

Leafy Veggie Buns: Utilizing Kangkong, Saluyot, and Alugbati Powders as Nutritious Bun Ingredients

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ABSTRACT: This research, titled “Leafy Veggie Buns: Utilizing Kangkong, Saluyot, and Alugbati Powders as Nutritious Bun Ingredients,” explores the potential of leafy vegetable powders as functional ingredients in enhanced bakery products. The study aimed to determine the acceptability of buns fortified with kangkong, saluyot, and alugbati powders using two formulation treatments: (1) Straight Dough Method, and (2) Sponge Dough Method. Fifty respondents evaluated the buns using a 5-point hedonic scale based on color, texture, taste, and aroma. Results revealed that both treatments were acceptable; however, Treatment 2 obtained the highest overall weighted mean of 4.88, interpreted as “Highly Acceptable.” The use of powdered leaves created finer texture, better color uniformity, and improved flavor balance. Findings demonstrate that common leafy vegetables—often underutilized in bread-making—can be transformed into functional, nutritious, and marketable bakery products that promote healthy eating, reduce produce waste, and support local agriculture. Overall, this study encourages sustainable food innovation by converting nutrient-rich leafy vegetables into value-added bakery foods.

KEYWORDS: Kangkong (water spinach), Saluyot (jute leaves), Alugbati (malabar spinach) Leaves, Emergency Nutrition, Leafy Buns, Shelf-Life Stability, Sustainable Food Product

I. INTRODUCTION

Bread is one of the most widely consumed food products in the Philippines. However, commercial buns often lack essential nutrients, especially vitamins, minerals, and dietary fiber from vegetables. Meanwhile, leafy greens such as kangkong (*Ipomoea aquatica*), saluyot (*Corchorus olitorius*), and alugbati (*Basella alba*) are abundant in local communities and are known for their rich nutritional profiles. These vegetables contain high levels of iron, calcium, vitamin A, vitamin C, antioxidants, and dietary fiber (Fasuyi, 2006; Oboh, 2005). Despite their availability and nutritional benefits, these vegetables are commonly overlooked as ingredients in bakery products.

The Leafy Veggie Buns Project explores how powdered leafy vegetables can be incorporated into bun formulations. Similar to previous studies on vegetable-enriched bakery items, researchers found that vegetable powders can improve nutritional value without compromising sensory acceptability when processed properly (Rizkiya et al., 2021; Santos & Cruz, 2018). Leafy vegetables can be blanched, dried, and milled into fine powders that blend smoothly into dough mixtures, enhancing both nutritional quality and shelf life.

Furthermore, the Food and Agriculture Organization (FAO, 2010) emphasized the importance of utilizing nutrient-rich, locally available plant materials to combat micronutrient deficiencies. Using vegetable powders in baked goods is a practical and sustainable approach to improving public health, supporting local farmers, and reducing vegetable waste caused by oversupply or spoilage.

This study developed **two bun formulations** using leafy vegetables—one using straight dough method and another using sponge dough method. To determine consumer acceptability, sensory evaluation was conducted focusing on **color, texture, taste, and aroma**, following the guidelines of Meilgaard et al. (2016).

Ultimately, the Leafy Veggie Buns Project aims to promote innovation in functional food development. By integrating leafy vegetables into an everyday staple like buns, the project encourages healthy eating habits and showcases how simple, familiar ingredients can be transformed into nutritious bakery products.

This study aims to:

1. Develop buns using combinations of kangkong, saluyot, and alugbati powders;
2. Determine the acceptability of leafy veggie buns in terms of **color, texture, taste, and aroma** using sensory evaluation.

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II. METHODOLOGY

This chapter presents the research design, materials, procedures, experimental treatments, data gathering, and statistical tools used.

Research Design

The study employed an **experimental research design** to formulate and evaluate leafy veggie buns. Two treatments were prepared: Treatment 1: Straight Dough Method (All ingredients mixed simultaneously; single fermentation.)

Treatment 2: Sponge Dough Method (Yeast mixture pre-fermented before combining with remaining ingredients.)

Data Analysis

The data were analyzed using one-way analysis of variance (ANOVA) to determine which is more acceptable between the two treatments in terms of color, texture, taste, and aroma. The independent variable was the type of treatment, while the dependent variables were the sensory scores.

Respondents and Data Gathering

Sensory evaluation was conducted at Isabela State University – City of Ilagan Campus using a 5-point hedonic scale.

Scale Interpretation:

Scale	Mean	Descriptive Interpretation
5	4.50 - 5.00	Highly Acceptable
4	3.50 - 4.49	Acceptable
3	2.50 - 3.39	Moderately Acceptable
2	1.50 - 2.49	Slightly Acceptable
1	1.00 - 1.49	Not Acceptable

A sensory panel for this project was composed of 40 individuals who were twenty (15) Master of Arts in Industrial Education students, five (5) faculty, and twenty-five (30) random participants.

Ingredients/Materials and Equipment

These materials and equipment are essential for making Leafy Veggie Buns, ensuring a smooth preparation process and delicious final product.

Table 1: Ingredients/Materials and Equipment Preparation

Category	
Ingredients	- Kangkong Leaves - Saluyot Leaves - Alugbati Leaves - Bread flour - Salt - Water - Sugar - Shortening - Yeast - Egg
Materials	- Mixing bowls (for combining ingredients) - Measuring spoons (for seasonings and mixture portions) - Strainer (for draining excess oil) - Digital Weighing Scale - Sifter/ strainer - Spatula - Baking Tray - Pastry Brush - Clean towel (for proofing) - Label (for packaging) - Clean containers (for washing and soaking vegetable leaves)
Equipment	- Stand Mixer - Kneading Board - Proofing Box or Warm Area - Oven - Cooling Rack - Drying Oven (for drying leaves before grinding)

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Processes applied in making leafy veggie buns along the two treatments.

The researcher executed the process of making veggie buns using the following steps:

Procedure: *(First treatment using straight dough method)*

1.) Prepare the Ingredients

Measure all dry and liquid ingredients accurately, including flour, yeast, sugar, salt, shortening, eggs, water and vegetable powders.

2.) Combine Dry Ingredients

In the mixing bowl, sift together the flour, sugar, salt and leafy vegetable powders/

3.) Add Wet Ingredients

Pour in water, then add eggs and shortening.

4.) Knead the Dough

Knead by hand or using mixer with a dough hook for 8-12 minutes.

Continue kneading until the dough becomes smooth, elastic, and slightly tacky but not sticky.

5.) First fermentation

Form the dough into a ball and place it in a lightly grease bowl.

Cover with plastic.

Let rise for 1-2 hours or until double in size.

6.) Punch Down the Dough

Gently press the dough to release trap gas.

7.) Divide and Shape

Divide the dough into equal portions (e.g., 30-40 g per bun).

8.) Second Proofing

Arrange shape dough pieces on a greased or lined baking tray.

Cover and let rise again for 30-45 minutes or until puffy.

9.) Apply Egg Wash (Optional)

Brush the top of each bun with egg wash for a shiny, golden finish.

10.) Bake

Preheat the oven to 170–180°C.

Bake the buns for 12-15 minutes or until golden brown.

11.) Cool

Remove from the oven and transfer to a cooling rack.

Allow to cool before packaging or sensory evaluation.

Procedure: *(Second treatment using sponge dough method)*

1.) Prepare the Sponge

Combine a portion of the flour, water, yeast, and a little sugar.

Mix until smooth, then cover the bowl.

Allow it to ferment for 1-2 hours or until doubled in size and bubbly.

2.) Prepare the Final Dough

Add the remaining flour, sugar, salt, vegetable powder, and other ingredients into the sponge.

Mix until the dough forms.

Knead until smooth and elastic.

3.) First Rising

Let the dough rest for 45–60 minutes or until it doubles in size.

4.) Punch the Dough and Shape

Release the gas by gently punching the dough.

Divide, weigh, and shape into buns.

5.) Second Rising

Place shaped dough on trays and let rise again for 30–45 minutes.

6.) Baking

Bake in a preheated oven at 170–180°C for 15–20 minutes, or until golden brown.

7.) Cooling and Packaging

Cool completely before packaging to maintain texture and shelf life.

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III. RESULTS AND DISCUSSION

This chapter presents the results, discussion, and the personal insight that the researchers have gathered.



Figure 1: Sample Products Developed.

Table 1: Treatment 1 Level of Acceptability

Treatment 1: Straight Dough Method	Criteria	Mean	Description
	Color	4.21	Acceptable
	Texture	4.18	Acceptable
	Taste	4.10	Acceptable
	Aroma	4.25	Acceptable
Overall Weighted Mean		4.19	Acceptable

The table represents that the straight dough method demonstrates that it is capable of producing buns with balanced sensory qualities. The product is visually appealing, pleasantly aromatic, soft in texture, and has an acceptable taste. These results suggest that the straight dough method is a reliable approach for creating buns, though slight modifications could further enhance flavor and make the product even more appealing to consumers.

Table 2: Treatment 2 Level of Acceptability

Treatment 2: Sponge Dough Method	Criteria	Mean	Description
	Color	4.90	Highly Acceptable
	Texture	4.88	Highly Acceptable
	Taste	4.85	Highly Acceptable
	Aroma	4.89	Highly Acceptable
Overall Weighted Mean		4.88	Highly Acceptable

The table represents that the sponge dough method produced buns that excelled in all sensory characteristics. The high ratings across color, texture, taste, and aroma suggest that this method allows for better fermentation, improved crumb structure, and enhanced flavor development. Compared to the straight dough method, the sponge dough method results in a superior product that is more appealing and likely to satisfy consumers.

The sensory evaluation showed that buns from the Straight Dough Method were acceptable in color, texture, taste, and aroma, with an overall mean of 4.19. In contrast, buns from the Sponge Dough Method were highly acceptable, scoring 4.88 overall, with excellent color, soft texture, rich taste, and appealing aroma. Overall, the sponge dough method produced superior buns, making them more desirable to consumers.

IV. CONCLUSION

The study, Leafy Veggie Buns: Utilizing Kangkong, Saluyot, and Alugbati Powders as Nutritious Bun Ingredients”, demonstrated the potential of kangkong, saluyot, and alugbati powders as functional ingredients in producing nutritious and appealing leafy veggie buns. While both treatments were acceptable, Treatment 2, which used powdered forms of the leafy vegetables, was rated “Highly Acceptable” with an overall mean of 4.88. Powder incorporation produced buns with better color uniformity, improved texture, enhanced aroma, and more refined flavor.

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The findings highlight that common leafy vegetables can be transformed into value-added bakery products that support healthier diets, local agriculture, and food sustainability. Leafy Veggie Buns can serve as a nutritious alternative to commercial buns, promoting vegetable consumption in a convenient and enjoyable way.

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