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Product Development of Tinapa Malunggay Noodles

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Abstract

The study aimed to develop Tinapa-Malunggay Noodles utilizing smoked fish(tinapa) and malunggay (moringa oleifera) as nutrient enhancers of noodles. The study's main objective was to develop a new variant of noodles with powdered tinapa and malunggay. Specifically, it sought answers to the following questions: (a) determine the possible formulations of tinapa-malunggay noodles; (b) determine the sensory characteristics of the three samples of tinapa-malunggay noodles in terms of appearance, aroma, taste, and texture; (c) determine the most preferred sample of tinapa-malunggay noodles. Using quantitative descriptive analysis, sensory qualities were analyzed, and a rank preference test was used to determine which sample of tinapa-malunggay noodles was more favored among the same participants. Developmental, evaluative, and descriptive methods were all utilized in the research methodology. The results of the research may help use locally available raw ingredients to create rich in nutrients, affordable, and consumer-pleasing food products utilizing powdered tinapa and malunggay powder.

Keywords: Tinapa-Malunggay Noodles, Product Development, Sensory Characteristics

1. Introduction

Today there are a lot of risks of many diseases around the world such as diabetes, high cholesterol, high blood pressure, and cardiovascular diseases. These diseases are said to be observed due to an unfit diet that is low in the nutrients our body needs, like dietary fiber, protein, carbohydrates, vitamins, minerals, fats, and antioxidants. Functional foods contain health welfare and help avoid diseases by incorporating ingredients that can provide optimum nutrients that can improve the nutrient value of the product. Another way to sustain the life of humans is by adopting the way of food processing and preservation. The main reason for undergoing food processing is to make sure that the food available in the market is microbiologically safe. Food processing can deliver and transform unsafe and unacceptable raw ingredients into palatable, edible, and desirable products. Food processing and food preservation may help to increase the demand for the development of a new product that can be helpful for the community and society as well.

In modern times, many products undergo food processing and preservation. The two are involved in developing a product that is considered processed food. The availability of processed food in the market is highly observed due to its convenience to consumers. The increasing demand for easy and convenient food products is now part of emerging trends.

An increasingly significant part of the human diet is noodles. However, based on customer preferences, they are provided in a variety of shapes and forms. Additionally, there are several variations, particularly

about the components, methods of processing, and quality of end-use. The nutrients most present in noodles are high in carbohydrates, vitamin B1, vitamin B2, and vitamin B3, minerals, dietary fiber, and amino acids which can promote good health to the consumers. One of the food products that are of high acceptability to all ages and can offer high nutritive value at a low cost is the noodles. It can be consumed any time of the day because it is capable of giving the body enough nutrients and energy that it requires to do daily tasks or activities. Noodles are molded and fried, or cooked in another way, made from wheat flour singly or with a combination of another kind of flour, starches, water, salt, oil, and other ingredients that can enhance the characteristic quality of the noodles.

Pancit, the Filipino local term for noodles, is a centerpiece in Filipino feasts along with rice as the staple food for every Filipino meal. It can already be considered as a dish meal if prepared with complete accompaniments like meat, fish, and vegetables. A staple at many important occasions, including weddings, christenings, graduations, and birthdays, pancit is a traditional Chinese food that is eaten to signify lifespan. Filipinos have been enjoying noodles in many different ways for years. The most popular varieties include sotanghon, bihon, pancit canton, and miki. In the Bicol Region, Pancit Bato is the popular noodles that originated in one of the municipalities of Camarines Sur known as Bato. The name of the noodle was taken from the name of the town. It has significant characteristics that became its identity and popularity. Through this initiative, the study considered creating and innovating new value-added noodles with a distinct feature by incorporating the tinapa and malunggay powder. The concept of the study is to develop unique and nutritious noodles that can be prepared without the addition of meat because it already has a source of protein incorporated in the processing of the noodles. Since the noodles are mixed with smoked fish or tinapa, it can already be accepted by young people and adults. The finished product is assured to be nutritious and affordable for every Filipino, especially those who belong to the marginalized group.

2. Objectives of the Study

This study aims to develop innovative and affordable noodles using tinapa powder and malunggay powder. Specifically, the study sought to answer the following questions:

1. What are the possible formulations of Tinapa-Malunggay Noodles?
2. What are the sensory characteristics of the three samples of Tinapa-Malunggay Noodles in terms of appearance (color), aroma, taste, and texture?
3. What is the most preferred sample of Tinapa-Malunggay Noodles?

3. Scope and Limitation

This study focuses on the development and evaluation of Tinapa- Malunggay Noodles utilizing tinapa powder and malunggay powder as primary ingredients. The product was subjected to the following process such as formulation of the product with three samples of different proportions, also Quantitative Descriptive Analysis (QDA) was evaluated by the panel of trained experts based on the sensory characteristics of the Tinapa-Malunggay Noodles in terms of appearance, aroma, taste, and texture. The study did not include tests for nutritional analysis, shelf life, microbial analysis, and sugar content.

4. Review of related literature and studies

According to the article " Joint research to improve Romblon’s smoked fish production and marketing forged” published by the National Fisheries Research and Development Institute. smoking is a

traditional and common fish preservation technique in the Philippines, giving the product its distinctive flavor, color, and aroma. The increasing demand for ready-to-eat packaged seafood products will contribute to the growth of the smoked fish market. “In the Philippines, smoking is one of the consumed processed fish, averaging 1.40 g/day per capita. The latest reports showed that Romblon produced 6,644 to 8,599 MT of fish from 2018 to 2020. However, most of the catch is sent to Lucena and Batangas because there is no processing facility on the island. Locals sell fish products they make in their backyards or buy from Lucena. This collaborative initiative on postharvest will address such concerns, generating income for Romblon fisherfolk. This research suggests the utilization of smoked fish in the development of the new product. This study by Andhikawati et. al (2021) smoking is one method that can be used to lessen fish damage and spoilage. Outlining the several ways that fish are smoked, their chemical makeup, and the quantity of microorganisms that are present. Nutrients like protein, fats, fiber, amino acids, minerals, and vitamins are still present in smoked fish. Smoked salmon is always safe for human eating since it inhibits the growth of microorganisms, particularly harmful ones, and even prevents some from growing. The study conducted by Hagos (2021) analyzed various smoking techniques and the smoked fish's microbiological quality. Fish is extremely perishable and quickly loses its freshness unless various preservation techniques are used. One way to preserve and maintain the safety and quality of fish and fish products is to smoke them. Products made from smoked fish are high in fat-soluble vitamins, unsaturated fatty acids, and essential amino acids. They are also regarded as healthy, ready-to-eat foods and are valued by consumers for their appealing flavor, color, and aroma. The study by Galoburda et al (2020) examines study results regarding the variables influencing the quality of smoked fish. Demand and the quantity of catching are rising yearly. Producers must maintain consistent quality throughout the year, which can occasionally be difficult for a variety of reasons. The quality of smoked fish is influenced by both the season and the method of preparation used. Crisostomo (2023) application of Allium species in the creation and sensory assessment of smoked fish flavors. The product's appearance, color, texture, flavor, odor, and scent were evaluated by both consumer and producer evaluators. The products' microbiological responsibilities were within permissible bounds. Groups of evaluators gave the product high acceptability ratings for both internal and external features. Producers gave several particular interior features a slightly lower but nonetheless positive rating. A study by Otilla et al. (2022) the microbiological quality and needs of smoked fish from a few businesses in Pasacao, Camarines Sur, and Naga City, Philippines, were evaluated. Seven businesses were chosen, and their processing methods were profiled, revealing that they varied from one another. Enterprises have very low compliance to organization, staff, equipment and utensils, and hygiene and sanitation criteria, according to an assessment of GMP compliance.

Only a small number of malunggay's many claimed therapeutic benefits have been validated by science. Consuming malunggay on a regular basis might significantly aid in reducing micronutrient deficiencies, which are still common in many regions of the nation, particularly in children. A study conducted by Thuy et al. (2023) assessed how the quality of noodles changed by acetylated starch (AS), konjac glucomannan (KG), and moringa leaf powder (MLP). Patel et. al (2023) Make noodles with rice flour, sorghum flour, and moringa leaf powder, and evaluate their proximate composition, antinutritional content, and sensory acceptability.In another study by Lanorio et al (2022) create palatable and nutrient-dense noodles with moringa and KALINGA mix. Bread flour, moringa powder, and KALINGA mix (rice, sesame seeds, and mung beans) were purchased in the Los Baños, Laguna, local market in order to make the noodles.

5. Research Methodology

This study considered three (3) phases in conducting the research activity: (1) Preparatory Phase, (2) Developmental Phase, and (3) Evaluation Phase. (1) In the preparatory phase, the researcher collected the good quality of raw materials such as the tinapa, all-purpose flour and malunggay. In the selection of the tinapa, it must be uniform in size and yellowish in color. The texture is presentable that it does not contain any molds that can cause food spoilage. The tinapa was deboned and flaked, oven dried to facilitate powderizing. Likewise, other ingredients like all-purpose flour, water, oil, egg, garlic powder, onion powder and black pepper were prepared prior to the actual development of the product. The needed tools and equipment were also prepared like the measuring tools, noodle maker, cooking tools, mixing tools, and trays for drying. (2) In this study, three samples were formulated for Tinapa-Malunggay powder to determine the most acceptable proportion. The formulations contain different amounts of tinapa powder and malunggay powder but the same amount of minor ingredients like all-purpose flour, water, oil, egg, garlic powder, onion powder and black pepper (3) In the evaluation phase the researcher conducted subjective evaluation in answer to the sensory characteristics of the product. For the subjective evaluation it was focused on the sensory evaluation based on the sensory characteristics of the Tinpa-Malunggay Noodles in terms of appearance, aroma, taste and texture. It was done by the trained panelists and experts from the Food Technology and Food Service Management students and faculty. Quantitative Descriptive Analysis was used in this evaluation. Likewise, after the evaluation, the three samples of tinapa-malunggay noodles were ranked to get the best sample.

6. Results and Discussion

Table 1. Tinapa-Malunggay Noodles

Sample 1	Sample 2	Sample 3
20 grams powdered tinapa	25 grams powdered tinapa	30 grams powdered tinapa
2 tablespoon malunggay powder	2 tablespoon malunggay powder	2 tablespoon malunggay powder

Table 1 shows three formulations for Tinapa-Malunggay Noodles, differing primarily in the amount of tinapa powder and malunggay powder, Sample 1 contains the less amount of powdered tinapa (20 grams), which likely gives it firm texture and less pronounced powdered tinapa and malunggay flavor. Sample 2, with 25 grams of powdered tinapa, offers a middle-ground option, while Sample 3, with 30 grams powdered tinapa produces the highest pronounced tinapa flavor. The consistent use of 2 tablespoon malunggay powder in each sample provides balance and enhances the noodle's texture. By varying the amount of powdered tinapa and malunggay powder, each sample offers different intensities and textures, guiding further experimentation.

Table 2. Sensory Characteristics of Tinapa-Malunggay Noodles

Sensory At-tributes	Sample 1		Sample 2		Sample 3	
	Mean	Description	Mean	Description	Mean	Description
Appear-ance: Color	3.8	Light Green	3.8	Light Green	3.8	Light Green

Aroma: Tinapa Aroma	2.9	Moderate Aroma	3.4	Moderate Aroma	3.9	Moderate Aroma
Taste: Tinapa Taste	2.7	Pronounced	2.9	Pronounced	3.2	Pronounced
Texture	2.1	Firm	2.4	Firm	2.8	Firm

Legend: Appearance (Color) – 0-1.9 Very Light Green; 2.0-3.9 Light Green; 4.0-6.0 Very Dark Green
Aroma – 0-1.9 Weak; 2.0-3.9 Moderate; 4.0-6.0 Strong
Taste – 0-1.9 Less Pronounced; 2.0-3.9 Pronounced; 4.0-6.0 Very Pronounced
Texture – 0-1.9 Soft; 2.0-3.9 Firm; 4.0-6.0 Very Firmed

The emphasis of the sensory evaluation was on appearance (color), aroma, taste, and texture. Results of the sensory evaluation were collected through statistical analysis using arithmetic mean. Using Quantitative Descriptive Analysis score sheets, the Tinapa-Malunggay Noodles were characterized. Scores given by the thirty (30) respondents from the 4th year BS Food Technology students and Food Service Management students and faculty who are considered as trained panelists and experts in one of the State University in Bicol, were measured from the scales. The sensory evaluation revealed in Table 1, that while color was consistent across all samples, it did nt significally differentiate consumers preferences. Aroma profiles were relatively similar, with a moderate presence of tinapa aroma. Taste assessments indicated a balanced flavor profile for all samples, with sample 3 standing out due to a more pronounced tinapa taste. Texture emerged as a firm texture for all samples. The sensory evaluation provides valuable data on determining the sensory characteristics of tinapa- malunggay noodles in terms of their appearance, aroma, taste and texture.
In the study of Junio (2024) about the product development of Coco-Squash Spread, the study utilized Quantitative Descriptive Analysis whereas in the present study, the researcher also used the QDA to evaluate the product in terms of the sensory characteristics in terms of appearance, aroma, taste and texture.

Table 3. Most Preferred Sample

Sample	Arithmetic Mean	Rank
1	2.2	3rd
2	1.9	2nd
3	1.8	1st

Among the three samples presented to the panelists, one sample emerged as the most preferred product based on the Rank Preference Test conducted among the 30 trained/expert panelists. Through the rank preference test, the panelists of evaluators ranked the three samples based on their preferred best sample up to the least liked. The lower mean score on the rank preference test will be the first and the sample with the highest mean score will automatically be ranked third. Respondent preference leaned heavily towards Sample 3, followed by Sample 2, and then Sample 1. This preference is primarily attributed to Sample 3's superior performance across sensory attributes and overall acceptability. The relative proportions of key ingredients significantly influenced product quality. The clear preference for Sample

3 underscores the significant impact of ingredient ratios on product quality. This suggests that optimizing the formulations of Samples 2 and 1 to more closely align with Sample 3 could elevate their overall acceptability. Given the substantial lead of Sample 3, marketing efforts should prioritize this product while leveraging its success to drive consumer interest in the entire product line. Moreover, in-depth analysis of the specific qualities that make Sample 3 so appealing can inform the development of future, improved products within the Tinapa-Malunggay Noodles category.

The study by Junio (2024) on the formulation of Coco-Squash Peanut Nutri Bar, in the study, identified the most preferred product based on the evaluation of the panelists, panelists considered trained experts in evaluating the product.

7. Recommendations

To ensure the successful development and commercialization of Tinapa-Malunggay Noodles, several critical aspects require further exploration. Firstly, conducting a comprehensive nutritional analysis is recommended to assess the noodle's macronutrient and micronutrient content, with a particular focus on fiber, vitamins, and minerals derived from powdered tinapa and malunggay powder. This information will be valuable for promoting noodles as a nutritious, plant-based food. Secondly, microbial testing is vital to guarantee product safety by identifying potential bacterial or fungal contaminants, ensuring consumer health, and meeting food safety standards. Additionally, a shelf-life study should be undertaken to determine how long the noodles remain fresh and safe under various storage conditions. This research will help identify optimal storage methods and the potential need for preservatives, both of which are essential for retail. Emphasizing its unique flavor combination and health benefits can attract health-conscious consumers seeking innovative foods. Conducting market research will provide insights into consumer preferences and competitive pricing, maximizing the product's market appeal and commercial potential.

8. Conclusion

The study reveals that varying the proportions of powdered tinapa and malunggay powder significantly impacts sensory attributes, on its appearance, aroma, taste and texture, which are critical to consumer preference. Among the samples, the panelists consistently favored Sample 3 with the highest powered tinapa and malunggay powder due to its optimal balance of flavor, texture and overall acceptability, outperforming the other samples. The results indicate that adjusting the formulations of Sample 2 and 3 to match the attributes of Sample 3 more closely could improve their consumer appeal. Sample 3 should be prioritized for market introduction, leveraging its sensory appeal to build consumer interest and brand recognition for the Tinapa-malunggay Noodles product line. These insights provide a foundation for refining the product and exploring additional enhancements to meet consumer expectations effectively.

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