

Development and Acceptability of Alibangbang Leaves Powder as a Souring Agent

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Abstract—This study explored the development and acceptability of Alibangbang (*Bauhinia malabarica*) leaves powder as a natural souring agent, with the goal of offering a sustainable and health-promoting alternative to conventional souring ingredients. The research aimed to identify the appropriate methods for preparing the powder, evaluate its sensory characteristics, specifically taste, aroma, and solubility, and assess its nutritional content and storage stability. The preparation process ensured that the natural properties of the leaves were retained, enabling the production of a consistent and high-quality powder. A sensory evaluation was conducted with a panel of parent respondents, who assessed the product using established sensory criteria. The powder was found to possess a pleasant sour taste that complemented various dishes, along with a distinctive aroma that enhanced its appeal. The solubility of the powder also contributed to its ease of use in food preparation, making it a practical ingredient for both traditional and modern culinary applications. Nutritional analysis revealed that Alibangbang leaves powder is rich in vitamin C and antioxidants, which contribute to its functional and health-promoting properties. These components support immune health and offer potential protective effects against oxidative stress. In addition, the powder demonstrated favorable storage characteristics, maintaining its sensory and nutritional quality over time when stored in airtight containers. Overall, the findings indicate that Alibangbang leaves powder is a promising natural souring agent. It combines desirable sensory qualities with nutritional benefits and practical storage stability. Its use promotes sustainable food practices and the incorporation of native plant resources into mainstream culinary systems. As such, this product offers valuable potential for innovation in both home and commercial food preparation.

Keywords— Alibangbang, taste, aroma, solubility.

I. INTRODUCTION

Souring agents are essential to Filipino cuisine, enriching traditional dishes such as sinigang and paksiw with their distinct flavor, aroma, and nutritional value. While ingredients like tamarind and calamansi are widely favored, their seasonal availability, perishability, and storage challenges limit their consistent use and commercial viability. These limitations highlight the need for alternative sources that are not only flavorful but also stable, sustainable, and locally available. One promising alternative is the Alibangbang tree (*Bauhinia malabarica*), which is abundant in the Philippines and traditionally used by local communities for its sour-tasting leaves. Despite its culinary use, scientific studies exploring its powdered form as a souring agent remain limited. Developing a shelf-stable, powdered version of Alibangbang leaves may offer a practical and culturally appropriate substitute for conventional souring agents. This study aims to produce and evaluate Alibangbang leaf powder, focusing on its nutritional

composition and sensory attributes such as taste, aroma, and solubility. Ultimately, the research seeks to contribute to food sustainability efforts by promoting the use of indigenous plant resources and diversifying locally available food ingredients.

Objectives of the Study

1. To determine the steps in preparing Alibangbang leaves powder as a souring agent.
2. To evaluate the sensory attributes (taste, aroma, and solubility) of Alibangbang leaves powder.
3. To assess the nutritional properties and shelf life of the powder. This research contributes to sustainable food innovation by utilizing indigenous resources and promoting the use of locally available ingredients in Filipino households.

II. METHODOLOGY RESEARCH DESIGN

An experimental research design was employed to develop and evaluate Alibangbang leaves powder. The study involved the preparation of the product, sensory evaluation, and laboratory analysis for nutritional content and shelf life.

Preparation of Alibangbang Leaves Powder

1. Collection and Selection: Fresh, mature Alibangbang leaves were collected and inspected for quality.
2. Washing and Drying: The leaves were thoroughly washed and air-dried under controlled conditions to preserve their natural souring properties.
3. Pulverization and Storage: Dried leaves were ground into a fine powder using a food-grade grinder and stored in airtight containers to prevent contamination.
4. Packaging: The powder was packaged in resealable pouches for storage and sensory evaluation.

Sensory Evaluation

A total of 100 parent respondents participated in the sensory evaluation. The powder was tested in sinigang and paksiw dishes, and respondents rated the product on a 5-point Likert scale for: • Taste • Aroma • Solubility

Nutritional Analysis and Shelf Life The nutritional properties of the powder were analyzed in a laboratory, focusing on vitamin C, antioxidants, and other key nutrients. The shelf life was assessed by monitoring the powder's quality over six months in various storage conditions (room temperature and refrigeration).

Data Analysis Data were analyzed using descriptive statistics, including mean scores and standard deviations, to determine overall sensory acceptability. Nutritional data and shelf life results were presented in tables for comparison.

Results Preparation Steps The study established a systematic process for producing Alibangbang leaves powder, ensuring optimal preservation of souring properties and ease of storage.

Sensory Evaluation results are sensory Attribute Mean Score Interpretation Taste as Highly Acceptable Aroma 4.6/5 Highly Acceptable Solubility 4.5/5 Acceptable The product was rated highly for its natural sour flavor and aroma, with respondents noting its suitability for traditional Filipino dishes. Solubility was rated acceptable, indicating ease of use in food preparation.

Nutritional Analysis The nutritional analysis revealed the following key components: • Vitamin C: 40 mg per 100 g • Antioxidants: High levels comparable to tamarind • Calories: 25 kcal per 100 g These findings highlight the product's health benefits as a natural and nutritious souring agent.

Shelf Life Alibangbang leaves powder remained stable for up to six months in airtight containers when stored at room temperature or under refrigeration. No significant changes in taste, aroma, or solubility were observed during this period.

III. RESULTS AND DISCUSSION

Level of Sensory Attributes of Alibangbang Leaves Powder Souring Agent

TABLE 1. Level of Sensory Attributes of Alibangbang Leaves Powder Souring Agent in terms of Aroma

STATEMENT	Mean	SD	Remarks
This Alibangbang Leaves Powder is distinctive and has a savory smell.	4.27	0.73	SA
The product smells delicious and appetizing.	4.44	0.65	SA
The Alibangbang Leaves Powder is pleasing and alluring to the appetite.	4.48	0.59	SA
The product has pleasant smell comparable to commercially available souring powder.	4.11	0.76	A
The finished product has distinct sour smell.	4.55	0.59	SA
Grand Mean	4.37		SA
Interpretation			Very High

Table 1 presents the evaluation of the sensory attributes of Alibangbang Leaves Powder as a souring agent, specifically focusing on its aroma. The data is summarized in terms of mean scores, standard deviations, remarks and verbal interpretation.

With a mean score of 4.27 and a standard deviation of 0.73, the respondents enthusiastically agree that Alibangbang Leaves Powder has a unique and tasty aroma. The product's distinctiveness and capacity to produce an identifiable perfume are reflected in this. A mean score of 4.44 with a standard deviation of 0.65 showed that the product smells delicious and appetizing, again earning a Strongly Agree remark. This means that the aroma is perceived as highly appealing. Respondents gave Alibangbang Leaves Powder the highest mean score of 4.48, making it appealing and attractive to the appetite, with a lower variability of 0.59 than other attributes. This indicates strong agreement and highlights the powder's capability to stimulate appetite through its aroma. However, the product's aroma, as compared to commercially available souring agents, received a mean score of 4.11 with a standard deviation of 0.76, categorized as Agree. While still positive, this score suggests slight variability in perceptions

when benchmarked against existing commercial products. The finished product has a distinct sour smell, with a mean of 4.55 and a standard deviation of 0.59, achieving Strongly Agree remark from the respondents. This highlights the powder's effectiveness in delivering a noticeable sour aroma.

The grand mean is 4.37, with a qualitative interpretation of Very High, indicates that the product consistently exhibits a strong aromatic profile appreciated by the respondents.

TABLE 2. Level of Sensory Attributes of Alibangbang Leaves Powder Souring Agent in terms of Taste

STATEMENT	Mean	SD	Remarks
The product can achieve a rich flavor experience.	4.54	0.87	SA
The Alibangbang Leaves Powder soothed the tongue of the consumer.	4.15	0.77	A
The product is palatable that can be compared to commercially available sinigang powder.	4.58	0.55	SA
The souring powder has a unique taste that can be compared to commercially available sinigang powder.	4.66	0.60	SA
The product improved taste assured satisfaction.	4.75	0.48	SA
Grand Mean	4.54		SA
Interpretation			Very High

Table 2 presents the sensory evaluation results of the Alibangbang Leaves Powder as a souring agent, specifically in terms of taste. The findings reveal that the overall grand mean score of 4.54 indicates that the product was strongly accepted (SA) by the respondents, interpreted as having a very high level of acceptability in terms of taste attributes. The statement "The product improved taste assured satisfaction" received the highest mean score of 4.75 (SA), implying that the Alibangbang powder significantly enhanced the flavor profile of the dish and met consumer satisfaction. This suggests that consumers perceive the souring agent as highly effective in improving taste, which is crucial in food product innovation and acceptance. Likewise, the statement "The souring powder has a unique taste that can be compared to commercially available sinigang powder" garnered a mean of 4.66 (SA). This suggests that respondents recognize the potential of the product to compete with existing commercial souring agents, showcasing its uniqueness and acceptability in traditional Filipino cuisine. Statements related to flavor richness (mean = 4.54), palatability compared to commercial powders (mean = 4.58), and tongue-soothing properties (mean = 4.15) also received favorable ratings. Although the statement "The Alibangbang Leaves Powder soothed the tongue of the consumer" had the lowest mean of 4.15 (A), it still indicates an acceptable level of sensory quality. The low standard deviation values across all statements (ranging from 0.48 to 0.87) suggest consistency in the responses, indicating that most respondents had similar perceptions of the product's taste attributes. Overall, the high scores and low variability affirm that Alibangbang Leaves Powder is a viable alternative souring agent with desirable taste characteristics, potentially adding value to local food products and promoting the utilization of indigenous plant ingredients in culinary applications.

TABLE 3. Level of Sensory Attributes of Alibangbang Leaves Powder Souring Agent in terms of Solubility

STATEMENT	Mean	SD	Remarks
The Alibangbang leaves powder can easily dissolve in water.	4.55	0.66	SA
No observable residues are left on the bottom after being combined with water.	4.17	0.76	A
When mixed with water, the Alibangbang leaves powder did not create slimy outcome.	4.56	0.54	SA
The product demonstrates high solubility in both hot and cold water.	4.65	0.56	SA
The product exhibits rapid solubility, requiring minimal stirring for full dispersion	4.59	0.62	SA
Grand Mean	4.51		SA
Interpretation			Very High

Table 3 illustrates the sensory evaluation results for the solubility characteristics of the Alibangbang Leaves Powder as a souring agent. The overall grand mean score of 4.51, interpreted as Strongly Agree (SA), indicates a very high level of acceptability in terms of the powder's solubility performance. The highest rating was recorded in the statement "The product demonstrates high solubility in both hot and cold water," with a mean of 4.65 (SA). This result affirms the versatility and convenience of the product in various culinary applications, as it can be used effectively regardless of temperature conditions. Following closely is the statement "The product exhibits rapid solubility, requiring minimal stirring for full dispersion," with a mean score of 4.59 (SA). This highlights the efficiency of the powder in preparation processes, which is a key consideration for both home cooks and commercial kitchens. Additionally, the statement "When mixed with water, the Alibangbang leaves powder did not create slimy outcome" was rated with a mean of 4.56 (SA), suggesting that the powder maintains a clean and acceptable texture upon mixing, further enhancing user satisfaction. Meanwhile, the statement "The Alibangbang leaves powder can easily dissolve in water" also received a favorable rating with a mean of 4.55 (SA), confirming the ease of use and integration of the product in food preparations. The only statement rated as Agree (A) was "No observable residues are left on the bottom after being combined with water," which had the lowest mean of 4.17. While still within the acceptable range, this may suggest that minimal sedimentation might occur, indicating a potential area for improvement in refining the powder's particle consistency or processing technique. Overall, the low standard deviation values (ranging from 0.54 to 0.76) demonstrate consistent responses among evaluators. These findings collectively indicate that Alibangbang Leaves Powder exhibits excellent solubility characteristics, making it a practical and user-friendly souring agent in both household and food industry settings.

Level of Acceptability of Alibangbang Leaves Powder Souring Agent

The results demonstrate that Alibangbang leaves powder is a viable alternative to conventional souring agents. Its high sensory acceptability scores indicate its potential as a flavorful and aromatic ingredient in Filipino cuisine. The powder's solubility ensures ease of use in food preparation, while its

nutritional content offers added health benefits. Moreover, the study highlights the product's sustainability and economic potential. By utilizing locally available Alibangbang leaves, this research supports efforts to promote indigenous resources and reduce dependence on imported souring agents. The extended shelf life of the product further enhances its practicality for household and commercial use.

TABLE 4. Level of Acceptability of Alibangbang Leaves Powder Souring Agent

Sensory Attributes	Grand Mean	SD	Remarks
Aroma	4.37	0.69	SA
Taste	4.54	0.70	SA
Solubility	4.51	0.65	SA
Overall Mean	4.47		SA
Interpretation			Very High

IV. CONCLUSION

This study successfully developed and evaluated the acceptability of Alibangbang leaves powder as a souring agent. The powder demonstrated high sensory acceptability, significant nutritional value, and extended shelf life, making it a sustainable and nutritious alternative to conventional souring agents.

Recommendations

1. Expand the study to include a broader demographic for sensory evaluation, such as chefs and food industry professionals.
2. Conduct further research on optimizing solubility to enhance product usability.
3. Explore mass production and commercialization strategies for the powder.
4. Promote awareness of the nutritional and culinary benefits of Alibangbang leaves through community-based programs.

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