

## **Development of Plant-Based Ball from Shiitake Mushroom and Chickpea: Physicochemical Properties and Acceptance of Selected Formulation**

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### **Structured Abstract**

**Background:** Shiitake mushrooms and chickpeas, valued for their nutritional benefits, functional attributes, and environmental sustainability, are potential ingredients for alternative food sources. Development has occurred; nevertheless, research on their synergistic application in plant-based products remains limited. This study aims to transform these shiitake mushroom into desirable food products, specifically plant-based balls, by combining shiitake mushrooms with chickpea flour thereby enhancing their value and promoting sustainability. The study examines the sensory attributes of plant-based ball using 9-point hedonic scale, physicochemical properties and calorie content of plant-based ball for nutritional labelling. Additionally, the research examine on the impact of various cooking times on texture and colour of the most selected plant-based ball.

**Methods:** Shiitake mushrooms and chickpea flour were blended in three distinct ratios (15:35, 25:25, and 35:15) to form the mushroom balls. The sensory evaluation aimed to determine the most preferred formulation based on consumer preferences on attributes such as chewiness, flavour intensity, umami, colour, saltiness, after taste and overall acceptance. The chosen formulation was used to ascertain the chemical composition of plant-based ball including moisture, protein, fat, ash, carbohydrate levels and calorie content. The physical properties of selected plant-based ball included texture profile study and colour analysis at several cooking time.

**Results:** Sensory analysis showed that formulation with 35:15 ratio of shiitake mushroom to chickpea had higher preference levels for overall acceptability. The chemical composition of the most chosen plant-based ball revealed moisture, protein, fat, ash and carbohydrate levels 53.36%, 13.48%, 1.29%, 5.25% and 26.62%, respectively. The calorie value of chosen plant-based ball was 172 kcal per 100 g. Texture profile study indicated that hardness and chewiness diminish with extended cooking duration, with 10 minutes identified as the best time for preserving these attributes in the plant-based ball. Colour analysis indicated that the lightness (L\*) values of the plant based sphere. The lightness reduces as cooking time rose, indicating that a cooking duration of 10 minutes was optimal for the plant-based ball, reflecting medium lightness.

**Conclusion:** In conclusion, the findings of this study indicated combining shiitake mushrooms with chickpea flour creates a nutritious, high-protein, low-fat plant-based food.

**Keywords:** Shiitake mushroom, chickpea, plant-based ball

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