ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

# Development and Acceptability of Red Bougainvillea (Great Bougainvillea) Lime (Citrus aurantiifolia) Tea

Liesel A. Jintalan*[1], Jessa N. Andres[1], Rhea Charisse G. Pascua[1], Jhenny F. Pascua[1], May Ann R. Timple[1], Shaina Mae S. Echavari[1], Lady Jane F. Dante[1], Mary Grace S. Vigilia*[1], Marigold M. Soriano[1], Cherrybel D. Gaspar, Eva N. Flores, and Jennifer B. Ibañez
[1]*Cagayan State University- Carig Campus*
*marygracevigiliasalongavigilia@gmail.com

Date Submitted:
**March 24, 2026**

Date Accepted:
**April 13, 2026**

Date Published:
**April 14, 2026**

DOI:
**10.5281/zenodo.19562724**

**ABSTRACT**

The purpose of this study is to investigate using bougainvillea as a source for tea production and determine how acceptable it is to consumers by measuring the color, aroma, flavor, texture, and overall acceptability and the proximate composition analysis and analysis of the nutritional value of the product. The findings of this study are of importance to bougainvillea growers, other food producers, and government and industry decision makers. These findings provide direction to food producers on the potential for producing and marketing tea from bougainvillea. In addition, these findings also provide added knowledge about bougainvillea tea and have implications for Cagayan State University College of Industrial Technology with regard to the development of new products, consumer preferences, and promoting the use of sustainable farming practices. In conducting experimental research, the bougainvillea tea product was developed using three different treatments: treatment one, treatment two, treatment three, and control group. The results showed that treatment three tea product (which contained 1.8 grams of dried bougainvillea and dried lime) received the highest score for color, aroma, taste, texture, and overall acceptability compared to the other tea products. Also, it was determined that treatment three tea was rated more acceptable than any other tea product that is currently being sold. To improve the bougainvillea tea product, it is suggested to consider using additional parts of the bougainvillea plant in order to increase the nutritional value of the tea; to add another source of plant-based ingredients to further increase the nutritional value of the tea.

***Keywords***: *Bougainvillea tea, Sensory Evaluation, Nutritional Content, Proximate Analysis*

## INTRODUCTION

Great Bougainvillea (Bougainvillea spectabilis) is a highly sought-after ornamental plant that originates from South America. The plant's colorful bracts are commonly used in landscaping and gardening. The bracts can be seen in many colors including pink, magenta, purple, red, orange, white and yellow. The flower bracts also have culinary usages because the flower bracts can be eaten fresh in salads, fried in batter or used as a coloring agent in beverages since the color will mix into liquid spouts. Bougainvillea has been highly regarded for its medicinal properties for centuries (Evans, 2021). In the traditional healing systems of many countries where Bougainvillea grows, the plant has been used to treat various ailments, including fevers, coughs and sore throats.

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

Lime is the common name for the fruit of the plant species Citrus aurantiifolia, which belongs to the Rutaceae family and Citrus genus. The fruit of the lime is consumed throughout North America, Mexico, Southeast Asia, Latin America and has been increasingly distributed globally. Limes are utilized as fresh fruit, in culinary dishes, sweetened and mixed into beverages; additionally, they are also utilized to manufacture oils for the cosmetic and pharmaceutical industries. Adverse reactions to lime appear primarily as contact dermatitis (or allergic or phototoxic reactions). Allergic contact dermatitis can occur with citrus family fruits; limonene was the first identified allergen, and while many allergens causing contact dermatitis from citrus fruits do not seem to have Cross Reaction with allergens from other fruits. The descriptors for citrus fruits may include limonene, (from oil), and fruit proteins (from fruit). A case of fruit protein contact dermatitis due to lime (fruit) was described where the individual had an allergic reaction to other fruits, including kiwifruit, avocados, pineapples, and apples. In terms of raw materials used to produce limes, there is generally a close association between citrus fruit production and limestone deposits. Historically, the difficulty of lime extraction, the methods used for lime production, and the costs involved in transporting limestones and producing lime had a major impact on the total cost (Bishop et al., 2017).Countries around the world are under constant pressure to create new food and beverage products that align with everyone's changing expectations about the way foods should be produced, consumed and marketed. The biggest driver of the need for new product innovations across the globe is the desire for healthier and more natural alternatives to conventional food and beverage products. Healthier and more natural products are also expected to be produced in ways that are environmentally friendly and sustainable. There is a large and growing market around the world for healthier, more natural and environmentally benevolent beverage products, and for those beverage products to be socially acceptable and safe.

The Philippines and other tropical regions of the world have a wealth of underutilised plant resources, including Bougainvillea spectabilis, with many possible nutritional and functional benefits. The opportunity exists to explore these plant-based sources of local ingredients for the purpose of designing new beverage products that can be produced with little or no synthetic additives, while also meeting the growing demand for natural alternatives. Bougainvillea Lime Tea is a new type of beverage in the Philippines that combines two plant species found there and creates a drink that may have health benefits. Bougainvillea has bright-colored bracts and is traditionally used as a remedy in Filipino culture. It has both anti-inflammatory and antioxidant properties (Quisumbing, 1978). When mixed with locally-grown lime, a common fruit in the Philippines, this tea provides an enjoyable and healthful beverage. Herbal teas in the Philippines are becoming more popular as natural health remedies are receiving increased attention. Research has shown that the chemical makeup of bougainvillea contains compounds that could be beneficial for those who are diabetic or have problems with breathing (Perez et al., 2000). Limes, which have Vitamin C and are also high in antioxidants, further improve health by supporting the immune system and assisting with digestion (Balunas & Kinghorn, 2005). To prepare this beverage, the bracts from bougainvilleas are steeped in hot water with a slice of lime. Some producers use locally-produced honey and/or other herbs to enhance both the taste and efficacy of the tea. The development of Bougainvillea Lime Tea also follows a worldwide trend toward functional foods and beverages as more and more consumers are interested in purchasing items that have some type of health benefit over and above providing sufficient nutrition. Bougainvillea lime tea from the Cagayan Valley area of the Philippines is a new local product that uses traditional knowledge and local biodiversity to create a unique beverage. The Cagayan Valley is an excellent place for growing both bougainvillea and lime because of its agricultural history, as well as the many different species of plants that grow in this area. Bougainvillea Lime Tea, as part of the growing trend of using native plants for wellness and health-related products, is a good fit with local cultural knowledge regarding how bougainvillea can be used medicinally and has historically been used by local people to treat illnesses. By combining both plants, local production of

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

Bougainvillea Lime Tea contributes to the availability of this beverage throughout the region and provides additional health benefits as a result of the high vitamin C content of limes.

This research is grounded in the theoretical concepts of responsible innovation and the frameworks of consumer acceptance by aligning food innovation with the values, needs and expectations of society through the participation of stakeholders and an understanding of consumer behaviour. Literature shows a gap in the systematic evaluation of the acceptability of beverage products derived from unconventional but nevertheless promising natural sources such as Bougainvillea. While there has been some research on Bougainvillea spectabilis in relation to its medicinal properties and potential use as a natural food dye, there has been limited research conducted on how Bougainvillea can be applied to beverage products such as tea in regards to sensory acceptability, as well as consumer preference. The outcome of the research will provide beverage manufacturers within the local region, consumers who are health-conscious, and the beverage industry as a whole with another source of natural pigments and functional phytochemical components for beverage products using Bougainvillea lime tea as a new product within food innovation and functional foods. There is currently an opportunity to expand beverage options within the region through the creation of beverage products that use local sustainable resources that promote good health and well-being, as there is a major void in the market for naturally coloured and nutritionally enhanced beverages. With sustainability and health being paramount, our Thematic Study has been designed to provide answers to the international challenge of food sustainability and health through the use of local natural resources and theoretical frameworks. The study aims to meet the demands.

## MATERIALS AND METHODS

### Research Design

This study was based on an experimental design of research methodology. An experiment is an observation of the cause and effect relationship (cause) by demonstrating that when a specific (independent) variable was (manipulated) factored, there was a specific result or outcome (dependent variable) (Serey Rath Em, 2024) (i.e. when the amount of carrots or bamboo shoots were manipulated the resultant impact was found in the sensory characteristics (sight, smell, taste, feel, and overall acceptability) of the various formulations of bougainvillea lime tea.

### Raw Materials and Ingredients

The raw materials used in the development of bougainvillea lime tea consisted of 1 gram of dried bougainvillea and 1 gram of dried lime. These ingredients were carefully measured and prepared to ensure product consistency and quality.The tools, utensils, and equipment used during the preparation and formulation process included mixing bowl, weighing scale, chopping board, knife, and dehydrator. These materials were essential for accurately cutting and measuring to achieve the intended flavor.

### Pre-preparation 0f Bougainvillea (Great bougainvillea) and Lime (Citrus aurantiifolia)

Preparing for the Bougainvillea and Lime In order to prepare for the bougainvillea, the bougainvillea bracts were separated from the stem, as well as removed froem any unwanted parts of the bougainvillea. Next, each bract is washed thoroughly under running water to ensure all dirt and impurities are removed. After being cleaned, the bracts are placed onto trays for drying or dehydrating the bougainvillea bracts until they become completely dried out to be used later. Preparing the lime, the first step is to wash it under running water to remove any impurities or dirt from the lime fruit. After washing the lime, the fruit is sliced using a sharp knife into small pieces and then arranged on trays for drying and

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

dehydrate. After the limes have dried out, the rind is removed and the lime flesh is cut into small pieces to blend with the dried bougainvillea bracts.

**General Procedure of Bougainvillea (Great bougainvillea) and Lime (Citrus aurantiifolia) Tea**

The bougainvillea bracts are cleaned thoroughly so that there is no dirt or anything on them then remove the unnecessary parts. After cleaning, the bracts are dried using a dehydrator or dry under the sun until all moisture is gone. Next, limes are cleaned well and cut into thin round slices. These slices should have been dried out completely in order to preserve the aroma of the lime for the tea mixture. After drying the sliced lime, remove the skin to lessen the bitterness taste of tea, then chop the flesh to fit in teabags. Lastly, the dried limes and dried bougainvillea bracts are mixed together and then put into clean, dry tea bags for packaging and brewing purposes.

**Formulation of the Bougainvillea (Great bougainvillea) and Lime (Citrus aurantiifolia) Tea**

The bougainvillea lime tea was produced using the bougainvillea (great bougainvillea) and lime (Citrus aurantiifolia). Following the procedure for preparing bougainvillea lime tea, three (3) treatments were formulated: Treatment 1 (1.5g bougainvillea bracts, 0.5g lime.), Treatment 2 (1.7 bougainvillea bracts, 0.8g lime.), Treatment 3 (1.8g bougainvillea bracts, 1g lime.). These treatments were subjected to sensory evaluation by six (6) Faculty Major Member and fourty four (44) Food Technology Students who assessed the color, aroma, taste, texture, and general acceptability of the bougainvillea lime tea. After conducting three trials, the collected data were analyzed to determine which treatment produced the most acceptable product.

**Consumers Acceptability**

The study involved a total of Fifty (50) respondents in the sensory evaluation, consisting of CIT Food Technology Faculty, and Food Technology Students. A stratified random sampling technique was employed to gather data from respondents, ensuring a well-represented distribution across key roles in various group. This method allowed for the inclusion of various respondent's categories such as six (6) faculty major in Food Technology and Forty-Four (44) Food technology Students with each group being proportionately represented.

Table 1. *Respondents of the Study*

| Respondents | Number of respondents | Percentage |
|---|---|---|
| Food Technology Students | 44 | 88%. |
| Food Technology Faculty | 6 | 12% |
| Total Number of Respondents | 50 | 100% |

**Proximate Analysis and Nutritional Analysis**

100 grams sample of the dried bougainvillea bracts and 100 grams of dried lime was submitted to the Department of Agriculture Laboratory Regional Feed Chemical Analysis Laboratory in Region 02, Tuguegarao City

**Proximate Analysis and Nutritional Analysis**

100 grams sample of the dried bougainvillea bracts and 100 grams of dried lime was submitted to the Department of Agriculture Laboratory Regional Feed Chemical Analysis Laboratory in Region 02, Tuguegarao City for proximate composition analysis. Sample composition was tested for crude protein (semi-Automatic Kjeldahl method), crude fiber and crude fat (ANKOM filter Bag Technique), moisture and ash (Gravimetric Method).

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

## RESULTS AND DISCUSSION

### Sensory Characteristics of the Developed Bougainvillea (Great bougainvillea) Lime (Citrus aurantiifolia) Tea in terms of Color, Aroma, Taste, Texture and General Acceptability

Table 2. *Sensory Characteristics of the Developed Bougainvillea (Great bougainvillea) Lime (Citrus aurantiifolia) Tea in terms of Color, Aroma, Taste, Texture and General Acceptability*

| Sensory Characteristics | Treatment 1 | Treatment 2 | Treatment 3 | Control |
|---|---|---|---|---|
| Color | 7.60 Like Very Much | 7.80 Like Very Much | 7.80 Like Very Much | 8.40 Like Extremely |
| Aroma | 7.40 Like Very Much | 7.80 Like Very Much | 7.60 Like Very Much | 8.40 Like Extremely |
| Taste | 7.40 Like Very Much | 8.20 Like Extremely | 8.00 Like Very Much | 7.20 Like Moderately |
| Texture | 7.00 Like Moderately | 7.80 Like Very Much | 7.80 Like Very Much | 6.80 Like Moderately |
| General Acceptability | 7.40 Like Very Much | 7.60 Like Very Much | 7.20 Like Moderately | 6.80 Like Moderately |

Based from the table 2, Treatment 2 consistently outperformed the other formulations across all sensory attributes, making it the most preferred tea formulation based from the evaluation of the panelists. In terms of color, the mean scores ranged from 7.60 to 7.80, all described as “Like Very Much”. Both Treatment 2 and Treatment 3 obtained the highest mean score (7.80), indicating the most visually appealing color among the samples. For aroma, the scores ranged from 7.40 to 7.80, where Treatment 2 again received the highest rating (7.80), described as “Like Very Much,” while Treatment 1 had the lowest score (7.40), indicating a milder aroma. In terms of taste, Treatment 2 obtained the highest mean score (8.20) interpreted as “Like Extremely” showing a better taste of bitterness Treatments 1 and 2. Regarding texture, Treatment 2 and Treatment 3 both received the highest mean score (7.80), indicating the most favorable smoothness). For general acceptability, Treatment 2 recorded the highest mean score (7.60), described as “Like Very Much”, making it the most preferred formulation among all treatments. Overall, the results indicate that Treatment 2 consistently received the highest ratings across all sensory attributes, suggesting it was the most desirable formulation in terms of color, aroma, taste, texture, and overall acceptability.

### Proximate and Nutritional Composition of the Developed Bougainvillea (Great bougainvillea) Lime (Citrus aurantiifolia) Tea

Table 3. *Proximate Analysis of the Developed Bougainvillea Lime Tea*

| Lab No. | Sample Description | Crude Protein | Crude Fiber | Crude Fat | Moisture | Ash |
|---|---|---|---|---|---|---|
| | | % | % | % | % | % |
| FT-25-664 | Bougainvillea Lime Tea | 6.75 | 8.18 | 1.32 | 18.70 | 4.72 |

Source: Regional Feed Chemical Analysis Laboratory Department of Agriculture, R02

Proximate composition of Bougainvillea Lime Tea tested using the Semi-Automatic Kjeldahl Method, ANKOM Filter Bag Technique, and Gravimetric Method at the Department of Agriculture Region 2 (DA RO2). The proximate composition analysis of the Bougainvillea Lime Tea revealed important nutritional properties, providing insight into its overall quality and potential health benefits.

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

The crude protein at 6.75%, crude fiber at 8.18%, crude fat at 1.32%, moisture at 18.70%, and ash at 4.72%. These values indicated a nutritional profile characterized by moderate protein and low fat and high moisture contents, with notably moderate fiber and low ash levels. The protein content of 6.75% reflected contributions from the base ingredients, while the fiber (8.18%) suggested effective processing of the bougainvillea and lime to reduce indigestible components. The elevated fat (1.32%) and moisture (18.70) levels contributed to a soft texture and the minimal ash (4.72%) aligned with the organic composition of the tea.

**Significant Differences of the three Treatments**

Table 4. *Test of Significant Difference in the Sensory Evaluation among the Three (3) Treatments of the Developed Bougainvillea (Great bougainvillea) Lime (Citrus aurantiifolia) Tea*

| Attributes | Treatment | Mean | Sd | F | P | Decision |
|---|---|---|---|---|---|---|
| Color | Treatment 1 | 7.60 | .89 | 0.80 | .512 | Do Not Reject Ho |
| | Treatment 2 | 7.80 | .84 | | | |
| | Treatment 3 | 7.80 | 1.10 | | | |
| Aroma | Treatment 1 | 7.40 | 1.14 | 0.81 | .506 | Do Not Reject Ho |
| | Treatment 2 | 7.80 | 1.10 | | | |
| | Treatment 3 | 7.60 | 1.34 | | | |
| Taste | Treatment 1 | 7.40 | 0.89 | 0.97 | .434 | Do Not Reject Ho |
| | Treatment 2 | 8.20 | 1.1o | | | |
| | Treatment 3 | 8.00 | 1.oo | | | |
| Texture | Treatment 1 | 7.00 | 1.41 | 1.09 | .384 | Do Not Reject Ho |
| | Treatment 2 | 7.80 | 1.10 | | | |
| | Treatment 3 | 7.80 | 1.30 | | | |
| General Acceptability | Treatment 1 | 7.40 | 1.82 | 0.26 | .854 | Do Not Reject Ho |
| | Treatment 2 | 7.60 | 1.64 | | | |
| | Treatment 3 | 7.20 | 1.30 | | | |

The results of the statistical analysis showed significant differences among the treatments in all sensory attributes evaluated. For color, a significant difference was observed (p = .512), where Treatment 2 and 3 obtained the highest mean (7.80), followed by Treatment 1 (7.60). Similarly, aroma showed a significant difference (p = .506), with Treatment 2 receiving the highest mean (7.80), indicating stronger panelist preference compared to Treatments 1 and 2. In terms of taste, a significant difference was also found (p = .434), with Treatment 2 again obtaining the highest mean rank (8.20), while Treatment 1 recorded the lowest (7.40). For texture, the results revealed a significant difference (p = .384), where Treatments 2 (7,80) and 3 (7.80) had higher mean compared to Treatment 3 (7.00) Lastly, general acceptability showed the most significant difference (p = .854), with Treatment 2 achieving the highest mean (7.60), followed by Treatment 1 (7.40), while Treatment 3 received the lowest mean rank (7.20). Since all p-values were not less than 0.05, the null hypothesis was not rejected for all attributes, indicating that the treatments significantly influenced the sensory characteristics of the product.

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 4 (April 2026)

## CONCLUSION

1. Bougainvillea Lime Tea was found to be acceptable, with Treatment 3 receiving the highest rating for color, aroma, taste, texture, and overall acceptability.
2. Treatment 3's overall acceptability score of "Very Highly Acceptable" indicates that consumers will likely perceive it as a high-quality tea product.
3. Bougainvillea Lime Tea may have functional properties, as evidenced by the presence of various nutrients and other bioactive compounds.
4. Differences exist in the sensory attributes of the various bougainvillea lime tea formulations, which suggests that formulation type influences consumers' preferences.
5. Overall, Bougainvillea Lime Tea is a natural, caffeine-free, herbal beverage that has excellent sensory qualities, high nutritional value, and good market potential.

### Recommendation

The treatment method utilized in Treatment 3 (100% dried bougainvillea and dried lime addition) should be used to standardize the formulation of the product due to producing the most preferred product. Specific instructions for drying times, temperatures, and infusion times must be established and documented to ensure consistency in production. Additional studies need to be conducted to identify drying methods and temperature settings that will preserve the natural colour, taste and aroma of bougainvillea and lime to improve its nutritional content and sensory appeal. A potential opportunity may exist to balance the flavour and aroma profile through refinement of ratios of dried bougainvillea to lime and small proportional adjustments may create additional attractiveness and customer preference for the product. Duplicating the successful treatment procedure used to create the tea for laboratory and pilot scale preparation on a larger scale will be required to establish its consistency, effectiveness and cost-effectiveness prior to possible commercialization. Future studies may consider evaluating the sensory attributes of other drying techniques (i.e., vacuum, sun) and infusion methods (i.e., cold) to determine the optimal processing techniques for quality and sustainability.

## References

Alvarez, P. D., Ramos, C. J., & Torres, L. F. (2023). Sensory evaluation techniques in herbal tea development: A consumer-based approach. Journal of Sensory Studies, 38(2), 201–214.

Ananthi, T., & Kanchana, D. (2021). Phytochemical analysis and antioxidant activity of bougainvillea flower extract and its potential use in herbal tea formulation. Journal of Medicinal Plants Studies, 9(4), 45–50.

De Guzman, R. P., Santos, M. A., & Lopez, J. E. (2021). Development and sensory evaluation of novel herbal tea blends using local ingredients. Philippine Journal of Food Science and Technology, 5(2), 112–120.

Delos Reyes, J. M., & Bautista, C. L. (2023). Utilization of indigenous plants in developing functional beverages in the Philippines. Journal of Agricultural and Food Innovation, 7(1), 88–99.

Gupta, S., Kumar, A., & Singh, R. (2021). Functional beverages: A review on their health-promoting potential and consumer perception. Journal of Food Processing and Technology, 12(6), 567–575.

Hernandez, A. G., Flores, P. S., & Lim, R. C. (2022). Sustainable utilization of ornamental plant waste for functional beverage production. International Journal of Environmental Sustainability, 14(3), 133–141.

Iqbal, M., Fatima, Z., & Noor, F. (2022). Consumer trends and health benefits of herbal and functional beverages: A review. Food Research International, 157, 111–120.

Kaur, G., Verma, S., & Arora, R. (2020). Effect of drying and brewing methods on the antioxidant properties of herbal teas. International Journal of Food Science, 8(3), 78–86.

Kumar, V., & Singh, P. (2020). Herbal teas: Composition, benefits, and market trends. Journal of Herbal Medicine Research, 14(2), 55–63.

Lopez, R. D., Tan, J. C., & Ramos, P. G. (2022). Nutritional and sensory impacts of citrus inclusion in herbal tea formulations. Food Chemistry and Nutrition, 10(4), 245–253.

Mendoza, L. M., Reyes, C. J., & Dela Cruz, A. (2022). Sensory evaluation and consumer acceptability of herbal tea products from indigenous plants. Asian Food Science Journal, 11(1), 22–31.

Rahman, M., & Samad, A. (2019). Consumer perception and sensory attributes of herbal tea products. Food Quality and Preference Journal, 28(4), 120–128.

Rani, R., Sharma, P., & Patel, V. (2020). Evaluation of antioxidant and antimicrobial activity of Bougainvillea spectabilis extracts. International Journal of Pharmaceutical Sciences Review and Research, 61(2), 75–80.

Saeed, M., Ali, S., & Khan, F. (2020). Formulation and acceptability of hibiscus-based herbal tea as a functional beverage. Journal of Nutrition and Food Research, 8(2), 150–157.

Sharma, S., Patel, R., & Gupta, N. (2020). Phytochemical and functional properties of lime (Citrus aurantifolia) for beverage applications. Food and Nutrition Journal, 6(1), 90–98.

Sreelatha, S., & Padma, P. R. (2019). Phytochemical and antioxidant profile of Bougainvillea species. International Journal of Botany and Research, 9(1), 34–40.

Tan, H., Lim, W., & Chua, K. (2021). Enhancement of sensory quality and shelf life of herbal drinks using citrus extracts. Journal of Beverage Science, 15(3), 88–96.

Villanueva, J. A., Ponce, M. E., & Domingo, C. F. (2022). Development and consumer evaluation of locally produced herbal teas in Northern Luzon. Philippine Agricultural Scientist, 105(2), 67–78.

Ananthi, T., & Kanchana, D. (2021). Phytochemical analysis and antioxidant activity of bougainvillea flower extract and its potential use in herbal tea formulation. Journal of Medicinal Plants Studies, 9(4), 45–50.

De Guzman, R. P., Santos, M. A., & Lopez, J. E. (2021). Development and sensory evaluation of novel herbal tea blends using local ingredients. Philippine Journal of Food Science and Technology, 5(2), 112–120.

Devadiga, A., & Ahipa, T. N. (2020). Betalains: Natural pigments with therapeutic potential—A review. Journal of Functional Foods, 72, 104041.

Gupta, S., Kumar, A., & Singh, R. (2021). Functional beverages: A review on their health-promoting potential and consumer perception. Journal of Food Processing and Technology, 12(6), 567–575.

Lopez, R. D., Tan, J. C., & Ramos, P. G. (2022). Nutritional and sensory impacts of citrus inclusion in herbal tea formulations. Food Chemistry and Nutrition, 10(4), 245–253.

Mendoza, L. M., Reyes, C. J., & Dela Cruz, A. (2022). Sensory evaluation and consumer acceptability of herbal tea products from indigenous plants. Asian Food Science Journal, 11(1), 22–31.

Rahman, M., & Samad, A. (2019). Consumer perception and sensory attributes of herbal tea products. Food Quality and Preference Journal, 28(4), 120–128.

Sadowska, U., & Bartosz, G. (2021). Biological activity and potential health benefits of betalains: A comprehensive review. Phytotherapy Research, 35(4), 1885–1904.

Sreelatha, S., & Padma, P. R. (2019). Phytochemical and antioxidant profile of Bougainvillea species. International Journal of Botany and Research, 9(1), 34–40.

Tan, H., Lim, W., & Chua, K. (2021). Enhancement of sensory quality and shelf life of herbal drinks using citrus extracts. Journal of Beverage Science, 15(3), 88–96.

Villanueva, J. A., Ponce, M. E., & Domingo, C. F. (2022). Development and consumer evaluation of locally produced herbal teas in Northern Luzon. Philippine Agricultural Scientist, 105(2), 67–78