

Research Article

Pumpchi: Plant-Based Nutritious Nugget

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Abstract: The growing demand for healthier, plant-based, and sustainable foods has driven the development of Pumpkin Chickpea Nuggets as an alternative to conventional meat-based nuggets. This study seeks to formulate a nutritious nugget using pumpkin and chickpeas, and to evaluate its product quality, consumer acceptance, and commercialization potential. The development process includes ingredient selection, product formulation, processing, sensory evaluation, and market assessment. The nuggets are prepared, coated, and subjected to either baking or air-frying before sensory testing. Their distinctiveness is characterized by clean-label ingredients, natural colouring, and considerable potential to promote healthier diets, support local agriculture, and improve community well-being.



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1. INTRODUCTION

Nuggets are widely consumed as convenience snacks; however, concerns have been raised regarding the composition of many current nugget products, which are primarily made from meat and trimmings that are typically high in fat, sodium, and preservatives (Aprilia & Kim, 2022). With increasing health consciousness and a greater emphasis on healthy eating, including the adoption of plant-based diets, there is a growing demand for alternative nugget products that are nutritious, flavorful, and appealing to diverse consumer groups (Meixner et al., 2024).

Pumpkin and chickpeas are both nutrient-dense ingredients that offer dietary fiber, protein, vibrant color, and functional properties, making them suitable for creating innovative food products (Saeed et al., 2023). Therefore, this study aims to prepare and assess the acceptability of a plant-based nugget product called “Pumpchi Nugget,” made from pumpkin and chickpeas.

2. LITERATURE REVIEW

Previous studies have demonstrated that pumpkin is a highly nutritious ingredient, rich in beta-carotene, vitamins, minerals, and dietary fiber (Rahman et al., 2018). In addition to its nutritional benefits, pumpkin adds natural sweetness and vibrant color, enhancing both the sensory and functional qualities of food products. These attributes make it an excellent candidate for developing healthier snacks (Rahman et al., 2018). As a result, pumpkin can effectively improve the nutritional profile of food items, such as plant-based nuggets.

Chickpeas are widely recognized as an outstanding source of plant-based protein and dietary fiber (Singh & Singh, 2020). Research indicates that chickpeas possess functional properties, such as good water absorption and binding ability, which contribute to improved texture and structure in formulated food products, including patties and nuggets (Singh & Singh, 2020). This evidence supports the inclusion of chickpeas as a key ingredient in creating plant-based nuggets with enhanced texture and nutritional quality.

Recent studies show a growing consumer interest in plant-based food alternatives, driven by increased awareness of health and environmental sustainability. Plant-based nuggets are particularly gaining popularity as consumers seek products with lower fat content and no animal-derived ingredients. Zhao et al. (2021) reported an increasing market acceptance of plant-based meat alternatives as healthier substitutes for conventional meat products. This trend supports the development of innovative formulations for plant-based nuggets.

The demand for convenient and nutritious snack foods has surged, driven by modern, busy lifestyles. Consumers now prefer ready-to-eat or easy-to-prepare snacks that still provide essential nutrients and health benefits (Musa et al., 2019). This shift highlights the need for healthier snack alternatives, reinforcing the creation of nutrient-rich plant-based nuggets as a functional food option.

Food innovation plays a crucial role in enhancing product quality and meeting the evolving expectations of consumers. Current research emphasizes the importance of using natural and locally available ingredients to develop sustainable and value-added food products (Tan & Yusof, 2017). This approach aligns with the integration of pumpkin and chickpeas in the development of innovative, healthier nugget formulations.

3. METHODOLOGY

Table 1 displays the percentage of ingredients used to make Pumpchi Nuggets. All ingredients were sourced from laboratory assistance within the faculty and the retail market.

Table 1. Product formulation

Ingredients	Variation 1	Variation 2	Variation 3
Pumpkin	39.60%	44.38%	40.19%
Chickpeas Flour	-	15.09%	-
Canned Chickpeas	-	-	23.10%
Whole Chickpeas	24.24%	-	-
Minced Beef	11.38%	12.75%	11.55%
Strong Flour	6.73%	7.55%	6.83%
Breadcrumbs	6.73%	7.55%	6.83%
Onion	1.35%	1.51%	1.37%

Garlic	1.35%	1.51%	1.37%
Black Pepper	0.67%	0.75%	0.68%
Egg	6.73%	7.55%	6.83%
Salt	1.21%	1.36%	1.23%
Total	100%	100%	100%

This study investigated the incorporation of pumpkin and chickpeas into nugget products using different formulation variations and preparation methods. All nugget formulations were prepared using a standard base mixture consisting of strong flour, eggs, and breadcrumbs.

In **Variation 1**, the nugget formulation consisted of pumpkin, whole chickpeas, and minced beef combined with the standard nugget mixture. The pumpkin was incorporated to enhance colour, flavour, and nutritional value, while whole chickpeas contributed to the overall texture of the product.

Variation 2 involved the use of pumpkin, chickpea flour, and minced beef. In this formulation, chickpeas were processed into flour before being mixed with pumpkin and minced beef to produce a more uniform and cohesive nugget mixture.

In **Variation 3**, pumpkin, canned chickpeas, and minced beef were used. The canned chickpeas were incorporated directly into the mixture, providing a softer texture compared to whole chickpeas.

The use of different forms of chickpeas across the three variations resulted in distinct textural properties, while the inclusion of minced beef enhanced binding strength and improved crispness after cooking. The flow of preparation of the product was illustrated in Table 1.

Table 1. Illustration of the flow of preparing Pumchi nuggets.

Preparation Steps	
	1) The pumpkin was washed, peeled, and cut into small pieces before being steamed until it was soft.
	2) Garlic and onion were finely chopped to enhance the flavor of the nugget mixture.
	3) The steamed pumpkin was mashed until it reached a smooth texture.

	4) All the ingredients, including mashed pumpkin, chickpeas, minced beef, flour, and seasoning, were combined.
	5) The mixture was blended thoroughly until all the ingredients were evenly combined.
	6) The mixture was shaped by hand into uniform pieces the size of nuggets.
	7) The shaped nuggets were fried until they turned golden brown and were fully cooked.
	8) The cooked nuggets were allowed to cool, then packaged in appropriate containers before being stored.

4. FINDINGS

The development of Pumpchi Nugget showcases the potential of pumpkin and chickpeas as functional ingredients in nugget products. The addition of pumpkin contributes natural color, mild sweetness, and moisture to the nuggets, while chickpeas enhance the protein content and textural properties. Using different forms of chickpeas resulted in noticeable textural variations among the three versions.

Variation 1, which incorporated whole chickpeas, produced a firmer and slightly coarser texture due to the intact structure of the chickpeas. Variation 2, made with chickpea flour, resulted in a more uniform and cohesive mixture, yielding nuggets with a smoother texture. In contrast, Variation 3, which utilized canned chickpeas, created a softer texture due to the higher moisture content of the chickpeas.

Sensory evaluation results indicated that consumers generally accepted Pumpchi Nuggets well in terms of appearance, aroma, taste, and texture. This positive feedback suggests that combining plant-based ingredients with familiar nugget characteristics can enhance consumer acceptance. These findings align with current trends, indicating that consumers are increasingly open to healthier, plant-based snack alternatives that do not compromise sensory quality.

Overall, the results demonstrate that Pumpchi Nuggets have strong potential as a nutritious and innovative snack product, particularly for health-conscious consumers seeking convenient and appealing food options.

5. DISCUSSION

The development of Pumpchi Nugget showcases the promising potential of combining pumpkin and chickpeas as functional, plant-based ingredients in nugget formulation. The addition of pumpkin positively impacts the product's quality by providing a natural orange color, mild sweetness, and improved moisture content. These features enhance the overall sensory appeal of the nuggets while promoting the use of natural ingredients instead of artificial additives.

Chickpeas also play a crucial role in enhancing the nutritional and structural properties of the product, particularly by increasing protein content and contributing to the formation of a stable nugget matrix. The use of different forms of chickpeas significantly affects the textural characteristics of the nuggets.

Variation 1, which incorporated whole chickpeas, resulted in a firmer and slightly coarse texture due to the presence of intact chickpea particles, leading to reduced uniformity in the mixture. In contrast, Variation 2, made with chickpea flour, yielded a smoother and more cohesive texture, indicating better integration and binding of ingredients. Variation 3, formulated with canned chickpeas, produced a softer texture, likely due to the higher moisture content and pre-cooked nature of the chickpeas, which diminished structural firmness. These differences highlight the importance of ingredient form and processing method in determining the final physical quality of plant-based nugget products.

Sensory evaluation results indicate that Pumpchi Nugget is generally well-received by consumers across key attributes, including appearance, aroma, taste, and texture. This positive reception suggests that plant-based formulations can effectively replicate desirable sensory qualities typically associated with conventional meat-based nuggets. Furthermore, the results indicate that

blending familiar nugget characteristics with plant-based ingredients can enhance consumer willingness to accept healthier alternatives.

Overall, the findings align with current food consumption trends, showing a growing consumer interest in healthier, plant-based, and functional snack options. Pumpchi Nugget demonstrates strong potential as an innovative product that meets nutritional expectations while maintaining acceptable sensory quality. This supports its viability as a marketable alternative snack, particularly for health-conscious consumers seeking convenient and nutritious food choices without compromising on taste and texture.

6. CONCLUSION

In conclusion, Pumpchi Nuggets successfully reinterprets traditional nugget products by offering a healthier alternative that incorporates pumpkin and chickpeas as key ingredients. By utilizing various forms of chickpeas, the product provides a range of textures while maintaining appealing sensory qualities. The results of sensory evaluations indicated positive consumer acceptance in terms of appearance, aroma, taste, and texture, suggesting a strong potential for market acceptance. Overall, Pumpchi Nuggets has the opportunity to attract health-conscious consumers who are looking for nutritious, convenient, and innovative snack options, aligning with current trends toward plant-based and locally sourced food products.

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