

Development and sensory acceptability of powdered guamias (guava–kamias) as an organic seasoning for sinigang dishes

Aimie Mendoza Ignacio *

San Isidro Integrated School, Disulap, San Mariano, Isabela, Philippines

ABSTRACT

Seasonings play an essential role in enhancing the flavor and sensory qualities of food, particularly in traditional dishes such as sinigang. However, many commercially available seasoning products contain artificial additives and flavor enhancers, highlighting the need for healthier and more natural alternatives. This study aimed to develop powdered Guamias, a combination of guava (*Psidium guajava*) and kamias (*Averrhoa bilimbi*), as an organic seasoning and to determine its acceptability when used in different sinigang recipes. The fruits were processed through selection, slicing, cabinet drying, grinding, and blending with natural flavoring ingredients to produce the powdered seasoning. Sensory evaluation was conducted among 120 respondents composed of teenagers, adults, and food experts using a structured questionnaire. Data were analyzed using weighted mean, standard deviation, and one-way ANOVA. Results revealed that pork, fish, and beef sinigang prepared with powdered Guamias were rated highly acceptable in terms of appearance, aroma, and taste. Statistical analysis showed no significant difference in acceptability across age groups. Nutritional analysis also indicated that the product contains beneficial nutrients, suggesting its potential as a natural, nutritious, and sustainable seasoning alternative. It is recommended that further studies explore improved packaging, shelf-life stability, and commercialization potential to support the wider utilization of powdered Guamias as an organic seasoning product.

Keywords: Powdered Guamias, organic seasoning, guava, kamias, sinigang recipes.

Date Submitted: March 9, 2026

Date Accepted: March 16, 2026

Date Published: April 6, 2026

INTRODUCTION

Seasoning enhances the taste of food by improving its flavor or adding new flavors. Salt, pepper, aromatic herbs, and spices are among the main types of seasoning. Salt contributes its own flavor, known as saltiness, and helps bring out the natural aromas of dishes. However, Smiechowska, Newerli-Guz, and Skotnicka (2021) stated that spices and seasoning mixes are widely used to enhance the sensory properties of food and are increasingly being developed through product and process innovations. These products often contain various additives such as artificial preservatives, food dyes, anti-caking agents (such as the synthetic compound sodium aluminosilicate), filler ingredients, and flavor enhancers like sugar. Sugar, sometimes

*Corresponding author

DOI: <http://doi.org/10.69651/PIJHSS0502892>

Recommended citation:

Ignacio, A. M. (2026). Development and sensory acceptability of powdered guamias (guava–kamias) as an organic seasoning for sinigang dishes. *Pantao (The International Journal of the Humanities and Social Sciences)* 5 (2), 121-126. <http://doi.org/10.69651/PIJHSS0502892>

described as an excitotoxin when consumed excessively, can enhance the flavor of food but may also have adverse effects on sensitive individuals (Olney, 1994; Freeman, et al, 2018; Olszewski, 2019).

For these reasons, the researcher focuses on developing an organic seasoning derived from natural sources of flavor and color. Organic seasonings can be used in food preparation without adding significant amounts of energy, sugar, saturated fats, or sodium. Moreover, they may provide beneficial effects on human health.

According to Mercadante et al. (2009), guava is a tropical fruit that belongs to the myrtle family. When ripe, the fruit becomes soft and has a sweet, musky aroma and creamy-textured flesh. The flesh varies in color depending on the cultivar and may be white, pink, yellow, or red. Ripe guava fruits possess a rich flavor characterized by a sweet-tart taste. Each fruit contains numerous small, semi-hard edible seeds, particularly concentrated in the center. Guava is a rich source of vitamins belonging to the B group, as well as vitamins C, A, and E (Edepalli et al, 2022; Trivedi, et al, 2012; Zaid et al, 2024). It is also an excellent source of dietary fiber and minerals such as potassium, manganese, magnesium, and phosphorus (Edepalli et al, 2022; Jiménez-Escrig et al, 2001). Because of its high nutritional value, guava is often labeled a “super fruit,” containing four times more vitamin C than oranges, three times more protein and four times more fiber than pineapple, twice as much lycopene as tomatoes, and slightly more potassium than bananas (Gladis et al, 2025; Zaid et al, 2024).

On the other hand, kamias is the Filipino name for a sour fruit-bearing plant scientifically known as *Averrhoa bilimbi* L. It originates from the Southeast Asian region and is commonly found in countries such as Malaysia, Indonesia, Myanmar, and Thailand. Bilimbi, commonly referred to as kamias, is an indigenous and underutilized fruit in the Philippines. It is widely used as a souring ingredient in traditional Filipino dishes such as sinigang and paksiw.

Kamias is classified as a tropical fruit and contains various nutrients, including vitamin B, vitamin C, iron, antioxidants, and phosphorus (Castro, 2021). While it is commonly used as a food ingredient, kamias also has potential health-related benefits. Due to its nutritional value, kamias may serve not only as a food source but also as a natural alternative for certain medicinal purposes.

In the Philippines, both guava and kamias are commonly found in household backyards. The fruits are often eaten raw or dipped in salt or bagoong (fish paste). They can also be used as souring agents in sinigang, a popular Filipino soup dish, in the preparation of native dishes such as pinangat, or served as appetizers when sliced and dipped in bagoong or patis.

Thus, the utilization of guava and kamias as functional food ingredients rather than allowing them to go to waste presents an interesting and beneficial area of research. Since these fruits are seasonal, processing them into dried powder form can make them available throughout the year while minimizing post-harvest losses. Therefore, this study aims to explore the utilization of powdered Guamias (guava and kamias) as an organic seasoning used in different sinigang recipes. It is believed that guava and kamias can be developed into a new food product that may provide value-added income, employment opportunities, and potential health benefits.

Statement of the problem

This study aimed to develop and determine the acceptability of powdered Guamias (guava and kamias) as an organic seasoning used in sinigang recipes. Specifically, it sought to answer the following questions:

1. What is the process involved in producing powdered Guamias as an organic seasoning used in different sinigang recipes?

2. What is the level of acceptability of powdered Guamias as an organic seasoning used in different recipes in terms of appearance, aroma, and taste?
3. What is the overall level of acceptability of powdered Guamias as an organic seasoning used in different sinigang recipes as evaluated by respondents from different age groups including teenagers, adults, and food experts?
4. Is there a significant difference in the overall level of acceptability of powdered Guamias as an organic seasoning used in different sinigang recipes when respondents are grouped according to age?
5. What is the nutritive content of powdered Guamias as an organic seasoning used in different sinigang recipes?

METHODOLOGY

This study aimed to develop powdered Guamias, a combination of guava and kamias fruits, as an organic seasoning and to determine its acceptability when used in different sinigang recipes. The preparation of the powdered Guamias began with the selection, washing, and slicing of fresh guava and kamias fruits. After preparation, the sliced fruits were subjected to cabinet drying to remove moisture. Once dried, the fruits were ground using a blender to produce a powdered form. The powder was then sifted to remove coarse particles and mixed with selected flavoring ingredients. Finally, the prepared powdered Guamias seasoning was stored in a clean, dry container to maintain its quality and ensure its readiness for use in food preparation.

Different tools and equipment were utilized during the preparation process, including preparatory tools, measuring tools, mixing tools, cutting tools, and processing equipment. The main raw materials used were guava and kamias fruits, while additional ingredients such as garlic powder, white pepper, and onion were incorporated to enhance the flavor of the seasoning. The developed product was intended for use in different sinigang dishes, particularly pork, fish, and beef sinigang.

To determine the acceptability of the product, the study conducted a sensory evaluation using a structured questionnaire. The evaluation involved 120 purposively selected respondents composed of three groups: teenagers, adults, and food experts. Each group consisted of 40 participants. The respondents were properly oriented on how to evaluate the product using a scorecard before participating in the assessment. They were asked to taste the prepared sinigang dishes and evaluate the product based on sensory attributes such as appearance, aroma, and taste, as well as its overall acceptability.

The collected data were analyzed using statistical tools through the Statistical Package for the Social Sciences (SPSS). The Weighted Mean (M) was used to determine the level of acceptability of the powdered Guamias seasoning in terms of appearance, aroma, and taste. The Standard Deviation (SD) was applied to measure the variability or dispersion of the responses around the computed mean. Furthermore, a One-Way Between-Groups Analysis of Variance (ANOVA) was employed to determine whether there were significant differences in the level of overall acceptability of the powdered Guamias seasoning across the three groups of evaluators: teenagers, adults, and food experts. These statistical analyses were used to interpret the acceptability and effectiveness of the developed organic seasoning product.

RESULTS AND DISCUSSION

Product development of powdered guamias as organic seasoning

The development of powdered Guamias as an organic seasoning involved a systematic process using guava and kamias fruits as the primary raw materials. The preparation began with harvesting, selecting, and washing the fruits to ensure quality and cleanliness. The guava fruits were sliced into quarters and deseeded, while the kamias fruits were cut into thin slices. The prepared fruits were arranged in a single layer on drying trays and dried using a cabinet dryer for four hours to remove moisture. After drying, the fruits were pulverized and sifted repeatedly until a fine powder was obtained.

The powdered guava and kamias were then measured and blended with selected flavoring ingredients, including onion powder, garlic powder, and white pepper. The mixture was processed to ensure uniform blending and then stored in airtight containers to preserve its quality. The resulting product served as an organic seasoning intended to enhance the flavor of various sinigang recipes.

Application of powdered guamias in sinigang recipes

The developed powdered Guamias seasoning was incorporated into three common Filipino dishes: pork sinigang, fish sinigang, and beef sinigang. In each preparation, the powdered seasoning was added during the cooking process to provide the characteristic sour and savory taste associated with sinigang. The use of the seasoning demonstrated its versatility as a souring and flavor-enhancing agent in different meat and fish-based dishes.

Sensory acceptability of recipes with powdered guamias

Sensory evaluation results indicated a high level of acceptability for all three sinigang variants prepared using powdered Guamias seasoning. In terms of appearance, pork sinigang obtained the highest mean score of 4.54, followed closely by fish sinigang (4.53) and beef sinigang (4.51), all interpreted as highly acceptable.

For aroma, fish sinigang recorded the highest mean score of 4.54, while pork sinigang had the lowest mean of 4.52, although still classified as highly acceptable. Regarding taste, fish sinigang again obtained the highest mean rating of 4.70, followed by pork sinigang (4.68) and beef sinigang (4.59). Overall, the results show that the use of powdered Guamias seasoning produced dishes that were consistently rated as highly acceptable across all evaluated sensory attributes.

These findings indicate that powdered Guamias effectively enhances the sensory qualities of sinigang dishes. The results support earlier findings by Limbaga et al. (2014), which demonstrated that kamias powder can serve as an acceptable souring agent in sinigang preparations.

Acceptability across respondent age groups

The evaluation results also revealed consistently high acceptability ratings across different groups of respondents, including teenagers, adults, and food experts. The overall mean acceptability scores were 4.56 for teenagers, 4.61 for adults, and 4.61 for food experts, all interpreted as highly acceptable. These findings suggest that the developed seasoning product appeals to a wide range of consumers regardless of age group or level of culinary expertise.

The results are consistent with the study of Zara et al. (2017), which demonstrated that fruit-based souring agents derived from guava and other acidic fruits are highly acceptable when used in sinigang preparations.

Statistical comparison of acceptability across age groups

Further statistical analysis using One-Way Analysis of Variance (ANOVA) showed no significant difference in the level of acceptability among the three respondent groups. The computed p-values for pork sinigang (0.202), fish sinigang (0.342), and beef sinigang (0.402) were all greater than the 0.05 level of significance. Consequently, the null hypothesis was accepted.

This result indicates that respondents across different age groups shared similar perceptions regarding the acceptability of powdered Guamias seasoning in the tested recipes. The consistency in evaluation suggests that the seasoning product has broad consumer acceptability.

Nutritional composition of powdered guamias

The nutritional analysis conducted by the Department of Agriculture revealed that powdered Guamias possesses notable nutritional components. The product contained 21.25% crude protein, 4.40% crude fiber, 1.93% crude fat, 1.45% moisture, and 68.05% ash content. These results indicate that the seasoning not only contributes flavor but also provides nutritional value.

The relatively low moisture content suggests good storage stability, which is important for powdered food products. According to Prangpru et al. (2017), moisture content is a critical factor affecting the shelf life and quality of powdered food materials because it influences microbial growth and product stability during storage.

Analytical implications

Overall, the findings demonstrate that powdered Guamias can be effectively developed as a natural and acceptable organic seasoning for traditional Filipino dishes. The consistently high sensory ratings across recipes and respondent groups indicate strong consumer acceptance. Furthermore, the absence of significant differences among age groups suggests the product's broad market potential. Combined with its favorable nutritional composition and low moisture content, powdered Guamias shows promise as a functional seasoning product that may contribute to the development of healthier and more sustainable food alternatives.

CONCLUSION

The findings of the study demonstrate that powdered Guamias, derived from guava and kamias, can be successfully developed as an organic seasoning when the prescribed preparation procedures are carefully followed. The materials required for its production are readily available in local communities, making the product practical and feasible for small-scale processing and household use. The developed seasoning proved to be versatile as it was effectively incorporated into different sinigang recipes, including pork, fish, and beef variants. Sensory evaluation results further revealed that all three dishes prepared with powdered Guamias were highly acceptable to respondents, including teenagers, adults, and food experts, in terms of appearance, aroma, and taste. These results indicate that the seasoning product enhances the sensory quality of traditional Filipino dishes and has strong consumer appeal across different age groups.

Moreover, the nutritional analysis conducted by the Department of Agriculture confirmed that powdered Guamias possesses valuable nutritional components, suggesting that

it is not only a flavor-enhancing ingredient but also a nutritious food product. Given these positive results, further improvement and development of the product are encouraged. Future studies may explore appropriate packaging and labeling materials to enhance the product's presentation and marketability. The use of improved grinding equipment may also be considered to obtain a finer powder texture and better product quality. In addition, further research may be conducted to develop other food products using powdered Guamias as a flavor enhancer and to examine its acceptability in various culinary applications. Subsequent studies may also focus on broader product analysis, including cost–benefit evaluation and shelf-life assessment, to determine the economic viability and storage stability of the seasoning. These initiatives would support the potential commercialization and wider utilization of powdered Guamias as a natural and sustainable organic seasoning.

REFERENCES

- Castro, C. J. (2021). Development of kamias (*Averrhoa bilimbi* L.) jam with coconut water. *International Journal of Vocational Education and Training Research*, 7(1), 1–5. <https://doi.org/10.11648/j.ijvetr.20210701.11>
- Edepalli, E., Lakshmi, N. V., Kumar, S., Sudhir, D. A., Jitendrabhai, P. S., Singh, S., & Jangir, S. (2022). A review on nutritional and medicinal properties of guava (*Psidium guajava* L.). *Annals of Phytomedicine: An International Journal*.
- Freeman, C. R., Zehra, A., Ramirez, V., Wiers, C. E., Volkow, N. D., & Wang, G. J. (2018). Impact of sugar on the body, brain, and behavior. *Frontiers in Bioscience*, 23, 2255–2266.
- Gladis, B., Prasad, M. S., Priya, B. T., Sadarunnisa, S., Jayaprada, M., & Arunodhayam, K. (2025). Biochemical constituents in guava: A review. *Plant Archives*, 25(2), 1874–1882. <https://doi.org/10.51470/PLANTARCHIVES.2025.v25.no.2.271>
- Jiménez-Escrig, A., Rincón, M., Pulido, R., & Saura-Calixto, F. (2001). Guava fruit (*Psidium guajava* L.) as a new source of antioxidant dietary fiber. *Journal of Agricultural and Food Chemistry*, 49(11), 5489–5493.
- Olney, J. W. (1994). Excitotoxins in foods. *Neurotoxicology*, 15(3), 535–544.
- Olszewski, P. K., Wood, E. L., Klockars, A., & Levine, A. S. (2019). Excessive consumption of sugar: An insatiable drive for reward. *Current Nutrition Reports*, 8, 120–128.
- Smiechowska, M., Newerli-Guz, J., & Skotnicka, M. (2021). Spices and seasoning mixes in the European Union: Innovations and ensuring safety. *Foods*, 10(10), 2289. <https://doi.org/10.3390/foods10102289>
- Trivedi, N., Singh, D. P., Bahadur, V., Prasad, V. M., & Collis, J. P. (2012). Effect of foliar application of zinc and boron on yield and fruit quality of guava (*Psidium guajava* L.). *HortFlora Research Spectrum*, 1, 281–283.
- Zaid, A., Prajapati, P., Singh, P., Jaiswal, E., Yadav, H. C., Gaund, M., Mishra, A., Gautam, H. K., & Kumar, L. (2024). Molecular exploration and nutritional composition of guava. *International Journal of Advanced Biochemistry Research*, 8(10), 695–702. <https://doi.org/10.33545/26174693.2024.v8.i10i.2598>