Processing of Taro (Leaves) Into Crackers

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Abstract

In the transformation from taro leaves to our exceptional crackers, meticulous attention to quality defines our approach. We started by selecting finest taro leaves, prioritizing its freshness and flavor. These leaves undergo thorough cleaning and preparation in upholding rigorous sanitary regulations. A precisely standardized production line then it converts the taro leaves into flavorful crackers, using a unique blend of ingredients for enhancement of its taste and texture. The baking or dehydration process is implemented with accuracy to achieve a perfect balance, resulting in a crisp and satisfying cracker. Throughout this journey, we remain dedicated to incorporating expert and customer feedback. Utilizing Likert scale surveys and statistical measures like the median, we analyze input rigorously. This ensures that our crackers, consistently exceed the expectation and it will reflect our commitment to quality and innovation. Our aim is not just to meet but to surpass the perceptive taste of our audience. From the start to finish, our procedure reflects a persistent pursuit of excellence. From start to finish, our process reflects its determined pursuit of excellence. Each step is instilled with expertise and care, culminating in a taro cracker that embodies our dedication to its quality and customer satisfaction. Our commitment to innovation and enhancement drives us to move forward, ensuring that our crackers continue to impress and delight in every bite.

Keywords: *taro, gabi leaves, chips, Colocasia esculenta*

INTRODUCTION

Taro leaves, the verdant foliage of the Colocasia esculenta plant, boast a distinct appearance characterized by large, heart-shaped leaves with vibrant shades of green. These leaves are not only visually striking but also hold significant cultural and culinary importance in many regions around the world. Beyond their aesthetic appeal, taro leaves are known for their nutritional richness and potential health benefits.

In this study, we embark on a journey to explore the multifaceted nature of taro leaves, beginning with an examination of their physical characteristics and cultural significance. From their broad, heart-shaped forms to their deep green hues, taro leaves captivate the senses and serve as a symbol of abundance and vitality in various cuisines.

Expanding our perspective globally, we delve into the broader context of taro (Colocasia esculenta) as a staple crop in many cultures. Renowned for its starchy corms, taro holds a revered status in traditional cuisines across Asia, Africa, the Pacific Islands, and the Caribbean. However, while the tuberous roots of taro often steal the spotlight, the nutritional potential and culinary versatility of its leaves remain underexplored.

Transitioning from the cultural and botanical realms to the realm of human health and nutrition, we investigate the myriad benefits that taro leaves offer to our bodies. Rich in essential nutrients such as vitamins, minerals, and dietary fibers, taro leaves contribute to a balanced diet and promote overall well-being. Research suggests that regular consumption of taro leaves may support digestive health, bolster immune function, and mitigate the risk of chronic diseases, making them a valuable addition to any diet.

By weaving together the botanical, cultural, and nutritional dimensions of taro leaves, this study aims to illuminate their significance as not just a culinary ingredient but also a source of nourishment

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and vitality for individuals and communities worldwide.

Taro (Colocasia esculenta) stands as a testament to the rich tapestry of agricultural diversity across the globe. Revered for its starchy corms, taro has long been a staple crop in many regions, serving as a reliable source of sustenance and cultural significance. However, amidst the spotlight cast upon its tuberous roots, the verdant bounty of taro leaves often languishes in relative obscurity. Despite boasting significant nutritional value and culinary potential, taro leaves remain underutilized and underappreciated.

In response to this oversight, this thesis endeavors to shed light on the latent potential of taro leaves by exploring their transformation into crackers, a novel food product with the promise of both palatability and nutritional richness. By focusing on the processing of taro leaves into crackers, this study aims to bridge the gap between tradition and innovation, harnessing the versatility of taro to create value-added products that resonate with contemporary dietary preferences.

This research delves into the intricacies of processing taro leaves into crackers, with the overarching goal of assessing their acceptability as a novel food product. Through sensory evaluation and consumer feedback, the study seeks to elucidate the feasibility and potential of taro leaf crackers as a sustainable and culturally relevant addition to the culinary landscape.

Globally, there is a burgeoning interest in diversifying food sources and promoting sustainable agricultural practices to address the challenges of food security and environmental sustainability. Taro, with its rich history and widespread cultivation, occupies a unique position in this discourse. Across various cultures and cuisines, taro leaves have been utilized in traditional dishes, attesting to their cultural significance and culinary versatility. However, the exploration of innovative applications for taro leaves, such as their incorporation into crackers, remains a relatively uncharted territory. This study aligns with international efforts to unlock the potential of underutilized crops and by-products, contributing to the global conversation on sustainable food systems and culinary innovation (Winarto, B., & Okada, K. 2019).

In the Philippines, taro, locally known as "gabi," holds a special place in the culinary repertoire and agricultural landscape. Both its corms and leaves feature prominently in traditional dishes, reflecting the country's rich culinary heritage and agricultural diversity. However, despite the abundance of taro cultivation, the utilization of taro leaves beyond conventional cooking methods is limited. This study seeks to fill this gap by exploring value-added products from taro leaves, specifically focusing on the development of taro leaf crackers. By tapping into local resources and culinary traditions, the research aims to contribute to the resilience of Philippine food systems while creating economic opportunities for small-scale farmers and food entrepreneurs (Dizon 2017).

The rationale for this study is grounded in the imperative to promote food security, enhance nutritional diversity, and foster sustainable agricultural practices. Given projections of the world's population reaching 9 billion people by 2050, there is a growing urgency to find new sources of nutrients while alleviating dependence on monoculture. The availability of taro leaves and their rich nutrient composition offer an opportunity to address these pressing needs. It is hoped that by producing taro leaf crackers, this idea can introduce a novel, easy, and delicious way to consume the crop, which may provide more people access to it and improve nutritional consumption. Moreover, by engaging consumers in the acceptability assessment, the research endeavors to ensure that the developed product aligns with local tastes and preferences, fostering sustainability and cultural relevance in food innovation. (Thiele 2018)

Literature Review

Origin

Taro (Colocasia esculenta) is believed to have originated in Southeast Asia, specifically in regions encompassing India and Malaysia. As one of the earliest cultivated plants, taro has a long history of domestication, with archaeological evidence suggesting its cultivation dating back to at least 28,000 years ago. Over time, taro spread across the globe through human migration and trade, becoming established in various tropical and subtropical regions (Kolenchenko et. al. 2016).

Characteristics

Taro leaves exhibit distinctive features that contribute to their culinary and cultural significance. Typically, large and heart-shaped, taro leaves boast a rich green coloration and a waxy texture. They are characterized by prominent veins and a slightly rough surface, contributing to their resilience and durability. The leaves emerge from a central stem and can grow to impressive sizes, making them a visually striking component of the taro plant (Deka et. al. 2014).

Benefits and Harmful Effects

Taro leaves are renowned for their nutritional richness and health-promoting properties. They are a good source of iron, calcium, vitamin C, and other important vitamins and minerals. Taro leaves also include antioxidants and dietary fibers that support healthy digestion and general wellbeing. Eating taro leaves has been linked to better immune system function, better digestion, and a lower chance of developing chronic illnesses.

However, it's important to note that raw taro leaves contain calcium oxalate crystals, which can cause irritation and discomfort if ingested in large quantities (Singh 2016). Proper cooking methods, such as boiling or steaming, can help mitigate the potential harmful effects of these crystals, rendering taro leaves safe for consumption.

Product Development from Taro and Other Research

Taro's versatility extends beyond its corms, with various studies exploring alternative uses for different parts of the plant, including the leaves. In addition to traditional culinary applications, researchers have investigated the development of value-added products from taro leaves, such as taro leaf powder, taro leaf extract, and taro leaf-based snacks. These efforts aim to maximize the nutritional value and economic potential of taro, while also promoting sustainable agricultural practices.

Furthermore, there is growing interest in utilizing taro leaves as a source of functional ingredients in food formulations. Studies have demonstrated the antioxidant, antimicrobial, and anti-inflammatory properties of taro leaf extracts, suggesting their potential applications in the food and pharmaceutical industries. Such research underscores the importance of exploring the diverse bioactive compounds present in taro leaves and their implications for human health and well-being (Valentina 2014).

Related Studies

Several studies have investigated various aspects of taro leaves, ranging from their nutritional composition to their culinary uses and medicinal properties. For instance, research has explored the impact of cooking methods on the nutritional quality of taro leaves, as well as their sensory attributes and consumer acceptance. Other Research has been directed towards... on the phytochemical composition of taro leaves and their potential therapeutic effects, including their role in managing diabetes, hypertension, and inflammatory conditions (Fransiska 2018). These studies contribute to our understanding of taro leaves as a valuable resource with diverse applications in food, nutrition, and health.

Other research has been directed towards the phytochemical composition of taro leaves and their potential therapeutic effects, including their role in managing diabetes, hypertension, and inflammatory conditions. For instance, a study by Odu et al. (2012) analyzed the phytochemical constituents of taro leaves and identified significant levels of flavonoids, saponins, and tannins, which are known for their antioxidant properties. Another study by Sharma et al. (2017) demonstrated the hypoglycemic effects of taro leaf extracts in diabetic rats, suggesting potential benefits for blood sugar regulation. Similarly, research by Agu et al. (2019) indicated that taro leaf extracts could help reduce blood pressure by promoting vasodilation, making them beneficial for managing hypertension. In addition to their health benefits, taro leaves have been studied for their potential in sustainable agriculture and environmental management. For example, Oki et al. (2015) discussed the use of taro plants in phytoremediation projects, highlighting their ability to accumulate heavy metals from contaminated soils.

Conceptual Framework

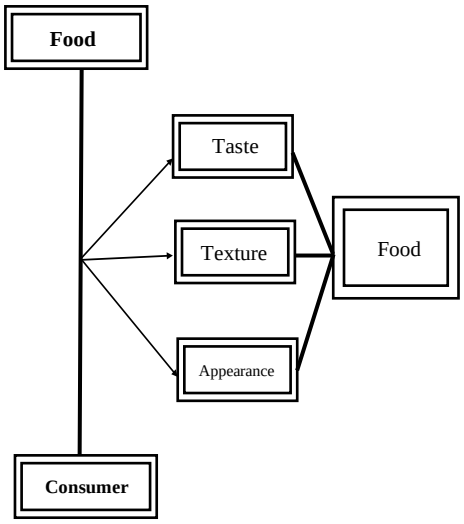

Figure 1. Hedonic Scaling Framework

The researchers used a Hedonic Scaling Framework to perceive and gather the perception between the consumers and food experts about the chicken-enriched pasta in terms of taste, texture, appearance and to determine its general acceptability as a food.

Statement of Objectives

The main objective of this research is to accomplish the following aims: developing high-quality Taro Leaves Crackers that will be widely enjoyed for their delicious flavor, consistent excellence, and inherent health benefits.

1. To Process Taro Leaves into Crackers.
2. To Subject Taro Crackers into Food validation from experts: in terms of
   2.1 Taste
   2.2 Texture
   2.3 Appearance
3. To Subject Taro Crackers to food acceptability among Consumers in term of:
   3.1 Taste
   3.2 Texture
   3.3 Appearance
4. To Determine the general acceptability of Taro Crackers among food expert and consumer.
   4.1 Taste
   4.2 Texture
   4.3 Appearance

Scope and Delimitation

In this study, 40 random persons around Angeles City, and 10 food experts that has 5 years' experience in Food Industry in Angeles City, who will be the respondents in conducting our research survey. The main purpose is to develop a product and using the Taro leaves to avoid wastes. This study considers the steps in preparation to production of Taro Leaves Crackers. Each of the respondents are given the same questionnaires for them to answer.

METHODS

Research Design

This study will adopt the process of both quantitative and experimental research designs to systematically collect and analyze data from diverse sources, aiming to establish a process for innovatively developing Taro Leaves into crackers.

Respondents

The respondent in this study consists of 40 random persons in Angeles City, Pampanga. These individuals possess the requisite knowledge to address the issues presented in our study. They will respond to the questionnaire provided, supplying the necessary information for our research. We aim to gather responses from a maximum of 60 third-year college participants through a survey, seeking insights related to our product.

Sample and Sampling Technique

This study is focused on assessing the preferences and feedback regarding Taro leaves crackers among a selected group of the research primarily aims to understand the acceptance of Taro leaves crackers as a sustainable snack option within this specific group. However, it does not extend to a broader population or other types of snacks. Additionally, the study is limited to use of printed Likert scale questionnaires for data collection.

According to Rensis, Likert, Likert scale is a question which is a five-point or seven-point scale. The choices range from Strongly Agree to Strongly

Disagree so the survey maker can get a holistic view of people's opinions. All Likert scales also include a mid-point e.g., neither agree nor disagree, for those who are neutral on the subject matter. In summary, a Likert scale is the survey. The statements and response types are a means of scaling or gauging attitudes. A Likert scale is a question with 5 or 7 potential response options. With the choices varying from Strongly Agree to Strongly Disagree, the survey designer can obtain a comprehensive perspective of people's opinions and even the degree of agreement. Additionally, all Likert scale survey questions contain a mid-point, which is for those who are neutral on the matter (Likert, 2011).

Research Instrument

The questionnaires utilized in this study are structured as checklists aimed at collecting data on the transformation of guava fruit into a product resembling strawberry jam, with a focus on its health benefits. These questionnaires are designed to gather insights regarding taste, aroma, texture, and appearance of the product. Respondents will provide their feedback by indicating whether each aspect is deemed acceptable or not, with responses recorded by checking appropriate boxes.

Data Collection Procedure

In our comprehensive evaluation of our taro (leaves) crackers, we used a Likert scale survey methodology to gather insights from both expert evaluators and customers. The survey questionnaire was thoughtfully designed to cover various dimensions crucial to the product experience, including taste, texture, appearance, and overall satisfaction. A selected panel of food experts, renowned for their expertise in product evaluation, participated in rigorous sessions where they provided nuanced feedback on each aspect of our taro (leaves) crackers. Simultaneously, we distributed surveys among our diverse customer base, encouraging them to share their honest opinions and preferences. The Likert scale, with its structured response format, allowed us to quantitatively measure perceptions, enabling a detailed analysis of the strengths and areas for improvement in our product. The collected data serves as a valuable foundation for refining our taro (leaves) crackers and ensuring they align with the expectations and preferences of both industry experts and customers.

Data Analysis Method

In our research on the processing of Taro leaves into crackers, we will utilize a structured data analysis approach. Following the collection of hard-copy survey responses, we will begin with data entry, carefully transcribing the responses into an electronic format to ensure accuracy. Subsequently, data cleaning procedures will be applied to identify and rectify any errors or inconsistencies in the collected data. The analysis phase willing compass descriptive statistics, including frequency distribution (f), percentage (%), and mean. This approach will enable us to assess the distribution of responses across categories, ranging from Strongly Agree (4) to Strongly Disagree (1). Any open-ended survey responses will undergo qualitative analysis to identify recurring themes.

The data analysis results will be interpreted in line with our research objectives, allowing us to draw meaningful conclusions and present them clearly in our research report, shedding light on preferences and feedback regarding Taro leaves crackers within the surveyed groups."

Hedonic Scale

Interval Scale	Verbal Scale	Abbreviation
4	Strongly Agree	SA
3	Agree	A
2	Disagree	Da
1	Strongly Disagree	SDa

Food Acceptability Scale

Interval Scale	Verbal Descriptor
3.26 – 4.00	Highly Acceptable
2.26 – 3.25	Acceptable
1.76 – 2.25	Slightly Acceptable
1.00 – 1.75	Not Acceptable

Statistical Treatment

In our detailed statistical analysis of the taste, texture, and appearance evaluations for our taro crackers, we focused on the utilization of the median as a key measure. The median, chosen for its ability to provide a central value unaffected by extreme scores, played a pivotal role in determining

the typical response within each dimension. The results of our research demonstrate that the median values for taste, texture, and appearance all fell within the categories of highly acceptable and acceptable. This statistical approach not only highlights the overall favorable reception of our taro crackers but also underscores the reliability and consistency of our product's positive assessment by both expert evaluators and customers.

Hedonic Scale

Interval Scale	Verbal Scale	Abbreviation
4	Strongly Agree	SA
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Food Acceptability Scale

Interval Scale	Verbal Descriptor
3.26 – 4.00	Highly Acceptable
2.26 – 3.25	Acceptable
1.76 – 2.25	Slightly Acceptable
1.00 – 1.75	Not Acceptable

Ethical Considerations

In the preparation for distributing printed survey questionnaires to the designated respondents, the researchers undertook a conscientious process of seeking and obtaining explicit permission or consent. This step adhered to established ethical research standards, emphasizing the importance of respecting participants' autonomy and ensuring that they willingly engage in the study. Furthermore, the researchers took the initiative to inform the respondents about the specific objectives of the research. This transparent communication served a dual purpose: it not only met ethical guidelines but also empowered the participants by providing them with a clear understanding of how the study directly related to their experiences or perspectives.

RESULTS

Recipe of the Develop Product (Taro Leaves Crackers)

A. Ingredients

Quantity	Ingredients
1 Kilo	Powdered Taro Leaves
1 ½ Kilo	Tapioca Flour
1 ½ Kilo	Wheat flour
2 Cups	Cooking Oil
1Table spoon	MSG
1 Cup	Vegetable Oil
1/2 Cup	Water

B. Tools and Materials

Frying Pan	Spatula
2 Tongs	Whisk
Strainer	3 Bowl
Mixing Bowl	Plate
Rolling pin	Dehydrator
Blender	Knife
Frying Pan	Spatula
2 Tongs	Whisk

C. Product Costing

Ingredients	Quantity	Price	Recipe Needed	Cost for the Recipe
Powdered Taro Leaves	1 kg	₱50	50 grams	₱25
Wheat Flour	1 ½ kg	₱65	60 grams	₱32
Tapioca Flour	1 ½ kg	₱50	150 grams	₱30
Cooking Oil	2 cups	₱50	1 cup	₱25
MSG	1 sachet	₱10	1 tsp	₱2
Vegetable Oil	1 1/2 cup	₱150	2 tsp	₱30
Other Expenses (utilities, electricity and gas)		₱100		
			Total	**₱144**

TOTAL: ₱144 = 60 grams of Taro Crackers

D. Procedures

1. To make the Taro Leaves powder, use the blender to make a powder of Taro Leaves, continue to blend it until the leaves became a fine powder.


2. Prepare the ingredients and cooking tools needed for the taro leaves crackers.


3. In a separate bowl, combine wheat flour, tapioca starch, and MSG.


4. Gradually add water to the dry ingredients, mixing until you get a smooth. Incorporate the grated taro and mix well.


5. Once the flatten dough is cut into bite size, then steam the square sheets. For 30 minutes.

6. After steaming the taro leaves square sheets, cut them into bite size shape.


7. After cutting the Taro sheets into bite sizes, it is ready for dehydration process. Dehydrate using the dehydrator for at least 8 hours to remove the excess water in the dough.

8. After 8 hours of dehydrating its already to fry. Heat vegetable oil in a pan for frying. Scoop a small, flat rounds. Ensure they are not too thick.

9. Fry the taro crackers until they expand, turn golden brown on both sides. This should take a few minutes. Remove the crackers from the oil and place them on a tissue paper to drain excess oil.

Food Taste Testing Feedback from the Experts

After the Taro Leaves Crackers was developed, the product was subjected to food testing among experts. Criteria to check the food acceptability of the Taro Leaves Crackers includes taste, appearance, and texture.

Taste

Taste involves the sensory ability to discern flavors and assess various attributes of food and drinks. This sense is among the five main ones, alongside sight, hearing, touch, and smell.

Table 1. Processing of Taro Leaves into Crackers in terms of Taste

#	Indicators	Rating	Verbal Interpretation
1	The Taro (Leaves) crackers leaves a pleasant taste.	3	Strongly Agree
2	The Taro (Leaves) crackers is delicious and flavorful	3	Strongly Agree
3	The Taro (Leaves) crackers have appropriate level of saltiness.	3	Strongly Agree
4	The Taro (Leaves) crackers are well-balanced in terms of seasonings.	3	Agree
5	The Taro (Leaves) crackers is consistent with my expectations for the type of snacks.	4	Strongly Agree
	Mean	**3.20**	**Acceptable**

Appearance

Appearance refers to the way food appears or looks in terms of its color, texture, shape, and overall presentation. It is an essential aspect of food appreciation and can significantly impact our perception and enjoyment of a dish.

Table 2. Processing of Taro (Leaves) into Crackers in terms of Appearance

#	Indicators	Rating	Verbal Interpretation
1	The Appearance of the Taro (Leaves) crackers is visually appealing	4	Strongly Agree
2	The presentation of the Taro (Leaves) crackers is appetizing	3	Agree
3	The visual elements of the Taro (Leaves) crackers align with my expectation for a high-quality snack product	4	Strongly Agree
4	The overall presentation of the Taro (Leaves) crackers stands out among similar snack product.	3	Agree
5	The size and shape of the Taro (Leaves) crackers are visually appealing	3	Agree
	Mean	**3.40**	**Highly Acceptable**

Texture

Food texture pertains to the physical attributes of what we consume, encompassing factors like consistency and mouthfeel. It encompasses qualities like firmness, tenderness, smoothness, roughness, chewiness, crispness, or silkiness. This aspect significantly contributes to our pleasure, flavor perception, and overall.

Table 3. Processing of Taro (Leaves) into Crackers in Terms of Texture

#	Indicators	Rating	Verbal Interpretation
1	The Taro (Leaves) crackers in consistently crispy	3.5	Strongly Agree
2	The Taro (Leaves) crackers maintains its crunchiness even after stored for a while	3	Strongly Agree
3	The texture of the Taro (Leaves) crackers is consistent with my expectations for a high-quality snack.	4	Strongly Agree
4	The Taro (Leaves) crackers provide a satisfying mouthfeel when you bite it.	3.5	Strongly Agree
5	The texture of the Taro (Leaves) crackers is pleasant and enticing.	4	Strongly Agree
	Mean	3.60	Highly Acceptable

General Food Acceptability

Denotes the overall readiness of individuals or a collective to embrace a specific food type or adopt particular food practices. This encompasses elements like flavor, texture, appearance, cultural inclinations, dietary constraints, and personal convictions.

Table 4. Overall Food Acceptability of Processing Taro (Leaves) into Crackers

According to Food Experts		
Criteria	**Rating**	**Food Acceptability Level**
Taste	3.20	Highly Acceptable
Appearance	3.40	Acceptable
Texture	3.60	Highly Acceptable
General Food Acceptability	**3.40**	**Highly Acceptable**

Food Taste Testing Feedback from the Consumers

Taste

Taste involves the sensory ability to discern flavors and assess various attributes of food and drinks. This sense is among the five main ones, alongside sight, hearing, touch, and smell.

Table 5. Food Acceptability of Processing Taro (Leaves) into Crackers in Terms of Taste

#	Indicators	Rating	Verbal Interpretation
1	The Taro (Leaves) crackers leaves a pleasant taste.	4	Strongly Agree
2	The Taro (Leaves) crackers is delicious and flavorful.	3	Agree
3	The Taro (Leaves) crackers have appropriate level of saltiness.	3	Agree
4	The Taro (Leaves) crackers are well-balanced in terms of seasonings.	3	Agree
5	The Taro (Leaves) crackers is consistent with my expectations for the type of snacks.	3	Agree
	Mean	**3.20**	**Acceptable**

Appearance

Appearance refers to the way food appears or looks in terms of its color, texture, shape, and overall presentation. It is an essential aspect of food appreciation and can significantly impact our perception and enjoyment of a dish.

Table 6. Food Acceptability of Processing Taro (Leaves) into Crackers in Terms of Appearance

#	Indicators	Rating	Verbal Interpretation
1	The Appearance of the Taro (Leaves) crackers is visually appealing.	3	Agree
2	The presentation of the Taro (Leaves) crackers is appetizing.	3	Agree
3	The visual elements of the Taro (Leaves) crackers align with my expectation for a high-quality snack product.	3	Agree
4	The overall presentation of the Taro (Leaves) crackers stands out among similar snack product.	3	Agree
5	The size and shape of the Taro (Leaves) crackers are visually appealing	3	Agree
	Mean	3	Acceptable

Texture

Food texture pertains to the physical attributes of what we consume, encompassing factors like consistency and mouthfeel. It encompasses qualities like firmness, tenderness, smoothness, roughness, chewiness, crispness, or silkiness. This

aspect significantly contributes to our pleasure, flavor perception, and overall.

Table 7. Food Acceptability of Processing Taro (Leaves) into Crackers in Terms of Texture

#	Indicators	Rating	Verbal Interpretation
1	The Taro (Leaves) crackers in consistently crispy	3	Agree
2	The Taro (Leaves) crackers maintains its crunchiness even after stored for a while	3	Agree
3	The texture of the Taro (Leaves) crackers is consistent with my expectations for a high-quality snack.	3	Agree
4	The Taro (Leaves) crackers provide a satisfying mouthfeel when you bite it.	3	Agree
5	The texture of the Taro (Leaves) crackers is pleasant and enticing.	3	Agree
	Mean	3	Acceptable

General Food Acceptability

Denotes the overall readiness of individuals or a collective to embrace a specific food type or adopt particular food practices. This encompasses elements like flavor, texture, appearance, cultural inclinations, dietary constraints, and personal convictions.

Table 8. Overall Food Acceptability of Processing Taro (Leaves) into Crackers

According to Food Experts		
Criteria	**Rating**	**Food Acceptability Level**
Taste	3.20	Acceptable
Appearance	3	Acceptable
Texture	3	Acceptable
General Food Acceptability	**3.07**	**Acceptable**

DISCUSSION

Data of the Taro Leaves into Crackers after the tasting of Experts.

Table 1 shows the results of the processing of Taro Leaves into crackers, as evaluated by food experts based on both the results and taste. The findings indicate that the majority of experts strongly agreed, with a mean rating of 4, regarding the saltiness and seasonings of Taro Leaves Crackers. Consequently, in terms of taste, food experts rated the Taro Leaves Crackers as acceptable, with a total score of 3.20. According to a Chef publish by Healthier Steps in (2023) to achieve a well-balanced saltiness in taro chips, place the taro slices in a bowl and gently toss them with olive oil, adding garlic and salt to taste. As a result, Taro Leaves Crackers attained the desired taste, as agreed upon, earning a rating of 4 due to the well-seasoned nature of the crackers. This aspect is considered a significant factor in the product's acceptability.

Table 2 Presents the assessment of the Taro Leaves Crackers' appearance by food experts yielded unanimous agreement, with an average rating of 3.40. Experts found aspects like the crackers' appealing color and suitable size to be satisfactory. In summary, the overall evaluation from the experts indicates that the appearance of the Taro Leaves Crackers is deemed acceptable.

According to Wibisono (2019) Taro chips with an initial average moisture content of 77.28±1.7%(db.) were dried in a custom laboratory scale hot-air dryer with static tray type at selected hot air temperatures 50, 60, 70 C. Hence the moisture content, drying rate, and moisture ratio through drying were

observed and determined. The fitted 12 existed thin layer drying models using the calculated moisture ratio data. Taro leaves crackers produced acceptable appearance and rated highly scored in the assessment by the food experts.

Table 3 describes the results of Processing of Taro (Leaves) into crackers. The result show that majority of the food experts rated a mean 3.60 in all indicators which is interpreted as agree in terms of crunchiness, thinness, roughness of the Taro Crackers. However, as an overall evaluation of the table in terms of texture, food experts gave Taro (Leaves) Crackers a rating of 4, which is recognized as highly acceptable.

Based on the publish article about Immaculate bites by African bites (2021), Taro chips from Vietnam, which are thin slices of taro that have been fried. Taro is a root vegetable that is starchy and grown in tropical and subtropical environments. A crisp texture and mild nutty flavor make plain taro chips to consume on their own or with a range of spices and dips. Taro is generally boiled, baked, and sometimes mashed and served with vegetables but is rarely fried.

The result of Processing of Taro (Leaves) into Crackers for foods experts as shown in the table 4. The taste of the Processing of Taro (Leaves) into crackers a rated score of 3.40 which is considered acceptable, while the appearance and texture received ratings of 3 and are both considered acceptable. In addition, for an overall acceptability of Taro (Leaves) Crackers Acceptable among the food expert's evaluation which is has been rated 3.40. This will reflect on the product's acceptability in terms of taste, appearance, and texture; hence it shows that the product has successfully obtained the desired feedback from food expert's ratings.

As stated by Black wood (2019), Taro can be substituted for potato and is usually prepared as you would a potato, that's the reason I decided to prepare taro chips. Taro has a deeper, and nuttier flavor than a potato, it has a thick starchy texture when boiled. It can also be fried, or roasted.

Data of the Taro Leaves into Crackers after the tasting of Consumers

Result derived from the data regarding the BTVTED student's perceptions towards the Taste of Taro Leaves Crackers is shown in table 5. The overall mean for saltiness and coating in Taro Leaves Crackers is pleasing to the eye, with a mean of 3.20 interpreted as acceptable. Consequently, the appearance of the Taro Leaves Crackers is deemed acceptable.

According to Vietnam (2023), These taro chips are hand-peeled, thinly sliced, cooked until crisp, and lightly seasoned with sea salt. Option for plain or lightly salted taro chips over flavored ones that may contain added sugars or artificial ingredients. Given the information presented, Taro Leaves Crackers demonstrated the desired texture and received strong approval from food experts.

The results related to the appearance of Taro Leaves Crackers, as shown in Table 6, the overall mean for shape, size, and coating meets the standard, and the color is pleasing to the eye with a mean of 3. As a final outcome, the appearance of Taro Leaves Crackers is acceptable.

Stated by Vietnam (2023) Taro chips are a delicious way to enjoy the exotic flavor and texture of taro root. By following these tips, you can make them a part of your healthy snacking routine. Taro leaves crackers received strong approval from food experts.

Table 7 define the result of the Processing of Taro Leaves into Crackers in terms of texture. Result showed the majority of student rated a mean of 3 in all indicators which it's interpreted as Acceptable in terms of the crunchiness of the taro leaves crackers is acceptable. The taro leaves cracker is interpreted as acceptable.

Based on the publish article about Immaculate bites by African bites (2021), In West Africa, Taro is commonly prepared by boiling, roasting, or occasionally mashed and served with vegetables, but it's seldom fried. In contrast, in Vietnam (as of 2023), Taro chips represent a snack crafted from thinly sliced taro root, a starchy tuber abundant in tropical and subtropical areas. These chips boast a

crispiness and a nutty taste, which can be savored either on their own or paired with different dips and seasonings. Stable 8 Define the overall result for Taro Leaves Crackers' consumer acceptability. The taste of Taro Leaves Crackers received an overall rating of 3.07, signifying acceptability. Similarly, both appearance and texture were rated 3, also considered acceptable. The total average for general food acceptability among consumers was 3.6, indicating that Taro Leaves Crackers are considered acceptable by consumers.

As stated by Black wood (2019), Taro can be substituted for potato and is usually prepared as you would a potato, that's the reason I decided to prepare taro chips. Taro has a deeper, and nuttier flavor than a potato, it has a thick starchy texture when boiled. It can also be fried, or roasted.

Conclusion

Experts and customers rated the food acceptability of the Taro (Leaves)Crackers in terms of taste. The Taro leaves coated with potato flour, egg, and with pinch of black pepper, and salt, reveals a unique blend of savory notes, earthy taro essence that was are clearly present and met the expectations of the respondents' ratings.

After the experts and consumers tasting evaluation, both expert and consumer concurred on the Taro Leaves Crackers to be acceptable in terms of appearance, the respondents provided favorable ratings. Their shared satisfaction was evident in the appealing color, consistent shape of taro, and the coating of Taro Crackers, inviting you to imagine the enticing essence of the product.

In terms of food acceptability for the texture of Taro (Leaves) Crackers, experts and consumers provided distinct ratings; experts regarded the texture as highly acceptable, while consumers found it acceptable. Nevertheless, the product's crunchiness, and textural resemblance to another snack were all noticeable, receiving positive scores from respondents.

Overall, experts declare the general acceptability of Taro Leaves Crackers as highly favorable, aligning with the set standards in taste, appearance, and texture.

Theoretical Implications of the Study

This investigation indicates the potential for developing a product that not only meets consumer expectations in terms of taste, appearance, and texture but also offers valuable nutrients such as carbohydrates, protein, and calories within a simple-to-prepare meal. Moreover, it underscores the significance of following precise ingredient combinations, blending techniques, and kneading methods to achieve a texture that satisfies both consumer preferences and culinary experts' standards.

Practical Implications of the Study

Taro Leaf Crackers" are manifold. By utilizing specific ingredients and employing a dehydration process, the study demonstrates a viable method for producing taro leaf crackers. Additionally, the process of powdering dry taro leaves further expands the potential applications of taro in food products. These findings hold significance for food manufacturers and entrepreneurs seeking to diversify their product offerings with innovative and nutritious snack options. Moreover, consumers interested in exploring alternative and sustainable snack choices may benefit from the availability of taro leaf crackers, which offer a unique flavor profile and potential health benefits. Overall, the study contributes to the advancement of food processing techniques and the promotion of taro leaves as a versatile and valuable ingredient in the food industry.

Limitations of the Study

This study, akin to all research endeavors, possesses specific limitations that warrant recognition. Primarily, the food tasting sessions were confined to the locale of Angeles City, Pampanga. Despite including respondents from various ethnic backgrounds beyond Kapampangan, some individuals refrained from consuming chips altogether, and others expressed dissatisfaction with the texture of certain chip varieties.

Future Researcher Directions

In future research endeavors, expanding the geographical scope of food acceptability assessments beyond the current study location could illuminate cultural variations in preferences and acceptance of taro leaf crackers. Experimenting

with different ingredient combinations and processing techniques offers opportunities to optimize sensory attributes and nutritional profiles, potentially broadening the product's appeal. Evaluating the health impact of regular consumption of taro leaf crackers, alongside sustainability considerations such as environmental impact assessments, could provide valuable insights for consumers and industry stakeholders. Additionally, delving into consumer behavior studies could uncover factors influencing purchasing decisions and willingness to pay for taro leaf crackers, informing effective marketing strategies. By addressing these research avenues, future studies can deepen our understanding of taro leaf crackers and contribute to their successful integration into the food industry.

REFERENCES

Blackwood, V. a. R. B. M., RN. (2019b, November 20). Taro chips - healthier steps. Healthier Steps. https://healthiersteps.com/recipe/taro-chips/ Cscs, D. P. R. (2020, March 18).
Taro leaves: nutrition, benefits, and uses. Healthline.
https://www.healthline.com/nutrition/taro

Evoniuk, J. (2018, December 10). Cracker | Commercial Baking | BAKERpedia. BAKERpedia. https://bakerpedia.com/specialties/cracker/

Faccioli, L. S., Klein, M. P., Borges, G. R., Dalanhol, C. S., Machado, J., & Bosco, S. M. D. (2021).

Development of crackers with the addition of olive leaf flour (Olea europaea L.): Chemical and sensory characterization. Lebensmittel-Wissenschaft + Technologie/Food Science & Technology, 141, 110848. https://doi.org/10.1016/j.lwt.2021.110848

FAQs on crackers. (n.d.). https://www.ingredion.com/apac/en-sg/solving-a-challenge/innovation-with-idea-labs/snacking/snacking-knowledge/faqs-crackers.

Gupta, M., Qumar, N., Fatima, N., & Shukla, G. (2023). Development of high fiber products by using different leaves. *International Journal of Horticulture and Food Science*, *5*(1), 41–45. https://doi.org/10.33545/26631067.2023.v5.i1a.155

Health Benefits of Taro Leaves — thecoconet.tv - The world's largest hub of Pacific Island content.uu. (n.d.-b). https://www.thecoconet.tv/coco-talanoa/health-wellbeing/health-benefits-of-taro-leaves/?fbclid=IwAR2Krl6aM3ECvZJIkXe2vOwGB-QqzQ-gZkZ7UuryYL7jxOtVDJR-EkRAgmk https://www.africanbites.com/taro-chips/

ImmaculateBites. (2021, May 22). Taro chips.

Immaculate Bites. Shehata, M. G., El-Aziz, N. M. A., Mehany, T., & Simal-Gándara, J. (2023). Taro leaves extract and probiotic lactic acid bacteria: A synergistic approach to improve antioxidant capacity and bio accessibility in fermented milk beverages. Lebensmittel-Wissenschaft + Technologie/Food Science & Technology, 187, 115280. https://doi.org/10.1016/j.lwt.2023.115280

Khan, M., & Nowsad, A. (2012). Development of protein enriched shrimp crackers from shrimp shell wastes. AgEcon Search. https://doi.org/10.22004/ag.econ.209727

Likert Scale Surveys—Definitions, Examples & How-tos | Typeform. (n.d.). Typeform.https://www.typeform.com/surveys/liker

Minantyo, H. (2013). Innovation to Mbote as The Seasoned Flour. https://www.semanticscholar.org/paper/

Lestari, Y., & Priyotomo, G. (2018). Corrosion resistance of API 5L grade B steel with taro leaf (Colocasia esculenta) addition as corrosion inhibitor in HCl 0.1 M.

Mitharwal, S., Kumar, A., Chauhan, K., & Taneja, N. K. (2022). Nutritional, phytochemical composition and potential health benefits of taro (Colocasia esculenta L.) leaves: A review. Food Chemistry, 383, 132406. https://doi.org/10.1016/j
Taro leaves. (n.d.).

Mousa, M. M., El-Magd, Ghamry, H. I., Alshahrani, El-Wakeil, Hammad, E., & Asker, G. A. (2021). Pea peels as a value-added food ingredient for snack crackers and dry soup. Scientific Reports, 11(1). https://doi.org/10.1038/
Nutrition, And more. FruitBuys Vietnam - Professional OEM Wholesale Supplier https://fruitbuys.com/taro-chips-calories

Shehata, M. G., El-Aziz, N. M. A., Mehany, T., & Simal-Gándara, J. (2023). Taro leaves extract and probiotic lactic acid bacteria: A synergistic approach to improve antioxidant capacity and bioaccessibility in fermented milk beverages. Lebensmittel-Wissenschaft + Technologie/Food Science & Technology, 187, 115280. https://doi.org/10.1016/j.lwt.2023.115280

Vietnam, F. (2023, July 29). The Ultimate Guide to Taro Chips: Calories, Nucleation and Atmospheric Aerosols. https://doi.org/10.1063/1.5038313