JASDG
JOURNAL FOR THE ADVANCEMENT OF SUSTAINABLE DEVELOPMENT GOALS
AN INTERNATIONAL, PEER-REVIEWED, OPEN ACCESS JOURNAL
www.jasdg.com
Volume 1 Issue 4 Pages 4314-4329
ISSN: 3155-7546 (Online)
DOI: 10.5281/zenodo.24295083

FROM ROOT CROP TO FUNCTIONAL KAKANIN: PRODUCT DEVELOPMENT, SENSORY ACCEPTABILITY, ECONOMIC VIABILITY, AND MARKET POTENTIAL OF UBIBINGKA ENRICHED WITH POWDERED SWEET POTATO (*Ipomoea batatas* L.)

Eden F. Macalingay
Teacher I
Department of Education
Email: emacalingay2014@gmail.com

ABSTRACT

This study developed and evaluated UbiBingka, an innovative bibingka product made with powdered sweet potato (*Ipomoea batatas*) and glutinous rice flour in equal proportions. It aimed to determine the sensory acceptability of the developed product in terms of appearance, aroma, taste, texture, and overall acceptability, and to assess its marketability based on consumers' willingness to purchase, perceived value, acceptable pricing, and willingness to recommend the product. An experimental product development design was employed. Fresh sweet potatoes were processed into powder through cleaning, slicing, drying, milling, and sieving. The UbiBingka formulation consisted of 1½ cups of powdered sweet potato and 1½ cups of glutinous rice flour combined with evaporated milk, condensed milk, sugar, coconut milk, butter, cheese, and salt. The finished product was subjected to sensory evaluation using a nine-point hedonic scale, and its marketability was assessed through a survey questionnaire administered to 40 selected respondents composed of students, teachers, and community members. Data were analyzed using mean scores, frequency counts, percentage distributions, and production cost analysis. UbiBingka was highly acceptable to the respondents, obtaining an overall sensory evaluation mean of 8.49, interpreted as "Like Extremely," with taste (8.70) rated highest and appearance (7.93) lowest. Marketability indicators likewise received favorable ratings ranging from 4.23 to 4.68, all interpreted as "Strongly Agree." The production cost analysis revealed a cost of ₱12.17 per piece and a recommended selling price of ₱15.00, indicating profitability and commercialization potential. The findings demonstrate that powdered sweet potato can be successfully utilized in bibingka production while promoting food innovation, value addition, entrepreneurship, and the utilization of locally available agricultural resources. Because the study involved a single formulation, a small purposive sample, and no shelf-life or microbiological testing, the results should be read as evidence of acceptability and commercial promise rather than of product stability or safety.

Keywords: *UbiBingka, Sweet Potato Powder, Glutinous Rice Flour, Sensory Evaluation, Marketability, Food Innovation, Value-Added Products*

© 2026 Advancing SDG Impact. All rights reserved.

JASDG
JOURNAL FOR THE ADVANCEMENT OF SUSTAINABLE DEVELOPMENT GOALS
AN INTERNATIONAL, PEER-REVIEWED, OPEN ACCESS JOURNAL
www.jasdg.com
Volume 1 Issue 4 Pages 4314-4329
ISSN: 3155-7546 (Online)
DOI: 10.5281/zenodo.24295083

INTRODUCTION

Background of the Study

Food innovation plays a significant role in maximizing the use of locally available agricultural resources. In Besao, Mountain Province, sweet potato (*Ipomoea batatas*), locally known as *ubi* or *kamote*, is one of the most commonly cultivated root crops and serves as an important source of food and livelihood. The crop contributes to food security and provides an affordable source of nutrition for many households in the Philippines (Porol, 2020). Research in the Cordillera Administrative Region supports its relevance to upland farming households: in participatory trials of orange-fleshed sweet potato under low-elevation, mid-elevation, and highland conditions, most varieties still produced considerable yields and high dry matter, and the authors concluded that the crop could contribute to nutrition, food security, and the income of marginal farmers (Quindara et al., 2020).

One way of enhancing the utilization of sweet potato is through its conversion into powder, which can be incorporated into various food products. Sweet potato flour and powder possess desirable functional properties, including favorable water absorption, swelling capacity, and starch characteristics that make them suitable for food processing and baking applications (Olatunde et al., 2016). A review by Dereje et al. (2020) similarly noted that producing foods from sweet potato flour is feasible because of the crop's wide availability, natural color, and low cost, and that the flour can contribute nutritional value, antioxidants, and natural color to processed foods.

This study developed UbiBingka, a modified bibingka prepared using powdered sweet potato and glutinous rice flour. The innovation combines a locally available crop with a traditional Filipino delicacy, creating a product that promotes indigenous agricultural resources while maintaining the familiar characteristics of bibingka. The development of value-added sweet potato products has been recognized as an effective strategy for increasing the economic value of sweet potatoes and generating additional livelihood opportunities for local communities.

Research Gap and Rationale

Previous studies have shown that sweet potato flour possesses desirable functional properties and can be incorporated into different food products. According to Olatunde et al. (2016), sweet potato is among the world's most important, versatile, and underutilized food crops, and its flour quality makes it suitable for various end-use applications. However, limited research has focused on the development, economic feasibility, and marketability of bibingka made from powdered sweet potato and glutinous rice flour. Likewise, information on consumer acceptance of such products within local communities remains inadequate.

Existing work tends to examine these questions separately. Studies on sweet potato flour have concentrated on its functional properties and on its use as a partial substitute for wheat or rice flour; studies on sensory evaluation have concentrated on acceptance; and studies on commercialization have concentrated on costs and returns. Studies that combine sensory acceptability, consumer marketability, and production costing appear to be scarce for a traditional kakanin, yet such a combined evaluation is exactly what a local entrepreneur or community organization needs to decide whether a product is worth producing. This study addresses that need.

This study therefore sought to develop a standardized UbiBingka formulation and to evaluate its sensory characteristics, economic feasibility, and marketability. The findings provide valuable information on the use of sweet potato as a value-added ingredient while promoting food innovation, entrepreneurship, and sustainable community development.

Review of Related Literature

This section reviews literature on sweet potato flour as a food ingredient, its use in baked and rice-based products, sensory evaluation using the nine-point hedonic scale, drivers of acceptance, consumer perception of value, the economics of value-added sweet potato products, and the shelf life and safety of rice-based cakes. These strands frame the design of the study and the interpretation of its results.

© 2026 Advancing SDG Impact. All rights reserved.

JASDG
JOURNAL FOR THE ADVANCEMENT OF SUSTAINABLE DEVELOPMENT GOALS
AN INTERNATIONAL, PEER-REVIEWED, OPEN ACCESS JOURNAL
www.jasdg.com
Volume 1 Issue 4 Pages 4314-4329
ISSN: 3155-7546 (Online)
DOI: 10.5281/zenodo.24295083

Sweet Potato and Its Flour as a Food Ingredient

Converting fresh roots into flour is a practical way to extend the utilization of sweet potato. Dereje et al. (2020) reviewed the functional properties of sweet potato flour and reported that its functional characteristics, such as viscosity, pasting and gelatinization temperature, swelling power, and solubility, depend on granule size and on starch, protein, and amylose content, and that these properties vary with variety and processing method. Consistent with this, Olatunde et al. (2016) examined sweet potato flour quality as influenced by variety, pretreatment, and drying method. Dereje et al. (2020) further observed that limited information on functional properties constrains the exploitation of the flour, and that high-quality flour is needed when it is integrated into other foods because flour quality affects the acceptability of the resulting products. These findings underscore the importance of standardizing the preparation of the powder, which in this study involved washing, peeling, slicing, drying, milling, and sieving.

Sweet Potato Flour in Baked and Rice-Based Products

Sweet potato flour has been examined as a partial substitute for cereal flours in several products. In the Philippines, Lizardo et al. (2017) tested sweet potato and saba banana flours in pandesal and found that replacing up to half of the all-purpose flour with either flour was acceptable to sensory panels, although higher sweet potato levels produced a denser, less spongy bread; the authors suggested maintaining gluten or adding improvers when non-wheat flours are used. Sweet potato flour has also been evaluated in rice-based products, including puto (Pa-ala et al., 2025) and vermicelli in which orange-flesh sweet potato powder partially replaced rice flour (Giau et al., 2024). Taken together, these studies indicate that sweet potato flour is compatible with a range of products and that the acceptable level of substitution depends on the product matrix.

Bibingka made from glutinous rice flour differs from wheat-based breads in that its structure does not depend on gluten, which may partly explain why an equal proportion of sweet potato powder and glutinous rice flour can still yield a product resembling traditional bibingka. This explanation is offered as a hypothesis, because the texture of UbiBingka was assessed only through consumer ratings and not through instrumental measurement.

Sensory Evaluation and the Nine-Point Hedonic Scale

The nine-point hedonic scale was developed by Peryam and colleagues to measure the food preferences of military personnel (Peryam & Pilgrim, 1957) and has since become one of the most widely used instruments for consumer acceptance testing. Its verbal categories range from “dislike extremely” to “like extremely.” Addo-Preko et al. (2023) compared 9-, 7-, 5-, and 3-point versions of the scale using Ghanaian breads and found that the ranking of products remained the same across scale lengths, although the nine-point version discriminated less than the three-point version in the t-tests; the authors emphasized that consumers’ attention to the scale matters as much as its length. In the present study, the descriptive mean ranges were derived by the researcher (Table 1), so interpretations such as “Like Extremely” should be read against that scale and not as an external benchmark of commercial success.

Appearance, Flavor, and Texture as Drivers of Acceptance

The role of appearance in acceptance has been examined in sweet potatoes. In a study of 12 cultivars with orange, purple, and yellow flesh, Leksrisompong et al. (2012) found that orange-fleshed cultivars received the highest color liking, which the authors attributed to consumers’ familiarity with orange sweet potatoes, but that flavor and texture were the main drivers of overall liking and color liking was not a major driver of overall acceptance. Bowen et al. (2019), working with 23 baked sweet potato cultivars, reported that consumers (n = 204) showed a strong bias toward particular color attributes, preferring an even, light-orange hue, with color evenness accounting for most of the variation among products. Although these studies concern whole roots and not processed products, they suggest that familiarity and color uniformity can shape appearance ratings even when flavor and texture are well liked.

© 2026 Advancing SDG Impact. All rights reserved.

JASDG
JOURNAL FOR THE ADVANCEMENT OF SUSTAINABLE DEVELOPMENT GOALS
AN INTERNATIONAL, PEER-REVIEWED, OPEN ACCESS JOURNAL
www.jasdg.com
Volume 1 Issue 4 Pages 4314-4329
ISSN: 3155-7546 (Online)
DOI: 10.5281/zenodo.24295083

Consumer Perception, Perceived Value, and Purchase Intention

Purchase decisions depend on perceived value as well as sensory liking. Dodds et al. (1991) examined how extrinsic cues, namely price, brand name, and store name, influence buyers' perceptions of product quality and value and their willingness to buy. The marketability indicators used in the present study, which cover purchase intention, perceived value, and willingness to recommend, follow this logic, and the purchase intention statements were adapted from Dodds et al. (1991). For a low-priced local snack, the perceived value of the product relative to its price is particularly relevant to whether sensory acceptance translates into purchase.

Economic Feasibility of Value-Added Sweet Potato Products

Cost and price information is commonly used to judge whether a value-added product merits commercialization. In the Cordillera, Botangen and Quindara (2009) developed two sweet-sour sweet potato candies and reported production costs of ₱13.55 and ₱14.25 per pack against a selling price of ₱18.50 per pack, with estimated returns on capital employed of 36.51% and 29.82%. The study illustrates how cost per unit, selling price, and a return indicator can be combined to assess commercial promise, and it offers a regional reference point for the cost per piece obtained in the present study.

Shelf Life and Food Safety of Rice-Based Cakes

Rice-based cakes raise specific storage and safety concerns. In a study of binanban, a traditional purple glutinous rice cake, Ofalsa (2024) found that yeasts, molds, coliforms, and *Escherichia coli* remained within safe limits during 72 hours of ambient storage, whereas aerobic mesophilic bacteria and *Bacillus cereus* increased significantly. Because *B. cereus* is a recognized concern in rice-based and starchy foods, it was identified as the main microbial shelf-life threat, and a shelf life of one to two days at room temperature was recommended. The same study reported that anthocyanin content declined during storage, making the cake lighter and more yellow. Although binanban differs from baked UbiBingka, these findings show why shelf-life and microbiological testing are needed before small-scale products of this kind are marketed beyond immediate consumption.

Synthesis

The reviewed literature shows that sweet potato flour is a functional and versatile ingredient, that its acceptable level of use depends on the product, that the nine-point hedonic scale is a standard tool for measuring acceptance, that flavor and texture often matter more than color for overall liking, that perceived value is central to purchase intention, and that cost-per-unit analysis and shelf-life testing are essential for commercialization. The literature reviewed for this study did not include a report that combined sensory acceptability, marketability, and production costing for a bibingka made from sweet potato powder and glutinous rice flour, which supports the research gap identified above.

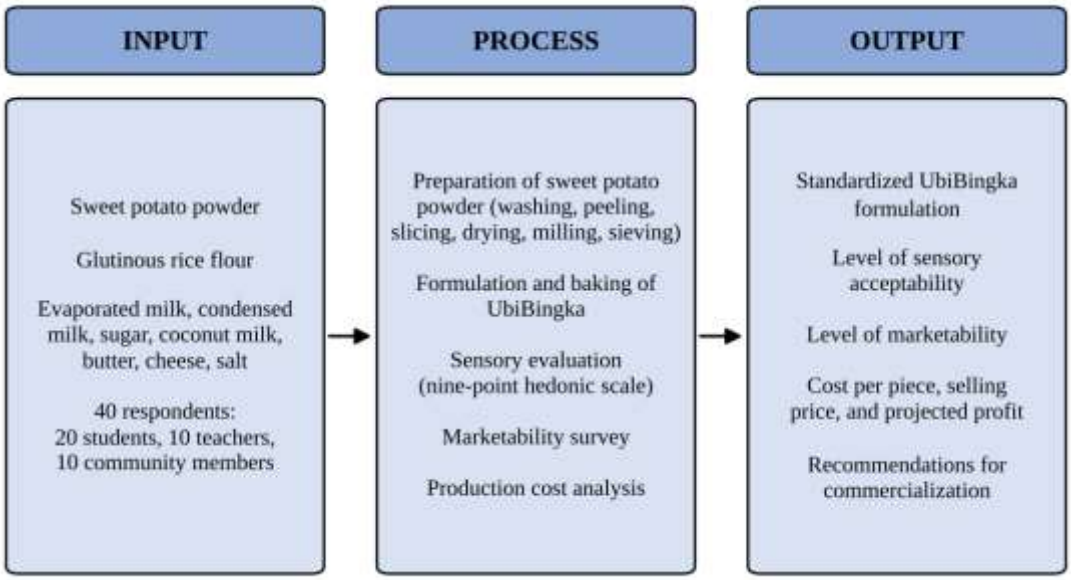
Conceptual Framework

The study followed an input–process–output framework (Figure 1). The input consisted of the sweet potato powder, glutinous rice flour, and other ingredients used in the formulation, together with the 40 respondents who evaluated the product. The process covered the preparation of the sweet potato powder, the formulation and baking of UbiBingka, the sensory evaluation using the nine-point hedonic scale, the marketability survey, and the production cost analysis. The output comprised a standardized UbiBingka formulation, the levels of sensory acceptability and marketability, the cost per piece, selling price, and projected profit, and recommendations for commercialization.

© 2026 Advancing SDG Impact. All rights reserved.

JASDG
JOURNAL FOR THE ADVANCEMENT OF SUSTAINABLE DEVELOPMENT GOALS
AN INTERNATIONAL, PEER-REVIEWED, OPEN ACCESS JOURNAL
www.jasdg.com
Volume 1 Issue 4 Pages 4314-4329
ISSN: 3155-7546 (Online)
DOI: 10.5281/zenodo.24295083

Figure 1. Conceptual Framework of the Study



Research Objectives

This study determined the development, acceptability, marketability, and economic feasibility of UbiBingka enriched with powdered sweet potato (*Ipomoea batatas*). Specifically, it sought to:

1. develop a standardized UbiBingka formulation and evaluate its sensory characteristics in terms of appearance, aroma, taste, texture, and overall acceptability;
2. determine the economic feasibility of UbiBingka through production cost analysis; and
3. evaluate the product's marketability based on consumers' willingness to purchase, perceived value, acceptable selling price, and willingness to recommend the product to others.

Significance of the Study

The development of UbiBingka demonstrated the potential of powdered sweet potato as a value-added ingredient in bibingka production. The innovation promotes the utilization of locally available sweet potatoes, supports value-added food processing, and provides opportunities for entrepreneurship and livelihood generation within the community. The findings may also serve as a reference for future food product development studies and local food innovation initiatives.

Specifically, the findings may benefit local entrepreneurs and community organizations by providing a tested formulation, a production cost breakdown, and an indication of consumer response that can guide livelihood decisions. Schools and community groups may use the results as a model of local food innovation, and sweet potato growers may benefit indirectly from a stronger demand for processed forms of the crop. Researchers in food product development may use the study as a baseline for formulation, nutritional, and shelf-life studies.

Scope and Delimitation

The study covered the development of one UbiBingka formulation in which powdered sweet potato and glutinous rice flour were used in equal proportions; the evaluation of its sensory acceptability and marketability by 40 respondents composed of students, teachers, and community members; and the production cost analysis of one batch of 35 pieces. The nutritional composition, shelf life, and microbiological safety of the product were outside the scope of the study.

© 2026 Advancing SDG Impact. All rights reserved.

JASDG
JOURNAL FOR THE ADVANCEMENT OF SUSTAINABLE DEVELOPMENT GOALS
AN INTERNATIONAL, PEER-REVIEWED, OPEN ACCESS JOURNAL
www.jasdg.com
Volume 1 Issue 4 Pages 4314-4329
ISSN: 3155-7546 (Online)
DOI: 10.5281/zenodo.24295083

METHODS

Research Design

The study utilized a product development and descriptive-evaluative research design. It focused on the development of UbiBingka enriched with powdered sweet potato (*Ipomoea batatas*), followed by the assessment of its sensory acceptability, marketability, and economic feasibility. The research involved the preparation of sweet potato powder, the formulation and production of the product, sensory evaluation by selected respondents, marketability assessment, and production cost analysis.

Materials

Fresh sweet potatoes (*Ipomoea batatas*) were used as the primary raw material for the production of sweet potato powder. The sweet potatoes were thoroughly washed, peeled, sliced, dried, milled, and sieved to obtain a fine and uniform powder suitable for baking. For the preparation of UbiBingka, the ingredients used were 1½ cups of powdered sweet potato (*ubi* powder), 1½ cups of glutinous rice flour, 1 cup of evaporated milk, ¾ cup of condensed milk, ½ cup of white sugar, 400 milliliters of coconut milk, 3 tablespoons of melted butter, and 1 teaspoon of salt. Grated cheese (165 g; see Table 5) was used as a topping to enhance the appearance and flavor of the finished product. All ingredients were accurately measured to ensure consistency and uniformity in the preparation of the product.

The equipment utilized in the study included a knife, chopping board, drying trays or food dehydrator, grinder or milling machine, fine sieve, measuring cups and spoons, weighing scale, mixing bowls, spatula, baking pans or bibingka molds, and an oven. These materials and equipment facilitated the preparation, processing, baking, and evaluation of the developed product.

Respondents of the Study

The respondents of the study consisted of 40 individuals, comprising 20 students, 10 teachers, and 10 community members. They were selected through purposive sampling based on their willingness to participate in the sensory evaluation and marketability assessment of UbiBingka. The respondents evaluated the product using the sensory evaluation questionnaire and the marketability assessment tool under standardized conditions.

Research Instruments

Two instruments were used in the study. The first was a sensory evaluation questionnaire based on a nine-point hedonic scale, which was used to assess the appearance, aroma, taste, texture, and overall acceptability of UbiBingka. The nine-point hedonic scale was adapted from Peryam and Girardot (1952) and Peryam and Pilgrim (1957), and the descriptive mean ranges used for interpretation were derived by the researcher (Table 1).

The second was a marketability questionnaire, which was used to determine consumers' willingness to purchase the product, acceptable pricing, perceived value, and willingness to recommend it to others. It contained 13 statements grouped under purchase intention (five statements), perceived value (four statements), and willingness to recommend (four statements). The purchase intention statements were adapted from Dodds et al. (1991). The responses to the marketability statements were interpreted using the scale presented in Table 2.

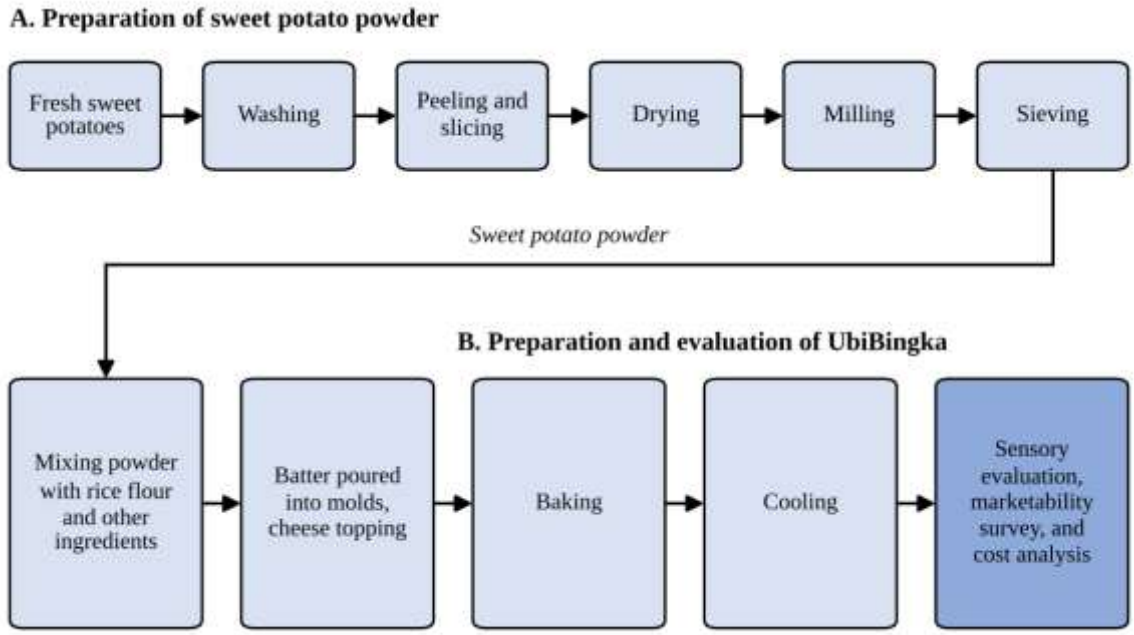
© 2026 Advancing SDG Impact. All rights reserved.

JASDG
JOURNAL FOR THE ADVANCEMENT OF SUSTAINABLE DEVELOPMENT GOALS
AN INTERNATIONAL, PEER-REVIEWED, OPEN ACCESS JOURNAL
www.jasdg.com
Volume 1 Issue 4 Pages 4314-4329
ISSN: 3155-7546 (Online)
DOI: 10.5281/zenodo.24295083

Product Development and Data-Gathering Procedure

The implementation of the study was carried out in several stages, summarized in Figure 2.

Figure 2. Process Flow in the Preparation and Evaluation of UbiBingka



Preparation of Sweet Potato Powder

Fresh sweet potatoes were washed thoroughly to remove dirt and impurities. The sweet potatoes were then peeled and sliced into thin, uniform pieces to facilitate efficient drying. The slices were dried until their moisture content was significantly reduced. After drying, the slices were milled into powder and passed through a fine sieve to obtain a smooth and uniform consistency.

Preparation of UbiBingka

For the preparation of UbiBingka, 1½ cups of powdered sweet potato and 1½ cups of glutinous rice flour were combined in a mixing bowl. The evaporated milk, condensed milk, sugar, coconut milk, melted butter, and salt were added and mixed thoroughly until a smooth and homogeneous batter was formed. The batter was poured into prepared bibingka molds or baking pans and topped with grated cheese. The product was baked at an appropriate temperature until fully cooked and golden brown. After baking, the UbiBingka was cooled and prepared for sensory evaluation and marketability assessment.

Sensory Evaluation and Marketability Assessment

The finished product was presented to the selected respondents under standardized conditions. The respondents evaluated the product using a nine-point hedonic scale to assess its appearance, aroma, taste, texture, and overall acceptability. A marketability questionnaire was likewise administered to determine consumers' willingness to purchase the product, acceptable pricing, perceived value, and willingness to recommend it to others.

Data Analysis

The data gathered from the sensory evaluation and marketability assessment were analyzed using descriptive statistical tools. Mean scores were computed to determine the level of acceptability of UbiBingka in terms of appearance, aroma, taste, texture, and overall acceptability, and these were interpreted using the hedonic scale in Table 1. Likewise, weighted mean scores were used to evaluate purchase intention, perceived value, and

© 2026 Advancing SDG Impact. All rights reserved.

JASDG
JOURNAL FOR THE ADVANCEMENT OF SUSTAINABLE DEVELOPMENT GOALS
AN INTERNATIONAL, PEER-REVIEWED, OPEN ACCESS JOURNAL
www.jasdg.com
Volume 1 Issue 4 Pages 4314-4329
ISSN: 3155-7546 (Online)
DOI: 10.5281/zenodo.24295083

willingness to recommend the product, and these were interpreted using the scale in Table 2. Frequency counts and percentage distributions were used to summarize the respondent profile and responses.

Production costs, cost per piece, selling price, and projected profit were computed to determine the economic feasibility of the product. The cost per piece was obtained by dividing the total production cost of a batch by the number of pieces produced, and the projected profit per piece was obtained by subtracting the cost per piece from the selling price. To aid interpretation, the projected profit was also expressed as a proportion of the cost per piece and of the selling price (Table 6).

Table 1. Hedonic Scale for Interpreting Sensory Acceptability

Mean Range	Descriptive Rating
8.21 – 9.00	Like Extremely
7.41 – 8.20	Like Very Much
6.61 – 7.40	Like Moderately
5.81 – 6.60	Like Slightly
5.00 – 5.80	Neither Like nor Dislike
4.21 – 4.99	Dislike Slightly
3.41 – 4.20	Dislike Moderately
2.61 – 3.40	Dislike Very Much
1.00 – 2.60	Dislike Extremely

Note. The nine-point hedonic scale was adapted from Peryam and Girardot (1952) and Peryam and Pilgrim (1957). The descriptive mean ranges used for interpretation were derived by the researcher.

Table 2. Scale for Interpreting the Marketability Ratings

Mean Range	Descriptive Rating
4.21 – 5.00	Strongly Agree
3.41 – 4.20	Agree
2.61 – 3.40	Neutral
1.81 – 2.60	Disagree
1.00 – 1.80	Strongly Disagree

Note. Marketability ratings were interpreted using the mean ranges shown above.

© 2026 Advancing SDG Impact. All rights reserved.

JASDG
JOURNAL FOR THE ADVANCEMENT OF SUSTAINABLE DEVELOPMENT GOALS
AN INTERNATIONAL, PEER-REVIEWED, OPEN ACCESS JOURNAL
www.jasdg.com
Volume 1 Issue 4 Pages 4314-4329
ISSN: 3155-7546 (Online)
DOI: 10.5281/zenodo.24295083

RESULTS AND DISCUSSION

Product Development of UbiBingka

The study successfully developed UbiBingka using powdered sweet potato and glutinous rice flour as the primary ingredients. The resulting product exhibited characteristics similar to traditional bibingka while incorporating the natural flavor, aroma, and color contributed by sweet potato powder. The processing method demonstrated that sweet potato could be effectively transformed into a powdered ingredient suitable for baking applications and food innovation. This outcome is consistent with the observation of Olatunde et al. (2016) that sweet potato flour is suitable for various end-use applications, and with the broader conclusion of Dereje et al. (2020) that sweet potato flour is a feasible basis for new food products.

The equal proportion of sweet potato powder and glutinous rice flour is notable. In pandesal, Lizardo et al. (2017) found that replacing up to half of the wheat flour with sweet potato flour was acceptable but that higher levels made the bread denser. The 50% level used here is therefore within the range reported as acceptable in a different product, although the two products are not directly comparable, since bibingka is not gluten-dependent. Because flour properties vary with variety and processing (Dereje et al., 2020), the sweet potato variety, drying conditions, and particle size should be documented in future work so that the formulation can be reproduced.

Sensory Acceptability of UbiBingka

Table 3. Sensory Acceptability of UbiBingka

Sensory Attribute	Mean Score	Descriptive Rating
Appearance	7.93	Like Very Much
Aroma	8.53	Like Extremely
Taste	8.70	Like Extremely
Texture	8.63	Like Extremely
Overall Acceptability	8.65	Like Extremely
Overall Mean	**8.49**	**Like Extremely**

Note. Interpretation is based on the hedonic scale in Table 1.

Table 3 presents the sensory acceptability ratings of UbiBingka in terms of appearance, aroma, taste, texture, and overall acceptability. The results revealed that the product obtained mean scores ranging from 7.93 to 8.70. Among the evaluated attributes, taste obtained the highest mean score of 8.70, while appearance obtained the lowest mean score of 7.93 and was the only attribute rated “Like Very Much”; the remaining attributes were rated “Like Extremely.” The computed overall mean of 8.49 indicates that the product was generally rated as “Like Extremely” by the respondents.

The attributes most closely tied to flavor and mouthfeel, namely taste (8.70), texture (8.63), and aroma (8.53), all exceeded 8.5, and overall acceptability was 8.65. This pattern is consistent with the finding of Leksrisompong et al. (2012) that flavor and texture were the main drivers of overall liking in sweet potatoes, and it suggests that the sweet potato powder did not impair the familiar eating qualities of bibingka. The lower rating for appearance is also consistent with that literature, in which color liking depended on familiarity and was not a major driver of overall acceptance (Leksrisompong et al., 2012), and in which an even, light-orange hue was preferred by consumers of baked sweet potatoes (Bowen et al., 2019). The present study did not record the flesh color of the sweet potato used or any instrumental color measurement, so the reason for the lower appearance score cannot be determined; color evenness, browning during baking, and presentation are plausible factors that future work could examine.

Two cautions apply to these results. First, the differences among attributes were examined descriptively and were not tested for statistical significance, so the 0.77-point gap between taste and appearance should be read as a

© 2026 Advancing SDG Impact. All rights reserved.

JASDG
JOURNAL FOR THE ADVANCEMENT OF SUSTAINABLE DEVELOPMENT GOALS
AN INTERNATIONAL, PEER-REVIEWED, OPEN ACCESS JOURNAL
www.jasdg.com
Volume 1 Issue 4 Pages 4314-4329
ISSN: 3155-7546 (Online)
DOI: 10.5281/zenodo.24295083

pattern in this sample and not as a confirmed difference. Second, the study did not include a traditional bibingka as a comparison product, so the ratings show that UbiBingka was well accepted by these respondents but do not show that it was preferred over conventional bibingka. Because the respondents were recruited through purposive sampling on the basis of their willingness to participate, the results should not be generalized to the wider market without further testing. The nine-point scale itself is a widely accepted instrument (Peryam & Pilgrim, 1957), although its discrimination among products can vary with the way consumers use the scale (Addo-Preko et al., 2023).

Marketability of UbiBingka

The marketability of UbiBingka was assessed based on the respondents' willingness to purchase, perceived value, and willingness to recommend the product. The results are presented in Table 4.

Table 4. Marketability of UbiBingka in Terms of Purchase Intention, Perceived Value, and Willingness to Recommend

Statements	Mean Score	Descriptive Rating
A. Purchase Intention		
1. I would purchase UbiBingka if it were available in the market.	4.40	Strongly Agree
2. I would consider buying UbiBingka in the future.	4.38	Strongly Agree
3. I am willing to buy UbiBingka because of its quality.	4.23	Strongly Agree
4. I am likely to purchase UbiBingka when available.	4.35	Strongly Agree
5. I am willing to spend money on UbiBingka.	4.30	Strongly Agree
B. Perceived Value		
6. UbiBingka offers good value for its price.	4.50	Strongly Agree
7. The quality of UbiBingka is worth its cost.	4.50	Strongly Agree
8. The use of sweet potato makes the product more valuable.	4.28	Strongly Agree
9. UbiBingka is a unique and innovative food product.	4.58	Strongly Agree
C. Willingness to Recommend		
10. I would recommend UbiBingka to my family.	4.43	Strongly Agree
11. I would recommend UbiBingka to my friends.	4.68	Strongly Agree
12. I would encourage others to try UbiBingka.	4.40	Strongly Agree
13. I believe UbiBingka has potential in the local market.	4.55	Strongly Agree

Note. Interpretation is based on the scale in Table 2. The purchase intention statements were adapted from Dodds et al. (1991).

The results in Table 4 showed that UbiBingka demonstrated high marketability potential, with all indicators receiving a rating of "Strongly Agree." For purchase intention, the respondents expressed a strong willingness to buy the product if it were available in the market, which obtained the highest mean score of 4.40 in this dimension. In terms of perceived value, the respondents agreed that UbiBingka provides good value for its price (M = 4.50) and is a unique and innovative food product (M = 4.58), the latter being the highest mean score in this dimension. Regarding willingness to recommend, the respondents were highly inclined to recommend UbiBingka to others, particularly to their friends (M = 4.68), and believed that it has strong potential in the local market (M = 4.55). The lowest mean score among all indicators was 4.23, which still fell within the "Strongly Agree" range. Overall, the findings indicate that UbiBingka is a quality, innovative, and marketable product with good potential for commercialization.

© 2026 Advancing SDG Impact. All rights reserved.

JASDG
JOURNAL FOR THE ADVANCEMENT OF SUSTAINABLE DEVELOPMENT GOALS
AN INTERNATIONAL, PEER-REVIEWED, OPEN ACCESS JOURNAL
www.jasdg.com
Volume 1 Issue 4 Pages 4314-4329
ISSN: 3155-7546 (Online)
DOI: 10.5281/zenodo.24295083

The pattern of results fits the value-based view of purchase behavior described by Dodds et al. (1991), in which perceived quality and value accompany willingness to buy. Respondents agreed that the product offers good value for its price (M = 4.50) and that its quality is worth its cost (M = 4.50), which supports the recommended selling price of ₱15.00 discussed below. The highest ratings overall were for recommending the product to friends (M = 4.68) and for its uniqueness and innovativeness (M = 4.58), suggesting that novelty and social endorsement may be useful selling points for a local product that pairs a familiar kakanin with an underused root crop. The lowest-rated item, willingness to buy because of quality (M = 4.23), and the item on the added value of sweet potato (M = 4.28) were still within the highest rating band, but they suggest that buyers may place somewhat less weight on the sweet potato content than on the product's overall appeal.

Two limitations should be noted. The ratings express stated intentions, which do not always become actual purchases, and the study did not test price points or record sales. In addition, although acceptable pricing is part of the study's stated objectives, the questionnaire contained no item asking respondents what price they would consider acceptable; the evidence on pricing comes from the value-for-price and quality-for-cost statements and from the cost analysis.

Economic Feasibility of UbiBingka

The production cost analysis was conducted to determine the economic feasibility of UbiBingka. The total cost of ingredients used in one batch amounted to ₱381.00. Including packaging and other incidental expenses, the total production cost was ₱426.00. The computed cost per piece was ₱12.17, while the recommended selling price was ₱15.00 to ensure profitability. The findings indicate that UbiBingka can be produced at a reasonable cost and has potential for commercialization.

Table 5. Production Cost Analysis of UbiBingka

Item	Quantity	Cost (₱)
Ubi powder	1½ cups	30
Glutinous rice flour	1½ cups	35
Evaporated milk	1 cup	45
Condensed milk	¾ cup	60
Sugar	½ cup	30
Salt	1 teaspoon	1
Coconut milk	400 ml	85
Butter	3 tablespoons	10
Cheese	165 g	85
Label/sticker	10 pcs	10
Plastic packaging (food-grade polypropylene)	35 pcs	35
Total Cost		**426**
Number of Pieces Produced	35 pieces	
Cost per Piece	₱12.17	
Selling Price per Piece	₱15.00	
Projected Profit per Piece	**₱2.83**	

Note. Costs are expressed in Philippine pesos (₱). The total cost of ingredients was ₱381.00; including packaging and incidental expenses, the total production cost was ₱426.00 for 35 pieces.

Table 6 restates the cost and profit figures from Table 5 and expresses the projected profit relative to cost and to selling price. These ratios were computed from the reported figures for this paper.

© 2026 Advancing SDG Impact. All rights reserved.

JASDG
JOURNAL FOR THE ADVANCEMENT OF SUSTAINABLE DEVELOPMENT GOALS
AN INTERNATIONAL, PEER-REVIEWED, OPEN ACCESS JOURNAL
www.jasdg.com
Volume 1 Issue 4 Pages 4314-4329
ISSN: 3155-7546 (Online)
DOI: 10.5281/zenodo.24295083

Table 6. Cost and Profit Indicators for One Batch of UbiBingka

Indicator	Computation	Result
Total production cost per batch	Table 5	₱426.00
Pieces produced per batch	Table 5	35
Cost per piece	₱426.00 ÷ 35	₱12.17
Selling price per piece	Recommended price	₱15.00
Projected profit per piece	₱15.00 − ₱12.17	₱2.83
Projected profit per batch	(35 × ₱15.00) − ₱426.00	₱99.00
Profit as a proportion of cost per piece	₱2.83 ÷ ₱12.17	about 23%
Profit as a proportion of selling price	₱2.83 ÷ ₱15.00	about 19%

Note. Figures were computed from Table 5. The costs exclude labor, utilities, fuel, and overhead, which were not reported.

At ₱15.00 per piece, the projected profit of ₱2.83 equals about 23% of the cost per piece and about 19% of the selling price, or ₱99.00 for a batch of 35 pieces. In the Cordillera, Botangen and Quindara (2009) reported production costs of ₱13.55 and ₱14.25 per pack for sweetpotato candies sold at ₱18.50, a cost-per-unit and price range close to that of UbiBingka. Their returns were expressed as returns on capital employed (36.51% and 29.82%), which is a different indicator from the margins computed here, so the figures should not be compared directly. The comparison does show that a cost near ₱12 to ₱14 per unit and a price in the ₱15 to ₱18 range are within the scale of sweet potato products that have been proposed for commercialization in the region.

The cost analysis should be read as a cost-of-materials estimate. It covers ingredients, labels, and packaging, but not labor, utilities, fuel, equipment, or marketing costs. Including these would reduce the margin, and the ₱99.00 batch profit would have to cover them. Because the cost per piece also depends on batch size and on ingredient prices, which can change, the ₱2.83 margin should be treated as an initial estimate to be verified through pilot production and actual sales. Nonetheless, the analysis supports the conclusion that UbiBingka can be produced at a reasonable material cost and sold at a price that respondents regarded as good value.

Shelf Life and Food Safety Considerations

The study did not measure shelf life, water activity, or microbial quality, so no conclusion can be drawn about how long UbiBingka remains safe and acceptable after baking. This matters for commercialization because rice-based cakes can be vulnerable to spoilage and to spore-forming bacteria. In the related case of binanban, Ofalsa (2024) found that *Bacillus cereus* and aerobic mesophilic bacteria increased during ambient storage and recommended a shelf life of only one to two days at room temperature. UbiBingka contains milk, coconut milk, and cheese in addition to rice flour, and it is portioned and packaged in plastic. These features make storage conditions, packaging effectiveness, and hygienic handling important topics for follow-up studies, and they support the recommendation that the product be sold fresh until shelf-life testing is completed.

Implications of the Findings

Taken together, the findings have the following implications:

1. **Value addition for local root crops.** The high sensory ratings suggest that powdered sweet potato can be used at an equal proportion with glutinous rice flour in bibingka without losing the qualities consumers expect, which adds a processing outlet for a crop that is already widely grown in the community.
2. **Livelihood and entrepreneurship.** The favorable marketability ratings and the positive material margin indicate that UbiBingka may be a viable livelihood product, provided that labor and overhead are costed and that actual sales confirm the stated purchase intentions.

© 2026 Advancing SDG Impact. All rights reserved.

JASDG
JOURNAL FOR THE ADVANCEMENT OF SUSTAINABLE DEVELOPMENT GOALS
AN INTERNATIONAL, PEER-REVIEWED, OPEN ACCESS JOURNAL
www.jasdg.com
Volume 1 Issue 4 Pages 4314-4329
ISSN: 3155-7546 (Online)
DOI: 10.5281/zenodo.24295083

3. **School and community food innovation.** Because the respondents included students, teachers, and community members, the results suggest that the product is acceptable across groups that schools and community organizations can reach, making it a candidate for local food innovation projects.
4. **Research priorities.** The absence of shelf-life, nutritional, and microbiological data, and the lack of a comparison with traditional bibingka, define the next steps needed before large-scale production or marketing claims are made.

CONCLUSIONS AND RECOMMENDATIONS

Summary of Findings

The study successfully developed UbiBingka enriched with powdered sweet potato and glutinous rice flour. Sensory evaluation revealed an overall mean score of 8.49, interpreted as "Like Extremely." Marketability indicators obtained mean ratings ranging from 4.23 to 4.68, interpreted as "Strongly Agree." Production cost analysis showed a production cost of ₱12.17 per piece and a recommended selling price of ₱15.00, indicating that the product is economically feasible and suitable for commercialization. The principal findings are summarized by objective in Table 7.

Table 7. Summary of Findings by Objective

Objective	Key Result	Interpretation
1. Sensory acceptability	Overall mean = 8.49 (range 7.93–8.70); taste highest (8.70), appearance lowest (7.93)	Like Extremely (appearance: Like Very Much)
2. Economic feasibility	Cost per piece = ₱12.17; selling price = ₱15.00; projected profit = ₱2.83 per piece	Economically feasible at the material-cost level
3. Marketability	Mean ratings of 4.23–4.68 across 13 indicators	Strongly Agree on all indicators

Note. Interpretations follow the scales in Tables 1 and 2.

The sensory evaluation generated data on the level of acceptability of UbiBingka in terms of appearance, aroma, taste, texture, and overall acceptability. Likewise, the marketability assessment provided valuable insights into consumers' willingness to purchase the product, acceptable pricing, perceived value, and willingness to recommend it to others. These findings highlight the potential of UbiBingka as a value-added food product that promotes the utilization of locally available agricultural resources while supporting entrepreneurship and livelihood development.

Limitations of the Study

The study was limited to the evaluation of a single UbiBingka formulation and involved only 40 respondents from the local community. The research focused on sensory acceptability, marketability, and economic feasibility and did not examine the nutritional composition, shelf life, or microbiological safety of the product. In addition, the respondents were selected purposively; no traditional bibingka was included as a comparison product; the sensory attributes were analyzed descriptively without tests of significance; and the cost analysis did not include labor, utilities, or overhead. The marketability results reflect stated intentions and not actual purchases.

Conclusions

Based on the findings of the study, the following conclusions were drawn:

1. UbiBingka, enriched with powdered sweet potato (*Ipomoea batatas*) and glutinous rice flour, was successfully developed and standardized.

© 2026 Advancing SDG Impact. All rights reserved.

JASDG
JOURNAL FOR THE ADVANCEMENT OF SUSTAINABLE DEVELOPMENT GOALS
AN INTERNATIONAL, PEER-REVIEWED, OPEN ACCESS JOURNAL
www.jasdg.com
Volume 1 Issue 4 Pages 4314-4329
ISSN: 3155-7546 (Online)
DOI: 10.5281/zenodo.24295083

2. The product achieved a high level of sensory acceptability, obtaining an overall mean rating of 8.49, interpreted as "Like Extremely." The respondents particularly rated its taste, texture, and overall acceptability favorably, while appearance, although still highly rated, obtained the lowest mean.
3. The marketability assessment indicated strong consumer interest, perceived value, and willingness to recommend the product, suggesting good commercialization potential.
4. The production cost analysis indicated that UbiBingka can be produced economically and marketed at a profitable selling price. Therefore, powdered sweet potato may be utilized as a viable value-added ingredient in bibingka production, contributing to food innovation, entrepreneurship, and the sustainable utilization of locally available agricultural resources.

Recommendations

Based on the findings and conclusions, the following recommendations are presented for consideration:

1. **For local entrepreneurs, schools, and community organizations.** The findings indicate that UbiBingka has strong potential as a value-added food product utilizing locally available sweet potatoes. It is recommended that local entrepreneurs, schools, and community organizations consider the product for livelihood and food innovation initiatives, starting with small pilot production and sales.
2. **For future researchers on product quality and safety.** Future studies may focus on determining the nutritional composition, shelf life, packaging effectiveness, and food safety characteristics of UbiBingka to support large-scale production and commercialization. Microbiological testing should include spore-forming bacteria such as *Bacillus cereus*, which has been identified as a concern in related rice-based cakes (Ofalsa, 2024), and storage conditions should be specified.
3. **For future researchers on formulation and validation.** Researchers are encouraged to conduct comparative studies involving different proportions of sweet potato powder and glutinous rice flour to determine the optimum formulation. Additional sensory and marketability evaluations involving larger and more diverse groups of respondents are also recommended to further validate the findings, preferably with a traditional bibingka as a control, tests of significance among attributes and formulations, and a record of the sweet potato variety and its flesh color. Instrumental color measurement may help explain the appearance ratings.
4. **For costing and pricing.** Subsequent cost analyses should include labor, utilities, fuel, equipment, and overhead, and should test alternative price points and record actual sales, so that the projected margin and the stated purchase intentions can be verified.

Use of Artificial Intelligence (AI)

Artificial Intelligence (AI) tools were used solely for language editing, proofreading, formatting assistance, and the improvement of sentence structure during the preparation of this research paper. The AI tools were not used for data generation, data analysis, interpretation of results, or the formulation of conclusions. All research procedures, data collection, computations, findings, and recommendations were conducted and verified by the researcher.

© 2026 Advancing SDG Impact. All rights reserved.

JASDG
JOURNAL FOR THE ADVANCEMENT OF SUSTAINABLE DEVELOPMENT GOALS
AN INTERNATIONAL, PEER-REVIEWED, OPEN ACCESS JOURNAL
www.jasdg.com
Volume 1 Issue 4 Pages 4314-4329
ISSN: 3155-7546 (Online)
DOI: 10.5281/zenodo.24295083

REFERENCES

Addo-Preko, E., Amissah, J. G. N., & Adjei, M. Y. B. (2023). The relevance of the number of categories in the hedonic scale to the Ghanaian consumer in acceptance testing. *Frontiers in Food Science and Technology, 3,* Article 1071216. https://doi.org/10.3389/frfst.2023.1071216

Botangen, E. T., & Quindara, H. L. (2009). Development of sweetpotato-based candy processing technology for commercialization. *Mountain Journal of Science and Interdisciplinary Research, 63*(1), 1–9. https://doi.org/10.70884/mjsir.v63i1.209

Bowen, A. J., Blake, A., & Turecek, J. (2019). Development and validation of a color evaluation process for sweet potato preference characterization. *Journal of Sensory Studies, 34*(5), Article e12524.

Department of Education–Lapu-Lapu City Division. (2021). *Division Memorandum No. 555, s. 2021: Format of a project proposal and completed project for innovation in schools.* DepEd Lapu-Lapu City Division.

Department of Science and Technology–Food and Nutrition Research Institute. (n.d.). *Philippine Food Composition Table.* DOST-FNRI.

Dereje, B., Girma, A., Mamo, D., & Chalchisa, T. (2020). Functional properties of sweet potato flour and its role in product development: A review. *International Journal of Food Properties, 23*(1), 1639–1662. https://doi.org/10.1080/10942912.2020.1818776

Dodds, W. B., Monroe, K. B., & Grewal, D. (1991). Effects of price, brand, and store information on buyers' product evaluations. *Journal of Marketing Research, 28*(3), 307–319. https://doi.org/10.1177/002224379102800305

Giau, T. N., Hao, H. V., Tai, N. V., Minh, V. Q., & Thuy, N. M. (2024). Orange-flesh sweet potato powder as a promising partial substitution rice flour to produce high-quality and low-glycemic-index vermicelli. *Journal of Agriculture and Food Research, 18*, 101464.

Leksrisompong, P. P., Whitson, M. E., Truong, V. D., & Drake, M. A. (2012). Sensory attributes and consumer acceptance of sweet potato cultivars with varying flesh colors. *Journal of Sensory Studies, 27*, 59–69. https://doi.org/10.1111/j.1745-459X.2011.00367.x

Lizardo, R. C. M., Castillo-Israel, K. A. T., Dizon, E. I., Mejico, M. I. F., & Jubinal, C. M. D. (2017). Development of high-value food products from selected indigenous and underutilized crops to increase food utilization and reduce food loss. *Journal of Developments in Sustainable Agriculture, 12*(1), 1–12. https://doi.org/10.11178/jdsa.12.1

Ofalsa, J. E. P. (2024). *Shelf-life estimation and characterization of traditional purple sticky rice cake (binanban)* [Bachelor's thesis, University of the Philippines Diliman]. UP Diliman Digital Archives. https://digitalarchives.upd.edu.ph/item/61577

Olatunde, G. O., Henshaw, F. O., Idowu, M. A., & Tomlins, K. (2016). Quality attributes of sweet potato flour as influenced by variety, pretreatment and drying method. *Food Science & Nutrition, 4*(4), 623–635.

Pa-ala, A. R., Focbit, B. P., & Alarcon, J. P. (2025). Acceptability of puto using sweet potato flour (sweet potato rice cake). *Business Fora: Business and Allied Industries International Journal, 4*(1), 23–29.

Peryam, D. R., & Girardot, N. F. (1952). Advanced taste-test method. *Food Engineering, 24*(7), 58–61.

Peryam, D. R., & Pilgrim, F. J. (1957). Hedonic scale method of measuring food preferences. *Food Technology, 11*(9, Suppl.), 9–14.

© 2026 Advancing SDG Impact. All rights reserved.

JASDG
JOURNAL FOR THE ADVANCEMENT OF SUSTAINABLE DEVELOPMENT GOALS
AN INTERNATIONAL, PEER-REVIEWED, OPEN ACCESS JOURNAL
www.jasdg.com
Volume 1 Issue 4 Pages 4314-4329
ISSN: 3155-7546 (Online)
DOI: 10.5281/zenodo.24295083

Porol, J. T. C. (2020). *Development and evaluation of the functional properties of sweet potato flour from different varieties.*

Quindara, H. L., Awal, I. B., Gayumba, R. P., & Tad-awan, B. A. (2020). Performance of orange-fleshed sweetpotato varieties in three agroecological conditions in the Cordillera Administrative Region, Philippines. *Mountain Journal of Science and Interdisciplinary Research, 80*(1), 48–55. https://doi.org/10.70884/mjsir.v80i1.264

© 2026 Advancing SDG Impact. All rights reserved.