# Bamboo Shoots (Bambusa Vulgaris) Bites: A Flavorful Twist On Siomai

**Arnold S. Baldo[1], Janette M. Casuco[2]**

**[1,2]Northwest Samar State University, Philippines**

**DOI: https://doi.org/10.51244/IJRSI.2025.120800310**

**Received: 04 Sep 2025; Accepted: 10 Sep 2025; Published: 08 October 2025**

## ABSTRACT

### Background

The research focused on modifying the traditional siomai recipe by replacing ground pork with young bamboo shoots, aiming to offer a more nutritious and plant-based version. The primary goal was to assess how acceptable different bamboo shoot-to-pork ratios would be in terms of sensory attributes. **Methods:** This study utilized quantitative research approach using Completely Randomized Design (CRD) with Five variations (T0–T4) were prepared by gradually decreasing the amount of ground pork from 250g to 0g and increasing bamboo shoots from 0g to 250g. Sensory evaluation was conducted among 62 students and 16 faculty-experts, who rated appearance, texture, aroma, and taste using a standardized 9-point hedonic scale. The collected data were subjected to statistical analysis to evaluate differences in responses. **Results:** All formulations were well-received. Student participants generally gave higher scores than faculty-experts. T4, made entirely with bamboo shoots and no pork, obtained the top ratings across all attributes: appearance (students 8.27; experts 7.88), texture (8.02; 7.56), aroma (7.98; 7.81), and taste (8.16; 7.94). Across treatments, average ratings fell between “Like Very Much” and “Like Extremely.” Although the original (T0) was rated positively, T4 stood out as the most preferred version. **Conclusions:** Replacing pork with bamboo shoots preserved or improved the product’s sensory qualities. T4 was the most favored, suggesting that bamboo shoots are a viable, health-conscious, and sustainable alternative for siomai production.

**Keywords:** Siomai, Vegetable-based, Plant-based, Alternatives

## INTRODUCTION

A common form of steamed dumpling found in various Asian cuisines, especially in China, Japan, and the Philippines, is the so-called siomai. The traditional filling for siomai is a mixture of ground pork, shrimp, or other meats with veggies, which is then wrapped in thin dumpling skins. You can find siomai as dim sum, street food, and in restaurants and homes. It's a very popular and flexible cuisine. But as dietary trends and environmental concerns change, there's a growing interest in investigating more sustainable and healthful substitutes for the conventional siomai fillings (Liu et al., 2020).

Though bamboo shoots are commonly used in cooking, their potential as a main ingredient in dumplings like siomai has not been thoroughly investigated. As per the research carried out by Chongtan, Bhist, and Haorongbam from Bamboo shoots at Punjab University in India are nutrient-rich in several ways. It contains few calories content, little sugar content, trace fat, and a good source of vitamins and protein essential nutrients, a lot of nutritional fiber, and tasty results. It facilitates weight loss and cardiac health, lowers cholesterol, prevents cancer, boosts immunity, and abundant uterotonic, anti-inflammatory, and dietary fiber qualities (Nagdeve, 2019). Moreover, the distinctive fermented vinegary malodor and crisp, refreshing flavor of pickled bamboo shoots are the "soul" of Luosifen. The unique flavor is adored by customers. Thus, the range of microorganisms and the flavor component composition in pickled bamboo shoots are examined, and their connections are outlined. The issues and difficulties involved in producing pickled bamboo shoots on a big industrial scale are examined. The microbial composition of pickled bamboo shoots is varied; the most

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue IX September 2025

common species are Lactobacillus fermentum and Lactiplantibacillus plantarum, while the superior genera are Lactobacillus, Serratia, and so forth, and the leading phyla are Firmicutes and Proteobacteria. Aromatics, organic acids, alcohols, aldehydes, and esters are the primary flavoring substances (Zhang, et al., 2023).

In the study of Leonor (2019), it was found that sixty-three percent of the siomai with 75 percent pork was favored by the customers, 25% choose bamboo shoots, whereas 37% of customers prefer siomai using only pork. Thirty-seven percent didn't like the pork-heavy siomai (75%) and bamboo shoot, however 63% of customers thought the siomai was better without whole pork. Moreover, the nutritional information for bamboo shoot siomai is as follows: 68.5g moisture, 1.37g ash, 7.58 g crude protein, 3.0 g total fat, 19.5 g carbohydrate, and 136 Kcal/100g of energy. Sixty-three percent of customers preferred the siomai that contained 75% pork and 25% bamboo shoot, while thirty-seven percent preferred the siomai that contained 100% pork.

Since the literature found only use 75% pork and 25% bamboo shoots and 100 % pork meat content, the researcher will further investigate its acceptability and nutrient content using various composition. Furthermore, this study will make use the ingredients needed in the preparation of bamboo shoot siomai, the young bamboo shoots, molo wrapper, ground pork, eggs, all-purpose flour (Leonor, 2019) and other spices. The purpose of this research is to determine whether it is feasible to replace the conventional flavors and textures of siomai filling with bamboo shoots using the various type of ingredients. This would provide consumers who are health-conscious with a wholesome and sustainable option.

# METHODOLOGY

### Experimental design and treatment

This study utilized quantitative research approach using Completely Randomized Design (CRD) with Five (5) treatments in each experiment as the most straightforward design for comparative studies which is appropriate in determining the acceptability of vegetable-based siomai. Furthermore, the experiment was laid out the following compositions, C0 (100% Pork), C1 (75% Pork & 25% BC), C2 (50% Pork & 50% BC), C3 (25% Pork & 75% BC), C4 (100% BC). This study used probability sampling with the total enumeration sampling in which this technique used to determine acceptable by surveying every respondent. To guarantee that everyone is included in the study, the Bachelor of Technology and Livelihood Education (BTLEd)- Home Economics with sixteen (16) faculty-experts and sixty-six (62) number of students from first year to fourth year with seventy-eight (78) total number of respondents at Northwest Samar State University-San Jorge Campus that will be involved in the study.

Furthermore, in carrying out this method, researchers asked everyone in the public to rate the vegetable-based siomai by distributing surveys or questionnaires. After that, the replies are gathered and examined to ascertain the general acceptability level. Even though total enumeration sampling provides thorough data, it can be resource- and time-intensive, particularly when working with larger populations. Notwithstanding these difficulties, the approach guarantees that the findings represent the opinions of the whole community. Making well-informed decisions about marketing tactics and product enhancements requires a rigorous approach to data collection.

### Selection of study area

The study was carried out at Northwest Samar State University – San Jorge Campus. The researcher prepared the needed ingredients the laboratory area and the respondents came to evaluate the finished product.

### Processing of Bamboo Shoots-Based Siomai

Pre-treating of bamboo shoots:

1. removing the rough bottom layer
2. peeling off the outer layer
3. chopping or slicing the sensitive portion into small thin pieces
4. rinsing with clean water.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue IX September 2025

5. Boiling the sliced bamboo shoots for 15 to 20 minutes,
6. squeezing to remove the bitter taste.

**Preparing the filling:**

1. In a clean container, combining 125 grams of ground pork meat, 125 grams of bamboo shoots, 44 grams of egg, 2 grams of powdered black pepper, 12 grams of sugar, 2 grams of garlic powder, 120 grams of all-purpose flour.
2. Mixing them to combine the all the ingredients.
3. Resting the mixture for 3-5 minutes.

**Wrapping the bamboo shoots siomai**

1. laying the molo wrapper on a clean surface
2. Placing a spoonful of the filling in the center.
3. Folding the edges of the wrapper around the filling, leaving the top open,
4. Pinching the edges to create pleats.

**Cooking the bamboo shoots siomai**

1. Placing the wrapped bamboo shoots siomai in a steamer basket.
2. Steaming the wrapped bamboo shoots siomai for 20-25 minutes in a medium fire.

**Acceptability of the product**

The research instruments that are used in the study is the score card which is adapted from Quartermaster Corps. 9-point Hedonic Scale that is originally developed at the U.S. Army Food and Container Institute and the standard survey questionnaire for economic value from Kotler 2016. The 9-point hedonic scale is used to assess general acceptability of Bamboo Shoots Siomai

**Product Evaluation**

The first step in the data collection process is the controlled preparation of pork siomai and siomai made from bamboo shoots. In creating the best proportions of ingredients, several formulations as treatment are utilized for the vegetable-based siomai, including different proportions of bamboo shoots, adjusting the flavor, and using binding agents. Moreover, in providing a baseline for comparison, a consistent recipe is used to create the pork siomai. Sensory assessments were the main method of gathering data, expert faculty and Home Economics students used a Likert scale to rate each variety of siomai on characteristics like taste, texture, aroma, appearance, and general acceptability. Additionally, a nutritional analysis was performed on each siomai sample to determine its nutritional properties. A varied sample of respondents was given acceptance surveys to gauge their preference for vegetable-based siomai over pork-based siomai. These assessments had yield numerical information regarding acceptability and the nutritional advantages of the vegetable-based substitute. Furthermore, in identifying the most palatable and nutritionally beneficial choice, statistical analysis, such as Analysis of Variance (ANOVA) was employed in comparing the sensory scores and nutritional content of the two varieties of siomai.

**Analysis of Results**

This study assured that every piece of collected was analyzed and interpreted. The statistical treatments that were used in the study includes descriptive statistics, such as frequency counts, percentages, and averages were computed to examine the quantitative data and provide an overview of the answers for each siomai type. The acceptability of the pork siomai and bamboo shoots siomai was compared using inferential statistical tests to see whether there are any notable variations.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue IX September 2025

**Ethical Considerations**

The researcher ensured that the data gathered, and the information obtained were treated with the utmost confidentiality. Additionally, approval and permission from the involved individuals, institutions, management, and authorities were secured prior to the conduct of the study. Every respondent in the acceptability testing and sensory evaluation is aware of the study's objectives and asked for their consent before beginning. Also, to guarantee the privacy and rights of participants, ethical guidelines was adhered. The conduct of this study prioritized the maintenance of sanitary conditions in all aspects, ensuring that adequate cleanliness protocols are followed to prevent contamination. It strictly follows food safety requirements, which include the proper handling, preparation, and distribution of food samples for tasting. Allergy screening is an important element of

the process, and it is performed on all participants before they participate in any food tasting, assuring their safety and wellbeing. Furthermore, first-aid support is easily available during the study, with fast assistance offered by the campus nurse as requested. Screening questions are included before participants begin the survey, assisting in identifying any health concerns or dangers in advance and ensuring that the entire study is carried out with the utmost care and attention for the participants' safety. The researcher also ensured that research ethics are observed throughout the study.

## RESULTS AND DISCUSSION

The following are the results and discussion of the study based on the collected data from the respondents. They are analyzed in accordance with the specific objectives of the study to provide a holistic picture of the ultimate goal of the study.

The composition of a product across five compositions (T0 to T4) with different amounts of young bamboo shoots and ground pork meat. T0 (Control) has no young bamboo shoots and 250g (38.70%) of ground pork meat. The quantity of ground pork meat per treatment drops by 62.5g (9.68%) as the treatments move from T1 to T4, but the quantity of young bamboo shoots increases by the same amount. By C4, all of the pork meat has been replaced with 250g (38.70%) of young bamboo shoots. All formulations contain the same amount of other ingredients, such as eggs (48g, 7.43%), sugar (12g, 1.86%), powdered black pepper (3g, 0.46%), salt (10g, 1.55%), and garlic powder (3g, 0.46%). Each treatment contains 120g of all-purpose flour (18.58%), most likely as a binding agent. Every formulation uses the same Molo wrapper (200g, 30.96%) as an outer covering. Each formulation's total weight is always 646g (100%), guaranteeing comparability when assessing the impact of substituting young bamboo shoots.

**Level of Acceptability of Bamboo Shoots Siomai**

The appearance evaluation of Bamboo Shoots Siomai demonstrates a marked distinction in perception between faculty-experts and students, with both groups expressing favorable views but at different levels of enthusiasm. Faculty-experts consistently rated all treatments within the "Like Very Much" (LV) category, with scores ranging from 7.44 for the control (T0) to 7.88 for T4, indicating a gradual improvement in visual appeal across treatments, with T4 emerging as the most visually appealing formulation from their perspective. In contrast, students rated all treatments within the "Like Extremely" (LE) category, with scores ranging from 8.05 for T1 to an impressive 8.27 for T4, demonstrating a significantly higher appreciation for the visual aspects of the siomai across all formulations. The control treatment (T0) received a notably high rating from students at 8.11, suggesting that even the original recipe possessed strong visual appeal, though the modified treatments, particularly T3 and T4, offered further enhancements to appearance. Treatment T4 consistently garnered the highest appreciation from both respondent groups, achieving scores of 7.88 from experts and 8.27 from students, highlighting its superior visual presentation. The grand mean scores further emphasize the difference in perception between the two groups, with faculty-experts averaging 7.61 (LV) and students averaging 8.13 (LE), clearly demonstrating that while the product's appearance is well-received by both groups, students demonstrate a markedly higher appreciation for the visual qualities of Bamboo Shoots Siomai across all formulations, with T4 emerging as the optimal formulation for visual appeal among all tested variations.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue IX September 2025

The texture evaluation of Bamboo Shoots Siomai demonstrates a consistently positive reception across all treatments, with both faculty-experts and students rating all formulations within the "Like Very Much" (LV) category, indicating a generally favorable perception of the product's textural qualities. Faculty-experts assigned scores ranging from 7.19 for T1 to 7.56 for T4, showing a gradual increase in appreciation from T1 through T4, with the control (T0) receiving an intermediate rating of 7.31, suggesting that while the original recipe had acceptable texture, the modifications in later treatments, particularly T4, offered textural improvements. Students consistently provided higher ratings than faculty-experts across all treatments, with scores ranging from 7.92 for the control to 8.02 for T4, nearly approaching the "Like Extremely" threshold for the highest-rated treatment. The progressive improvement in scores from T0 to T4 for both respondent groups suggests that each modification may have incrementally enhanced the textural properties of the siomai. The grand mean scores further highlight the difference in perception between the two groups, with faculty-experts averaging 7.40 and students averaging 7.97, both within the LV range but with students demonstrating a notably higher appreciation overall. This consistent pattern across treatments indicates that while the product's texture is well-received by both groups, students appear more receptive to the textural qualities of Bamboo Shoots Siomai, with T4 emerging as the optimal formulation for textural appeal among all tested variations.

The aroma evaluation of Bamboo Shoots Siomai reveals a consistently positive reception across all treatments, with both faculty-experts and students rating all formulations within the "Like Very Much" (LV) category, indicating a generally favorable perception of the product's aromatic qualities. Faculty-experts assigned scores ranging from 7.06 for T3 to 7.81 for T4, showing some variation in appreciation across treatments, with T3 receiving the lowest rating despite still falling comfortably within the LV range, while T4 emerged as the most aromatically appealing formulation. Students consistently provided higher ratings than faculty-experts across all treatments, with scores ranging from 7.81 for T2 to 7.98 for T4, demonstrating less variation in their perception of aroma between treatments compared to the experts. Unlike the progressive improvement pattern seen in texture evaluations, the aroma scores fluctuate across treatments for both groups, suggesting that aromatic qualities were affected differently by the various formulation modifications. Treatment T4 consistently garnered the highest appreciation from both respondent groups, achieving scores of 7.81 from experts and 7.98 from students, highlighting its superior aromatic profile. The grand mean scores further illustrate the difference in perception between the two groups, with faculty-experts averaging 7.37 and students averaging 7.88, both within the LV range but with students demonstrating a notably higher appreciation overall. This consistent pattern across treatments indicates that while the product's aroma is well-received by both groups, students appear more receptive to the aromatic qualities of Bamboo Shoots Siomai, with T4 emerging as the optimal formulation for aromatic appeal among all tested variations.

The taste evaluation of Bamboo Shoots Siomai reveals a consistently positive reception across all treatments, with notable differences in perception between faculty-experts and students. Faculty-experts rated all treatments within the "Like Very Much" (LV) range, with scores ranging from 7.38 for T1 to 7.94 for T4, indicating a generally favorable taste perception with T4 emerging as their preferred formulation. Students demonstrated a slightly more enthusiastic response overall, with their scores ranging from 8.02 to 8.16, and notably rating treatments T0, T3, and T4 in the "Like Extremely" (LE) category with scores of 8.11, 8.08, and 8.16 respectively, while treatments T1 and T2 fell just below the LE threshold at 8.02 and 8.03. Treatment T4 consistently garnered high appreciation from both respondent groups, achieving the highest score from faculty-experts (7.94) and students (8.16), highlighting its superior taste profile. The control treatment (T0) also performed remarkably well, receiving the second-highest rating from faculty-experts (tied with T2 at 7.88) and the second-highest from students (8.11), suggesting that while modifications in T4 may have enhanced taste, the original recipe already possessed strong flavor characteristics. The grand mean scores further illustrate the pattern of students rating the taste more favorably (8.08, LE) compared to faculty-experts (7.75, LV), indicating that while the product's taste is well-received by both groups, students demonstrate a greater appreciation for the flavor profile of Bamboo Shoots Siomai across all formulations.

## CONCLUSION

In this study, incorporating bamboo shoots (Bambusa vulgaris) into siomai presents an innovative way, by introducing bamboo shoots as a filling, traditional siomai recipes are revitalized, appealing to health-conscious consumers. Additionally, assessing the acceptance of this bamboo shoots-based siomai, considering factors

like appearance, texture, aroma, and taste, will help determine its success and potential as a popular alternative in the dim sum market.

Specifically, the study concluded the following:

1. The evaluation of Bamboo Shoots Siomai, across various formulations (T0 to T4), reveals a consistent preference for the visual, textural, aromatic, and taste qualities of the product, with notable differences in the perceptions of faculty-experts and students. While both groups consistently rated all treatments favorably, students generally demonstrated a higher level of appreciation across the board, with T4 emerging as the most preferred formulation in terms of appearance, texture, aroma, and taste.
2. The gradual substitution of ground pork meat with young bamboo shoots, starting from T0 (control) and progressing to T4, did not detract from the overall acceptability of the product. In fact, modifications improved certain qualities, particularly in visual appeal and texture. The control treatment, although containing the highest amount of pork meat, was still well-received, particularly by students, who rated it highly in appearance, taste, and aroma.
3. The substitution of pork meat with bamboo shoots demonstrated the potential of plant-based ingredients to maintain or even enhance the sensory qualities of traditional siomai, with T4 emerging as the most optimal formulation for most of the evaluated aspects. The study highlights the acceptability of bamboo shoots as a viable ingredient in siomai, offering an appealing and potentially healthier alternative to ground pork, with promising results for both sensory attributes and consumer preference.

## DECLARATIONS

**Ethics approval and consent to participate (Not Applicable)**

**Consent for publication (Not Applicable)**

**Availability of data and materials (Not Applicable)**

**Competing interests (Not Applicable)**

**Funding (Not Applicable)**

**Authors' contributions (Not Applicable)**

## AUTHORS' INFORMATION

The author is a 27-year-old professional from Brgy. San Miguel, Gandara, Samar, known for his strong commitment to education, personal growth, and community service. A Magna Cum Laude graduate of Northwest Samar State University–San Jorge Campus, he holds a degree in Technology and Livelihood Education and a Master's in Education from Samar State University. With experience in both teaching and youth leadership, he continues to inspire through service, scholarship, and dedication.

## REFERENCES

1. Acharya B, Behera A, Sahu PK, Mishra DP, Purohit S, Chowdhury B, Behera S. 2024. Advances in bamboo science.
2. Khan S, Murtaza G, Ahmad R. 2019. Sustainability of bamboo as a green resource in construction and food industry. J Clean Prod. 218:859–870.
3. Kumar A, Verma A. 2017. Nutritional and phytochemical composition of bamboo shoots. J Food Sci Technol. 54(9):2783–2792.
4. Leonor LG. 2019. Consumer preference and proximate analysis of bamboo shoot siomai. [journal unknown]. 29(1).
5. Li Y, Zhang J, Sun J. 2019. The anti-inflammatory effects of bamboo shoot extract on human health. Food Sci Hum Wellness. 8(1):21–27.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue IX September 2025

6. Liu Z, Zhang S, Wang Y. 2020. Innovations in traditional dumpling recipes: a review. J Culin Sci Technol. 18(3):145–163.
7. Nagdeve M. 2019. 13 interesting bamboo shoots benefits [Internet]. [cited 2025 Jul 8].
8. Nguyen TH, Kim J. 2018. Antioxidant properties of bamboo shoot extracts and their potential health benefits. Food Chem. 261:187–194.
9. Ramasubramanian S, Singh CR, Muralikrishna R. 2023. Bioprospecting of bamboo: a review. Asian J Biotechnol Bioresour Technol. 9(1):7–19.
10. Raymund. 2014. Shomai (Shumai) [Internet]. Ang Sarap; [cited 2025 Jul 8]. Available from: https://www.angsarap.net/2014/02/27/siomai-shumai-2/
11. Siomai Talk. [date unknown]. Siomai House – Pasay City Mall [Internet]. [cited 2025 Jul 8]. Available from: http://siomai.weebly.com/what-is-siomai.html
12. Zhang S, Liu Z, Liu Y. 2020. Sustainable cultivation of bamboo for food and economic benefits. Sustain Agric Res. 9(1):15–25.
13. Zhang X, Wang A, Yao H, Zhou W, Wang M, Liang B, Tong LT. 2023. Research advancements on the flavor compounds formation mechanism of pickled bamboo shoots in river snails rice noodles. LWT. 115226.
14. Zhang Y, Wu L, Li Y, Yang J, Yang H, Zhao Y, Chen G. 2024. Bamboo shoot and its food applications in last decade: an undervalued edible resource from forest to feed future people. Trends Food Sci Technol. 104399.