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Level of Acceptability of Jarred Coconut Heart

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Abstract

This study assessed the level of acceptability of jarred coconut heart among 50 Hotel and Restaurant Management (HRM) students from Iloilo State University of Fisheries Science and Technology in Dumangas, Iloilo. Conducted in a controlled food laboratory setting, the study utilized a purposive sampling technique to ensure that respondents possessed relevant knowledge in food preparation and sensory evaluation. A modified five-point Hedonic Scale was employed to measure acceptability in terms of odor, texture, color, saltiness, and overall perception. Data were analyzed using weighted mean and processed through the Statistical Package for the Social Sciences (SPSS). Results revealed that the jarred coconut heart received an overall acceptability rating of 4.44, classified as "Very Acceptable." Among the specific sensory attributes, odor and color obtained the highest scores of 4.56 respectively, indicating a strong preference for the product's aroma and visual appeal. Texture was also well-received, with a mean score of 4.44, while saltiness, though rated lowest at 4.22, remained within the "Very Acceptable" range. These findings suggest that the jarred coconut heart holds strong potential for marketability. However, slight modifications in saltiness may further enhance consumer acceptance. The study concludes that the product is highly acceptable and suitable for commercialization.

Keywords: jarred, coconut heart, Hedonic Scale, food preservation, commercialization, marketability, Dumangas, Iloilo

INTRODUCTION

Food plays a fundamental role in human survival and development, providing essential nutrients such as carbohydrates, fats, proteins, vitamins, and minerals necessary for growth and overall well-being. However, because most foods are perishable, various preservation techniques have been developed to extend their shelf life. Since ancient times, humans have employed methods such as drying, salting, and fermentation to prevent spoilage (Boehringer, 2009). One of the more modern preservation techniques is canning or jarring, which involves sealing food in sterilized containers, such as glass jars or tin cans, to inhibit microbial growth and oxidation (Rahman, 2020). These preservation methods not only ensure food security but also enable the commercialization of food products by making them available for extended periods.

Coconut (Scientific Name: Cocos nucifera L.) is one of the most economically significant crops in the Philippines, contributing substantially to food production, employment, and various industries. As the vast lands of the Philippines were grown of coconuts, the country ranks among the world's top coconut producers, exporting significant volumes of coconut-based products (Philippine Statistics Authority [PSA], 2021). In particular, coconut farming plays a vital role in the agricultural economy of Western Visayas, where provinces such as Iloilo cultivate extensive coconut plantations that support both small-scale farmers and large agricultural enterprises (Department of Agriculture [DA], 2022).

In Dumangas, Iloilo, coconut is widely grown, and many farmers rely on its production as their primary source of income. While coconut-derived products such as copra, virgin coconut oil, and coconut water have strong market demand, the coconut heart—also known as "palm heart" or ubod—remains underutilized despite its nutritional value and culinary versatility (Villanueva et al., 2021). The coconut heart is the tender core of the coconut tree's growing bud and is rich in dietary fiber, antioxidants, vitamin B6, vitamin C, and essential minerals such as potassium and magnesium (Rao & Mathew, 2020). Research suggests that its consumption may promote digestive health, reduce inflammation, and support cardiovascular function (Santos et al., 2019).

Despite its health benefits, the coconut heart has a short shelf life, making storage and distribution challenging. Traditional preservation methods such as drying and refrigeration have limitations in maintaining its texture and nutritional properties over extended periods. Jarred preservation, which involves pickling or vacuum-sealing in brine, presents a promising alternative for extending its shelf life while retaining its quality (Goyal et al., 2022). However, the acceptability of jarred coconut heart among consumers has not been extensively studied, particularly in Iloilo and Dumangas, where coconut-based food products are gaining popularity in both local households and commercial markets.

Due to nutritional value of coconut heart and limited study on how to utilize them, this study aims to assess the level of acceptability of jarred coconut heart based on sensory attributes (taste, texture, aroma, and overall acceptability) and its market potential among consumers in Dumangas, Iloilo. By evaluating consumer preferences and perceptions, this research seeks to contribute valuable insights into the feasibility of coconut heart preservation for commercial distribution and public consumption.

Statement of the Problem. This study aimed to determine the level of acceptability of jarred coconut heart. Specifically, it sought to answer the level of acceptability of jarred coconut heart as to the following characteristics: odor, texture, color, and saltiness.

Conceptual Framework. This study examines the level of acceptability of jarred coconut heart based on different sensory attributes as well as its overall general acceptability. The input consisted of data regarding the product's acceptability in terms of specific characteristics namely, odor, texture, color, and saltiness each of which plays a crucial role in shaping consumer perception and product quality.

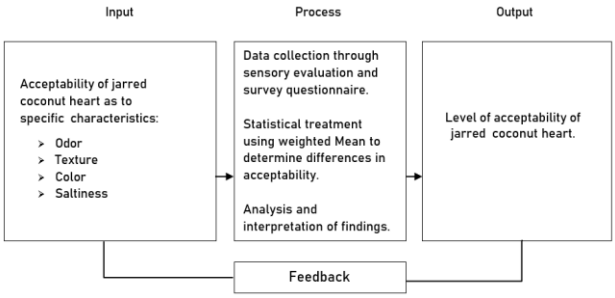

Figure 1
The Conceptual Design Depicting the Relationship Between Variables

The process involved collecting data through sensory evaluations and survey questionnaires administered to selected respondents. Data gathered were analyzed using weighted mean to quantify the level of acceptability for each sensory attribute and to identify differences in consumer perception across these characteristics. This statistical treatment provided a systematic and objective approach to processing the data, enabling a clear interpretation of the results. The output of the study revealed the level of acceptability of the jarred coconut heart in terms of the four characteristics. The findings offered valuable insights into the product's appeal and consumer preferences, effectively assessing its market potential and commercialization and identifying areas for possible improvement through this structured and rigorous methodology.

LITERATURES

The coconut (Cocos nucifera), a member of the Arecaceae (palm family), is the only accepted

species in the Cocos genus. The term "coconut" can refer to the entire coconut palm, its seed, or its fruit, which is botanically classified as a drupe rather than a nut. The name originates from the 16th-century Portuguese and Spanish word coco, meaning "head" or "skull," inspired by the three indentations on the coconut shell that resemble a face. Coconuts are widely recognized for their versatility and extensive applications in food, cosmetics, and industrial uses. They serve as a staple in the diets of people in tropical and subtropical regions, providing essential nutrients such as fats, proteins, and minerals.

Coconuts are unique among fruits due to their high-water content, especially when immature, at which stage they are known as tender or jelly nuts. This coconut water is valued for its hydration properties and bioactive compounds such as cytokinins, which are linked to anti-aging and anti-carcinogenic effects (DebMandal & Mandal, 2011). As the coconut matures, its flesh solidifies and is processed into copra, from which coconut oil and milk are derived. These byproducts are widely used in culinary applications, cosmetics, and even pharmaceuticals. The husks and leaves of the coconut tree are valuable resources for making ropes, mats, and other handcrafted goods. Furthermore, the coconut holds religious and cultural significance in many societies, particularly in India, where it is used in Hindu rituals.

Different coconut varieties have distinct characteristics that affect their agricultural value. Tall varieties, which can grow up to 18 meters in height, are hardy and bear fruit in seven to ten years, producing high-quality copra, oil, and fiber. These trees have a lifespan of up to 90 years and can tolerate diverse soil and climatic conditions. In contrast, dwarf varieties are shorter, self-pollinating, and begin bearing fruit earlier, typically within three to four years. Despite their high yield, their economic bearing age is shorter, lasting up to 25 years. Among the notable dwarf types is the Malayan dwarf, recognized for its resistance to lethal yellowing disease, which has been a major threat to coconut plantations in various regions (Batugal et al., 2009). Hybrid varieties, such as the Tall × Dwarf and Dwarf × Tall hybrids, have been developed to combine the desirable traits of both types, resulting in improved growth rates, higher bearing capacity, and economic nut characteristics (Menon & Pandalai, 2005).

The nutritional and health benefits of coconut further enhance its value. Coconut meat is rich in calories, vitamins, and minerals, with a medium-sized nut containing approximately 354 calories per 100 grams. It is high in lauric acid, a saturated fatty acid that helps increase high-density lipoprotein (HDL) cholesterol, known as "good cholesterol," which may contribute to cardiovascular health (Dayrit, 2014). Also, coconut water is an excellent natural beverage containing electrolytes, simple sugars, and enzymes that aid digestion and metabolism. Moreover, research suggests that coconut-based compounds such as cytokinins and polyphenols possess anti-aging, anti-thrombotic, and anti-carcinogenic properties (DebMandal & Mandal, 2011).

Several local studies have examined the various applications and benefits of coconut and its byproducts. Santos et al. (2008) conducted research on the canning of vegetable-type soybeans in acidified brine, which is relevant to the preservation of coconut-based products. The study focused on evaluating the impact of adding sucrose and pasteurization time on soybean quality. Findings indicated that thermal processing enhanced the isoflavone content while maintaining the desirable color and texture of the canned product. These results have implications for coconut-based food preservation methods, where similar processing techniques may be employed to maintain product quality and extend shelf life.

In a separate study, Lantican (2012) explored the economic contributions of the coconut industry in the Philippines. The research highlighted that the coconut sector remains a vital part of the country's economy, providing livelihoods for millions of farmers and playing a significant role in exports. However, issues such as low

farm productivity and outdated processing technologies were identified as challenges to industry growth. These findings emphasize the need for innovation in coconut cultivation and product development to improve sustainability and economic viability.

Additionally, a study by Reyes et al. (2015) investigated the antibacterial properties of virgin coconut oil (VCO). The results showed that VCO exhibited significant antimicrobial effects against common bacterial strains, supporting its potential use as a natural antibacterial agent in both food preservation and pharmaceutical applications. This aligns with global interest in coconut oil as a functional ingredient with health benefits beyond its traditional culinary uses.

Internationally, research on coconuts has continued to explore their diverse applications. Rama Rao and Choudhury (2005) examined the canning qualities of various tomato cultivars, which can be paralleled with coconut processing techniques. Their study assessed fruit quality and canning behavior, concluding that hybrid varieties displayed improved characteristics for preservation. These findings suggest that hybrid coconut varieties may also yield better processing outcomes, particularly in terms of oil extraction and copra production.

Furthermore, a study by Nevin and Rajamohan (2006) investigated the health benefits of coconut oil, specifically its impact on lipid metabolism. The research demonstrated that dietary consumption of virgin coconut oil significantly improved lipid profiles in animal models, reducing the risk of cardiovascular diseases. This study reinforces earlier findings on the benefits of coconut oil in promoting heart health.

Another significant study by Gunathilake et al. (2018) examined the antioxidant properties of coconut kernel extracts. The researchers found that polyphenols and flavonoids in coconut flesh exhibited strong antioxidant activity, which could be beneficial in reducing oxidative stress and preventing chronic diseases. These findings provide scientific validation for the traditional use of coconut-based products in natural medicine and skincare formulations.

METHODOLOGY

This study employed experimental research as its design. According to Fraenkel and Wallen (2009), experimental research is a systematic approach used to investigate causal relationships by manipulating one or more independent variables while controlling other influencing factors. In this study, the independent variables were the specific sensory characteristics of the jarred coconut heart odor, texture, color, and saltiness which were systematically varied or observed to determine their effect on the dependent variable, the overall acceptability of the product.

The experimental approach was applied through controlled sensory evaluations where respondents assessed the jarred coconut heart under specific conditions designed to isolate and measure the impact of each sensory attribute. By controlling extraneous factors such as environment and sample presentation, the study aimed to minimize bias and accurately identify how changes in sensory characteristics influenced consumer acceptability.

Thus, the use of experimental research in this study allowed for establishing cause-and-effect relationships between the sensory attributes (independent variables) and the general acceptability (dependent variable). This approach facilitated testing hypotheses about the influence of individual sensory factors on overall product preference under controlled conditions, ensuring reliable and valid results.

Ingredients. The following ingredients were used in the preparation of jarred coconut heart:

- Fresh coconut heart (ubod)
- Water (for blanching and brining)
- Salt (for brine solution)

Materials and Equipment. The materials and equipment used in the experiment included:

- Sharp knife and peeler

- Large mixing bowls
- Stainless steel pot
- Glass jars with airtight lids
- Sterilization equipment (boiling water or pressure canner)
- pH meter (to ensure food safety)

The experiment was conducted in HRM Food Laboratory at Iloilo State University of Fisheries Science and Technology a controlled food laboratory setting to ensure uniformity in the preparation and sensory evaluation of jarred coconut heart.

Cooking Procedures. The preparation and cooking procedures followed a standardized process:

1. Preparation of Coconut Heart
   - Select fresh and tender coconut hearts (ubod).
   - Peel off the outer layers and trim the fibrous parts.
   - Slice into uniform sizes or desired cuts.
   - Soak in cold water with a small amount of salt or citric acid to prevent browning.

2. Blanching Process
   - Bring water to boil in a large pot.
   - Blanch the sliced coconut heart for 3–5 minutes to soften the texture and remove excess bitterness.
   - Quickly transfer to ice-cold water to halt the cooking process.

3. Preparation of Brine Solution
   - In a separate pot, prepare a brine solution by mixing:
     - 4 cups of water; and,
     - 2 tablespoons of salt for flavor and preservation.
   - Bring the solution to a boil and let it simmer for 5 minutes.

4. Packing the Jars
   - Sterilize glass jars and lids by boiling them in water for at least 10 minutes.
   - Drain and dry the jars before use.
   - Pack the blanched coconut heart into the jars, leaving about one half inch of headspace.

5. Pouring the Brine and Sealing
   - Pour the hot brine solution over the coconut heart inside the jar, ensuring all pieces are submerged.
   - Remove any air bubbles by gently tapping the jars or using a sterilized spatula.
   - Wipe the rims of the jars to remove any residue.
   - Seal the jars tightly with sterilized lids.

6. Pasteurization and Storage
   - Process the sealed jars using boiling water bath canning for 20–30 minutes to ensure food safety and extend shelf life.
   - Allow the jars to cool at room temperature.
   - Store in a cool, dry place for at least 2–3 weeks before consumption to allow flavors to develop.

Final Presentation and Evaluation. After 2-3 weeks of storing. Respondents evaluated the product's texture, odor, color, saltiness, and general acceptability through sensory evaluation and survey questionnaires. Data collected were statistically analyzed using the Weighted Mean to determine differences in acceptability across the different attributes.

Population, Setting, and Sampling Technique. This study was conducted to assess the level of acceptability of jarred coconut heart. The research took place in a controlled food laboratory setting to ensure standardized preparation and evaluation. The respondents consisted of 50 HRM students from Iloilo State University of Fisheries Science and Technology, located in the municipality of Dumangas, Iloilo. These participants were chosen due to their familiarity with food preparation, sensory evaluation, and consumer acceptability, making them suitable for providing informed feedback.

Survey Instrument. To assess the acceptability of jarred coconut heart, the study utilized a sensory evaluation score sheet based on a modified five-point Hedonic Scale. This scale is widely adopted in experimental research focusing on consumer preference and product acceptability. According to Peryam and Pilgrim

(1957), the Hedonic Scale is an effective tool in sensory evaluation research, allowing panelists to express their degree of liking or disliking of a product based on specific attributes such as appearance, texture, taste, aroma, and overall acceptability. The use of this standardized instrument ensured objective data collection and facilitated the statistical analysis of respondents' perceptions regarding the jarred coconut heart.

In this study, the scale was modified to include descriptive anchors for each numerical rating, ensuring clarity and consistency in responses. The ratings were as follows:

Table 1
Interpretation of weighted mean scores for sensory acceptability ratings

Scale	Range	Responses
5	4.21 – 5.00	Very Acceptable
4	3.41 – 4.20	More Acceptable
3	2.61 – 3.40	Acceptable
2	1.81 – 2.60	Slightly unacceptable
1	1.00 – 1.80	Unacceptable

The instrument underwent content validation by a panel of four experts who assessed its clarity, relevance, and alignment with the study's objectives. Their feedback and recommendations were integrated into the revised version of the instrument to enhance its effectiveness. Following content validation, a pilot test was conducted with 15 HRM students from the study area to evaluate the instrument's construct validity and reliability. Factor analysis was performed using the Statistical Package for the Social Sciences (SPSS) to assess the validity of the scale. Additionally, the reliability of the instrument was measured using Cronbach's alpha, which yielded a result of 0.995, indicating high and excellent internal consistency.

Data Analysis. The Weighted Mean was employed to assess the level of acceptability of jarred coconut heart based on specific attributes, particularly when respondents were grouped as HRM students. This method provided a comprehensive measure of overall acceptability across the respondents.

To ensure accuracy and reliability, data analysis was systematically conducted using the Statistical Package for the Social Sciences (SPSS), allowing efficient processing and interpretation of the results.

RESULTS AND DISCUSSIONS

Table 2 illustrate the level of acceptability of jarred coconut heart based on specific sensory characteristics, including odor, texture, saltiness, and color. The data reveal that all attributes were rated as "Very Acceptable", indicating a positive response from the respondents. Among the characteristics assessed, odor and color received the highest mean score of 4.56, suggesting that respondents found the aroma and visual appeal of the product highly favorable. This could indicate that the jarred coconut heart maintained a fresh and appetizing scent while presenting an appealing color that met consumer expectations. Texture received a mean rating of 4.44, showing that the consistency and mouthfeel of the product were well-accepted, likely offering a desirable balance between firmness and tenderness. Meanwhile, saltiness had the lowest mean score of 4.22, though still categorized as "Very Acceptable". This suggests that while the seasoning was well-received, there may be slight variations in individual taste preferences regarding the product's salt content.

Table 2
Mean Distribution of acceptability of jarred coconut heart as to odor, texture, color and saltiness

Characteristics	Mean	Description
Odor	**4.56**	Very Acceptable
Texture	**4.44**	Very Acceptable
Saltiness	**4.22**	Very Acceptable
Color	**4.56**	Very Acceptable

Overall, the consistently high ratings across all characteristics indicate that the jarred coconut heart was sensory-appealing and well-received by the respondents, reinforcing its potential for acceptance and marketability.

Conclusion. Based on the findings, the following conclusions were drawn:

The jarred coconut heart demonstrated a high level of acceptability among respondents, with an overall mean rating of 4.44, categorized as "Very Acceptable." This suggests that the product successfully met consumer expectations in terms of its sensory attributes, indicating strong potential for market acceptance.

Furthermore, the assessment of specific characteristics revealed that odor and color received the highest ratings, both with a mean score of 4.56, highlighting the product's appealing aroma and visual presentation. Texture also received a favorable rating of 4.44, suggesting that the consistency and mouthfeel of the jarred coconut heart were well-received. Meanwhile, saltiness, though still rated as "Very Acceptable" with a mean score of 4.22, had the lowest rating among the attributes, indicating slight variations in taste preferences among respondents.

Overall, the study concludes that the jarred coconut heart is a well-accepted product with strong sensory appeal, making it a promising option for commercial production. However, further refinement, particularly in seasoning adjustments, may enhance its overall acceptability and widen its potential consumer base.

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