



BAMBOO SHOOT AS AN ALTERNATIVE INGREDIENT IN LONGGANISA (SAUSAGE) MAKING

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Article DOI: <https://doi.org/10.36713/epra28306>

DOI No: 10.36713/epra28306

ABSTRACT

The study entitled “Bamboo Shoot as an Alternative Ingredient in Longganisa (Sausage) Making,” explored the potential of bamboo shoots as an alternative ingredient in traditional longganisa. As the demand for sustainable food options, this research addressed the gap in utilizing underexplored ingredients like bamboo shoots in longganisa production. The objective was to develop and assess the feasibility of bamboo shoot longganisa as an alternative ingredient, and evaluate its physicochemical, microbiological, and sensory attributes across different consumer groups.

Eight formulation trials were conducted to determine the appropriate bamboo shoot longganisa (sausage). Physicochemical analysis indicated a slight decrease in pH over a 14-day period (from 5.85 to 5.73), suggesting potential for shelf-life stability. Microbial analysis confirmed the product's safety, with no detection of Salmonella spp., E. coli, Staphylococcus aureus, or molds and yeast.

Sensory evaluations were conducted with experts, faculty, and students to evaluate appearance, aroma, taste, and texture. While both the bamboo shoot and Homemade Chicken longganisa were rated favorably, the Homemade Chicken longganisa scored slightly higher in appearance, aroma, taste, and texture. A statistically significant difference ($p = 0.003$) was found in how the three consumer groups perceived the products, indicating varied preferences.

These findings highlight the feasibility of using bamboo shoots in longganisa. Future efforts can refine the formulation to balance sensory preferences, enhancing acceptance while promoting sustainable food.

KEYWORDS: Bamboo shoots, Longganisa formulation, Physicochemical, Microbial analysis, Sensory evaluation

1.INTRODUCTION

Food is essential for human health, helping prevent disease and support overall well-being. Due to the growing demand for sustainable food options, meat substitutes have become more popular. These are alternative protein products that can be used in foods like sausages, nuggets, and burgers while still maintaining similar texture, color, and taste to meat (Choudhury et al., 2020).

Bamboo shoots support sustainability goals (SDGs 2, 3, and 12) because they are nutritious, rich in protein, fiber, and vitamins, and help promote food security and healthier diets. They also grow quickly and require minimal resources, supporting responsible consumption and production (Oceans Republic, 2024).



Traditional *longganisa* may pose health risks when consumed in excess, such as obesity and heart diseases, so alternative ingredients are needed. This study explores bamboo shoots as an ingredient in *longganisa* through physicochemical, microbial, and sensory analyses to ensure safety and acceptability.

2. OBJECTIVES

The purpose of this research is to develop *longganisa* (sausage) using bamboo shoots as an alternative ingredient and evaluate its appearance, aroma, taste, and texture to determine consumer preference.

1. How may the Bamboo shoot *longganisa* be formulated?
2. How may the physicochemical and microbial properties of formulated bamboo shoot *longganisa* be evaluated through a comprehensive assessment of:
 - 2.1 Physicochemical Analysis:
 - 2.1.1 pH level
 - 2.2 Microbial Analysis
 - 2.2.1 *Staphylococcus aureus* count;
 - 2.2.2 *Salmonella species* count;
 - 2.2.3 *Escherichia coli* count;
 - 2.2.4 Mold count; and
 - 2.2.5 Yeast count
3. How may the bamboo shoot *longganisa* (sausage) be compared to commercially available, in terms of:
 - 3.1 Sensory Evaluation;
 - 3.1.1 Appearance
 - 3.1.2 Aroma;
 - 3.1.3 Taste; and
 - 3.1.4 Texture
4. Is there a significant difference in the sensory evaluation between the formulated Bamboo Shoot *Longganisa* and Commercially *Longganisa* based on the suggestions of the following consumers:
 - 4.1 Experts;
 - 4.2 Teachers; and
 - 4.3 Students?

3. METHODOLOGY

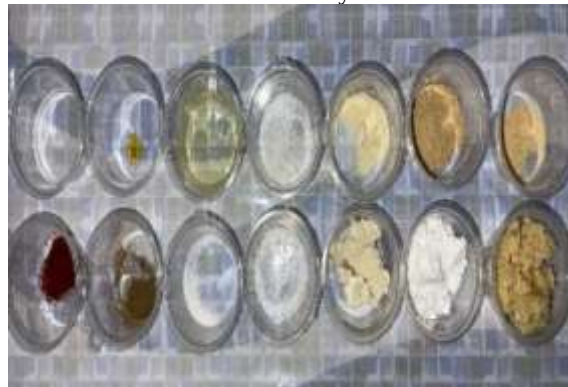
The study “Bamboo Shoots as an Alternative Ingredient in *Longganisa* (Sausage) Making” used the developmental method as its research design. This method allowed the researchers to systematically develop a *longganisa* formulation using bamboo shoots by adjusting ingredients, especially the amount of bamboo shoots, to determine the best ratio. Sensory evaluation was conducted using a 9-point hedonic scale to assess appearance, aroma, taste, and texture. The product also underwent physicochemical testing and microbiological analysis to ensure safety, including checks for molds, yeast, *Staphylococcus aureus*, *Salmonella spp.*, and *Escherichia coli*. This approach helped generate reliable data on the suitability of bamboo shoots as an alternative ingredient in *longganisa* making.



Figure_ 1. Bamboo Shoot



To prepare fresh bamboo shoots, start by thoroughly rinsing away any dirt or debris. Next, trim off the tough base and slice the shoot crosswise, which allows you to easily peel back and discard the fibrous outer husks until you reach the pale, tender core. Finally, slice or dice the tender inner shoot to your desired size so it cooks evenly.



Figure_ 2. Ingredients

Accurately weighing ingredients is essential when making bamboo shoot *longganisa* to achieve the perfect balance of savory flavor and unique texture. Using a kitchen scale ensures the exact ratio between , seasonings, and minced bamboo shoots, which prevents the sausage from becoming too dry or losing its structure.



Figure_ 2. Final Product

Stuffing it firmly into the *longganisa* casings and twisting them into even links, taking care to avoid any air pockets. After the sausages are formed and portioned, they are vacuum sealed in airtight packaging. This vacuum-sealing process removes all oxygen, which preserves the freshness of the bamboo shoot *longganisa*, prevents freezer burn, and extends its shelf life while locking in all the savory flavors.

Table 1. Bamboo Shoot *Longganisa* Formulation

Ingredient	Percentage (%)
Minced bamboo shoots	24.46%
Crushed tofu	17.27%
Potato starch	23.02%
Warm water	15.83%
Vegetable oil	9.35%
Garlic powder	1.87%
Barbecue marinade	1.44%
Monosodium glutamate (MSG)	1.44%
White sugar	1.00%
Iodized salt	1.00%
Paprika	0.86%
Black pepper	0.72%
Onion powder	0.44%
Liquid smoke	0.29%



4. RESEARCH DESIGN

Method: The developmental research method is used to systematically develop a bamboo shoot-based *longganisa* by adjusting ingredients, especially the amount of bamboo shoots, to find the best formulation. The product will undergo physicochemical analysis, including pH testing, to determine whether it is acidic, neutral, or alkaline. This helps ensure its safety and quality.

Microbial analysis will also be conducted to check for mold, yeast, *Staphylococcus aureus*, *Salmonella* species, and *Escherichia coli* to ensure the product is safe for consumption. Lastly, sensory evaluation will assess the product's appearance, aroma, taste, and texture to determine consumer acceptability.

Table 2. Total number of Respondents

Respondents	Frequency	Percentage %
Experts	3	11.54%
Faculty	3	11.54%
Students	20	76.92%
Total	26	100%

5. Statistical design

This study uses statistical analysis to evaluate the development, quality, and acceptability of bamboo shoot *longganisa*. The data from experts, teachers, and students will be analyzed using the mean, overall mean, p-value, and Kruskal-Wallis H Test.

The formulation of the product will be developed by adjusting ingredient ratios and tested for quality through physicochemical analysis (pH level) and microbial analysis, including *Staphylococcus aureus*, *Salmonella*, *Escherichia coli*, mold, and yeast. The bamboo shoot *longganisa* will also be compared with commercial *longganisa* in terms of appearance, aroma, taste, and texture using a 9-point hedonic scale. Lastly, consumer evaluations from experts, teachers, and students will be analyzed to determine if there are significant differences between the products.

6. Geographical area

The research study focuses on the development of *longganisa* (sausage) utilizing bamboo shoot that serves as an alternative ingredient. This study was conducted during the school year 2024–2025 at the Nueva Ecija University of Science and Technology, located at the Sumacab Campus in Cabanatuan City, Nueva Ecija, as well as at the General Tinio Campus in Cabanatuan City and the Fort Magsaysay Campus located in Palayan City, Nueva Ecija.

7. RESULTS

Table 3. Results

Category	Indicator	Bamboo Shoot Longganisa	Commercial Longganisa	Notes
Physicochemical	pH Level	5.85 (Day 1) → 5.73 (Day 14)	—	Slight decrease (mild acidification)
Microbiological	Pathogens (Staph. aureus, Salmonella, E. coli, Yeasts/Molds)	Not Detected (ND)	Not Detected (ND)	All safe, no growth detected
Sensory – Appearance	Overall Mean	8.41	8.61	Both “Very Much Likely”
Sensory – Aroma	Overall Mean	8.51	8.70	Commercial slightly higher
Sensory – Taste	Overall Mean	8.37	8.68	Commercial slightly higher
Sensory – Texture	Overall Mean	8.37	8.52	Close results
Overall Acceptability	Mean Score (n=26)	8.41 (SD 0.32)	8.61 (SD 0.27)	Commercial slightly higher
Statistical Test	Kruskal-Wallis H Test	—	—	Significant difference (p = 0.003)

The pH levels of bamboo shoot *longganisa* showed a slight decrease over time, from 5.85 on Day 1 to 5.80 on Day 7 and 5.73 on Day 14, remaining within a safe, slightly acidic range. These values indicate good stability and food safety, as acidic conditions help inhibit spoilage and pathogen growth. Foods within the pH 5–6 range are still considered nutritious and healthy (World Health Organization, 2020). A pH of 5.73 is also considered safe with proper handling and storage (Kim et al., 2024).



Microbial results showed no detection of *Staph. aureus*, *Salmonella spp.*, *E. coli*, and yeasts/molds, indicating the product is microbiologically safe. Proper processing, hygiene, and storage help maintain this safety, which is essential since contaminated food can cause serious illness (World Health Organization, 2022; Smslaglobal, 2024).

Sensory evaluation results showed that both bamboo shoot and commercial *longganisa* were highly accepted in terms of appearance, aroma, taste, and texture, with mean scores mostly in the “Likely Very Much” range. However, commercial *longganisa* slightly ranked higher overall. Statistical analysis also showed a significant difference in perceptions among experts, faculty, and students ($p = 0.003$), meaning the two products were rated differently by the groups.

8. SUGGESTIONS

Future researchers may explore different flavors like hamonado and spicy to suit more consumer preferences. They may also conduct nutritional analysis to determine health benefits such as vitamins and minerals.

It is also suggested to improve packaging to extend shelf life, maintain quality, and enhance appearance for possible commercialization. Lastly, adding other tests like moisture content is recommended for a more complete evaluation of product quality.

9. CONCLUSION

The researchers developed a bamboo shoot *longganisa* through eight trials, finding the best formulation that improved taste, texture, and acceptability. Proper preparation (peeling, boiling, squeezing) helped reduce bitterness and moisture.

The product was safe, with pH slightly decreasing from 5.85 to 5.73 and no harmful bacteria detected, confirming good microbiological quality.

Sensory results showed both bamboo shoot and commercial *longganisa* were well accepted, though the commercial version was slightly preferred in taste, aroma, and texture.

Overall, results show bamboo shoots are a promising and sustainable ingredient for *longganisa*, with some differences in consumer preference.

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