

Appearance. Table 16 indicates the significant difference of the sensory acceptability level of condensed milk in the macaroons enriched with latik in terms of appearance.

A pair-comparison of the varied proportions found no significant variations in the acceptability level in terms of appearance across the treatments. This suggests that the macaroons supplemented with coconut curd are seen similarly by the three groups of responders.

Table 17. Differences in the Sensory Acceptability Level of Condensed Milk of Macaroons Enriched with Coconut Curd (LATIK) in terms of Color

Color			Z	Asymp. Sig. (2-tailed)	Description
Treatment 1 - Treatment 2			-.231[b]	.818	Not Significant
Treatment 1 - Treatment 3			-1.932[c]	.053	Not Significant
Treatment 2 - Treatment 3			-1.810[c]	.070	Not Significant

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.
c. Based on positive ranks.

Color. Table 17 shows the significant difference of the sensory acceptability level of condensed milk in the macaroons enriched with latik in terms of color.

A pair- comparison of the different proportions indicated that there are no significant variations in color acceptability across the treatments. This suggests that the macaroon supplemented with Coconut curd is perceived similarly by the three groups of responders.

Table 18. Differences in The Sensory Acceptability Level of Macaroons Enriched with Coconut Curd (latik) in Terms of Aroma

Aroma			Z	Asymp. Sig. (2-tailed)	Description
Treatment 1 - Treatment 2			-.230[b]	.818	Not Significant
Treatment 1 - Treatment 3			-.333[c]	.739	Not Significant
Treatment 2 - Treatment 3			-.660[c]	.509	Not Significant

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.
c. Based on positive ranks.

Aroma. Table 18 shows the significant difference of the sensory acceptability level of condensed milk in the macaroons enriched with latik in terms of aroma.

The pair-comparison of the various proportions is shown in table 18. It demonstrates that there are no significant changes in aroma acceptability between T1 and T2, z= - 0. T1 and T3, z=-0.660, p= 0.509; and T2 and T3, z=-0.660, p= 0.509. This indicates that all three categories of responders had similar opinions about the macaron enhanced with coconut curd (LATIK).

Table 19. Differences in the Sensory Acceptability Level of Macaroons Enriched with Coconut Curd (LATIK) in terms of Taste

Taste			Z	Asymp. Sig. (2-tailed)	Description
Treatment 1 - Treatment 2			-1.061[b]	.289	Not Significant
Treatment 1 - Treatment 3			-.218[c]	.828	Not Significant
Treatment 2 - Treatment 3			-1.850[c]	.064	Not Significant

Wilcoxon Signed Ranks Test
Based on negative ranks
Based on positive ranks

Taste. Table 19 reveals the evaluation of the three groups of respondents on the significant differences in the sensory acceptability level of macaroons enriched with latik as to taste.

A pair- comparison of the different proportions revealed that there are no significant differences in the acceptability level in terms of taste between T_1 and T_2, z= - 1.061, p= 0.289; T_1 and T_3, z=-0.218, p= 0.828; and T_2 and T_3, z=-1.850, p= 0.064. This indicates that all three categories of responders had similar opinions about the macaron enhanced with coconut curd (LATIK).

Table 20. Differences in the Sensory Acceptability Level of Macaroons Enriched with Coconut Curd (LATIK) in Terms of Texture

Texture			Z	Asymp. Sig. (2-tailed)	Description
Treatment 1 - Treatment 2			-1.420[b]	.155	Not Significant
Treatment 1 - Treatment 3			-1.554[c]	.120	Not Significant
Treatment 2 - Treatment 3			-3.467[c]	.001	Significant

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.
c. Based on positive ranks.

Texture. Table 20 reveals the evaluation of the three groups of respondents on the significant differences in the sensory acceptability level of macaroons enriched with latik as to texture

The pair- comparison of the different proportions indicated that there are no significant variations in texture acceptability between T1 and T2, z= - 1.420, p= 0.155; T1 and T3, z=- 1.554, p= 0.120; but substantial differences between T2 and T3, z=-3.467, p= 0.001.This suggests that respondents in treatment 1-treatment 2 and treatment 1-treatment 3 have the same opinions of macaroon acceptability, however there is a significant variation in texture for treatment 2-treatment 3.

The findings are reinforced by Respicio's (2020) study on the acceptability and marketability of banana blossom, maize silk, and bougainvillea as components in macaroons. The study found no significant variations in the acceptance of banana blossom, maize silk, and bougainvillea as ingredients in manufacturing macaroons with 50 grams, 75 grams, and 100 grams in terms of appearance, color, aroma, taste, and texture among the three groups of respondents.

Produced macaroons using condensed milk enriched with coconut curd (LATIK).

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Fig.3 Baked macaroons

The photograph shows baked macaroons, and based on the data acquired, the macaroons enhanced with coconut curd (latik) were acceptable and highly appreciated by the responders.

CONCLUSIONS

The macaroons with coconut curd were rated as desired and well received by the respondents.

The treatment 2 received the highest mean and greatest quality in terms of appearance, color, aroma, taste, and texture from the three groups of respondents.

There was a substantial variation in the respondents' evaluations of the baked items in treatments 2 and 3.

The produced macaroons were highly acceptable and desirable based on the evaluation of the respondents.

RECOMMENDATIONS

The macaroons might be used as an income-generating project for the school.

The proportion in treatment 2 could be used to make macaroons that can be introduced to the community.

To achieve the desired texture of macaroons preferred by the respondents, one must be well-versed in precise ingredient combination and time in baking.

Registering the utility model for preparing macaroons with coconut curd may be considered.

Future researchers and students may conduct research on various baked goods produced using latik or locally accessible raw ingredients to determine their utility and health benefits.

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