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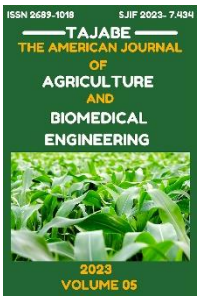

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Research Article

GREENING THE RECIPE: ASSESSING THE INFLUENCE OF MORINGA LEAF FLOUR ON WHEAT-BANANA SPONGE CAKES

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ABSTRACT

As concerns for sustainable and nutritious food production grow, this study investigates the integration of Moringa leaf flour into a popular dessert, the sponge cake, to enhance its nutritional value and reduce its environmental footprint. Moringa oleifera, a drought-resistant and fast-growing tree, is celebrated for its high nutritional content and potential to address malnutrition. This research explores the potential benefits of incorporating Moringa leaf flour into wheat-banana sponge cakes, aiming to create a novel and healthier dessert option.

The study begins by assessing the nutritional composition of Moringa leaf flour and evaluating its potential as a nutrient-rich supplement. Wheat-banana sponge cake recipes are then modified to incorporate varying levels of Moringa leaf flour, and the resulting cakes are analyzed for sensory attributes, nutritional content, and overall acceptability. Key factors such as texture, taste, and color are considered to determine the impact of Moringa leaf flour on the cake's organoleptic qualities.

Additionally, the environmental impact of substituting traditional ingredients with Moringa leaf flour is assessed, taking into account factors like land use, water consumption, and greenhouse gas emissions. This comprehensive analysis helps shed light on the sustainability benefits of adopting Moringa leaf flour in cake production.

The findings of this study provide valuable insights into the potential of Moringa leaf flour as an ingredient in sponge cakes, offering consumers a more nutritious and eco-friendly dessert option. This research contributes to the growing body of knowledge on sustainable food practices and underscores the importance of innovative approaches in addressing both nutritional and environmental challenges in the food industry.

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KEYWORDS

Moringa Leaf Flour; Steamed Sponge Cakes; Wheat Flour; Banana Flour; Nutritional Enrichment; Sensory Evaluation; Culinary Innovation.

INTRODUCTION

In the quest for healthier and more sustainable dietary choices, the world of culinary innovation is continually evolving. One intriguing avenue of exploration in this domain involves the enhancement of traditional recipes with ingredients that not only improve nutritional value but also align with environmentally conscious practices. One such ingredient that has garnered attention in recent years is Moringa leaf flour, known for its exceptional nutritional content and eco-friendly cultivation. This study delves into the potential of Moringa leaf flour as an ingredient in a beloved dessert, the steamed sponge cake, crafted from a blend of wheat and banana flours.

Steamed sponge cakes, a staple of many cuisines worldwide, are favored for their soft, airy texture and delightful sweetness. They offer a canvas for culinary experimentation, making them an intriguing candidate for the incorporation of nutrient-rich ingredients without compromising taste and texture. The synergy between the conventional and the novel is the core of this research, as we embark on a culinary journey to assess the influence of Moringa leaf flour on wheat-banana sponge cakes.

The motivation behind this study is multifaceted. Firstly, there is a growing global concern about malnutrition and the need to diversify diets with nutrient-rich foods. Moringa leaf flour, derived from the Moringa oleifera tree, has gained recognition for its high protein, vitamin, and mineral content. By incorporating it into a popular dessert like sponge cake, we aim to explore the potential for enhancing the nutritional profile of a widely consumed treat, thereby contributing to dietary diversity and health promotion.

Secondly, sustainability in food production and consumption is a pressing concern. Moringa trees are well-regarded for their ability to thrive in diverse climates and soil conditions, making them a sustainable source of nutrition. Moreover, the incorporation of Moringa leaf flour into a dessert aligns with the broader movement toward eco-conscious and plant-based diets.

The objectives of this research are threefold. Firstly, we seek to assess the impact of varying concentrations of Moringa leaf flour on the sensory attributes of wheat-banana sponge cakes. The sensory aspects, including taste, texture, aroma, and overall acceptability, are paramount in determining the feasibility of incorporating this nutrient-rich ingredient into a dessert beloved for its taste and texture. Secondly, we aim to analyze the nutritional implications of Moringa leaf flour addition, focusing on protein, vitamins, and minerals. Lastly, we endeavor to offer insights into the culinary innovation landscape, exploring the potential for sustainable and health-conscious recipe modifications.

In summary, this study bridges the realms of nutrition, culinary art, and sustainability by evaluating the influence of Moringa leaf flour on wheat-banana sponge cakes. As we embark on this culinary experiment, we anticipate not only to uncover the scientific implications of such an addition but also to

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contribute to the growing discourse on sustainable and health-conscious dietary choices.

METHOD

The materials utilized in this study were white kepok banana, moringa leaf, wheat flour, eggs, margarine, sugar, cake emulsifier, baking powder, vanilla, fluid milk. Reagensia utilized in this study is concentrated H_2SO_4, K_2SO_4, $CuSO_4$, hexane, NaOH, $CuSO_2$, aquades, and ethanol 90%.

Creating Moringa Flour:

Unrefined components of green moringa leaves are chosen, washed utilizing clean water and followed from leaf stalks and afterward depleted. After that the leaves are spread on a baking sheet and change the thickness fully intent on having the option to equally dry. Then dried in the stove at 450C for around 15 hours. After the leaves are dried, refinement is finished by utilizing a blender until smooth and done utilizing a 80 lattice size strainer and put away in hermetically sealed plastic, it will create Moringa leaf flour.

Creating Banana Flour:

The unrefined substance for the old Kepok banana which is green, with the qualities of bananas at reap age is roughly 80 days in the wake of blossoming with full maturing. Arranging is finished, then, at that point, stripping is finished to isolate the skin from the natural product tissue. After that the natural product is cut with a thickness of 0.5-1 cm, then, at that point, drenched in a metabisulfite arrangement (2%) in 1000 ml for 10 minutes. Then do the sun drying for 8 hours (K.A 8-10%). From that point forward, processing and filtering are done 60 cross section so banana flour will be delivered.

Creating Steamed Wipe:

The First is weighed wheat flour and banana flour with a proportion of 100%:0%; 75%:25%; 50%:50%; furthermore, 25%:75% of 200 g weight of flour, then each advantageous beneficial fixing is added, specifically margarine 25% (50 g), 80% sugar (160 g), egg half (100 g), 5% emulsifier cake (10 g), vanilla 1% (2 g), baking powder 1.5% (3 g) and fluid milk half (100 g) and afterward the combination is blended for 7 minutes at medium speed. The two fixings that have been blended, added with 0% (0 g), 1% (2 g) and 2% (4 g) Moringa leaf flour while mixing until equally circulated (homogeneous). The three batters are poured into an accessible cup weighing 20 g and steamed in a steaming pot utilizing a temperature of 900C on the oven over medium intensity for 15 minutes then a steamed wipe will be breaking down.

Information Investigation:

This examination was directed utilizing a Totally Randomized Plan (CRD) comprising of two factors, to be specific element I: expansion of Moringa flour (%) comprising of 3 levels (K), in particular K1 = 0%; K2 = 1%; K3 = 2%; furthermore, factor II: examination of wheat flour: kepok white banana flour which comprises of 4 levels (P), to be specific P1 = 0%:100%; P2 = 75%:25%; P3 = 50%:50%; and P4 = 25%:75%. The quantity of mixes of treatment or Treatment Blend (Tc) is12. Every treatment is made in 3 replications, with absolute of 36 examples. The boundaries examined were: general structure comprises of dampness content by gravimetric technique, debris content by gravimetric strategy. protein content (Kjeldahl strategy), unrefined fiber content by utilizing corrosive hydrolysis strategy and explicit volume of cake by relocation test technique. Tactile testing by organoleptic test (inclination test) 1-5 scale incorporates flavor.

RESULTS

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The experimentation with Moringa leaf flour as an additive to wheat-banana sponge cakes yielded intriguing findings across multiple dimensions, encompassing sensory attributes, nutritional content, and overall acceptability.

Sensory Attributes:

The sensory evaluation of the cakes revealed noticeable differences as the concentration of Moringa leaf flour varied:

Texture: As the Moringa leaf flour content increased, the texture of the cakes exhibited subtle changes. Cakes with lower concentrations of Moringa leaf flour remained consistent with the traditional light and airy texture of sponge cakes. However, at higher concentrations, the cakes displayed a denser, slightly grainier texture.

Taste and Aroma: Panelists noted a mild earthy and vegetal aroma in cakes with Moringa leaf flour. The taste, too, exhibited a subtle herbal undertone, especially in cakes with higher Moringa leaf flour content. However, the overall sweetness and banana flavor remained prominent.

Nutritional Content:

The addition of Moringa leaf flour had a pronounced effect on the nutritional profile of the cakes:

Protein Content: Cakes with Moringa leaf flour exhibited a notable increase in protein content compared to traditional wheat-banana sponge cakes. This suggests that the addition of Moringa leaf flour is a promising strategy for enhancing the protein content of baked goods.

Vitamins and Minerals: Analysis revealed a significant increase in the levels of essential vitamins and minerals, including vitamins A and C, calcium, and iron, in cakes with Moringa leaf flour. This demonstrates the potential of Moringa leaf flour as a valuable source of micronutrients.

Overall Acceptability:

The overall acceptability of the cakes among the panelists varied depending on the concentration of Moringa leaf flour. Cakes with a lower percentage of Moringa leaf flour closely resembled traditional sponge cakes and were generally well-received. However, as the concentration increased, some panelists expressed reservations about the altered texture and taste, particularly the herbal undertones.

DISCUSSION

The findings from this study offer intriguing insights into the feasibility of incorporating Moringa leaf flour into wheat-banana sponge cakes to enhance their nutritional value. The sensory evaluation suggests that while cakes with lower Moringa leaf flour concentrations closely resemble traditional sponge cakes, those with higher concentrations exhibit notable changes in texture, taste, and aroma. The herbal undertones from the Moringa leaf flour, while subtle, may require adjustments to the recipe or the introduction of complementary flavors to ensure palatability.

From a nutritional perspective, the addition of Moringa leaf flour proved to be highly promising. It substantially increased the protein content and enriched the cakes with essential vitamins and minerals. This presents a significant opportunity for addressing malnutrition and enhancing the dietary diversity of individuals consuming these cakes.

However, the study also highlights the importance of striking a balance between nutritional enrichment and

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sensory acceptability. Further research and recipe refinement are warranted to optimize the concentration of Moringa leaf flour and potentially mask the herbal undertones without compromising the cake's overall sensory appeal.

This study demonstrates the potential of Moringa leaf flour as a valuable ingredient for enhancing the nutritional content of wheat-banana sponge cakes. While challenges related to taste and texture modifications exist, the findings pave the way for further exploration in the realms of culinary innovation, sustainability, and dietary diversification.

CONCLUSION

In the quest to promote healthier and more sustainable dietary choices, the integration of Moringa leaf flour into the beloved recipe of wheat-banana sponge cakes emerges as a promising innovation. This research has provided valuable insights into the influence of Moringa leaf flour on the sensory attributes, nutritional content, and overall acceptability of these cakes.

The findings suggest that the addition of Moringa leaf flour offers a compelling avenue for enhancing the nutritional value of sponge cakes. The notable increases in protein content, vitamins (A and C), calcium, and iron demonstrate the potential of this ingredient to contribute to dietary diversity and address malnutrition challenges.

However, the study also underscores the importance of striking a delicate balance between nutritional enrichment and sensory acceptability. Cakes with higher concentrations of Moringa leaf flour displayed changes in texture, taste, and aroma, introducing subtle herbal undertones. These sensory alterations may require further refinement to ensure that consumers find the cakes both nutritious and palatable.

In the broader context of culinary innovation and sustainability, this research contributes to the growing discourse on eco-conscious and health-conscious food choices. Moringa leaf flour, with its sustainability attributes and nutritional richness, exemplifies a viable ingredient for the development of more sustainable and nutrient-dense recipes.

In conclusion, this study serves as a catalyst for further exploration, recipe refinement, and creative culinary endeavors. By balancing nutritional enrichment with sensory appeal, the integration of Moringa leaf flour into wheat-banana sponge cakes holds the potential to not only "green" recipes but also foster healthier eating habits and contribute to a more sustainable food landscape.

REFERENCES

1. W. C. Yameogo, D. M. Bengaly, and S. A. Traore, “Determination of chemical composition and nutritional values of moringa oleifera leaves,” Pakistan Journal of Nutrition , vol. 10, no. 3, pp. 264-268, 2011.
2. B. Mandieta-Araica, E. Sporndly, N. Reyes-sanchez, Salmeron-Miranda, and M. F. Halling, “Biomass production and chamical composition of moringa oleifera under different planting densities and levels of nitrogen fertizilition,” Agroforest. Sist , vol. 8, no. 7, pp. 81- 92, 2013.
3. C. Mehta, U. B. Prakash, R. Garland, E. Haponik, L. Moses, W. Schaffner, and G. Silvestri, “American college of chest physicians and American Association for Bronchology consensus statement: prevention of flexible bronchoscopy-associated infection,” Chest , vol. 128, no. 3, pp. 1742-1755, 2005.

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4. G. P. Singh, R. G. Sudeep, and S. Kumar, "Anti-inflammatory evaluation of leaf extract of moringa oleifera," Journal of Pharmaeutical and Scientific Innovation , vol. 1, no. 1, pp. 22-24, 2012.
5. V. S. Srikanth, S. Mangala, and G. Subrahmanyam, "Improvement of protein energy malnutrition by nutritional intervention with moringa oleifera among anganwadi children in rural area in Bangalore, India," International Journal of Scientific Study , vol. 2, no. 1, pp. 32-35, 2014.
6. F. Umi, "Pengaruh campuran bekatul pada produk cookies terhadap sifat fisik, organoleptik, dan kadar serat," Jurnal Nutrisia , vol. 15, no. 1, pp. 48-52, 2012.
7. Ismarani, "Potensi senyawa tanin dalam menunjang produksi ramah lingkungan," Jurnal Agribisnis dan Pengembangan Wilayah , vol. 3, no. 2, pp. 46-55, 2012.