Formulation And Standardization of Lotus Petal Incorporated Peanut Chikkis

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Abstract - The present study aimed to enhance the nutritional and functional quality of traditional Indian confectionery through the incorporation of lotus petals. Lotus (*Nelumbo nucifera*), a nutritionally significant aquatic plant, was selected for its rich content of bioactive compounds, antioxidants, vitamins, and minerals, as well as its traditional and cultural relevance. The objective of the study was to develop a value-added peanut chikki by integrating lotus petals with peanuts and jaggery, thereby improving its nutritional profile while maintaining sensory acceptability. The research was carried out in the Department of Food Science and Processing Management, Subbalakshmi Lakshmipathy College of Science, Madurai. Fresh lotus petals were procured, washed, shade-dried, powdered, and incorporated into peanut chikkis at three different levels, namely 2%, 3%, and 5%. The prepared chikkis were evaluated for sensory attributes such as colour, flavour, taste, texture, and overall acceptability using a five-point hedonic scale by a panel of trained judges. Among the three formulations, the chikki incorporated with 3% lotus petal powder recorded the highest overall acceptability score, indicating an optimal balance between sensory quality and functional enrichment. Nutritional analysis of the standardised lotus petal peanut chikki (per 100 g) revealed an energy value of 470.05 kcal, protein content of 13.03 g, fat content of 22.33 g, fibre content of 2.34 g, calcium content of 100.81 mg, phosphorus content of 262.7 mg, and iron content of 293.02 mg, along with appreciable amounts of vitamins and choline. The product was packaged in stand-up pouches to ensure freshness and consumer appeal. Shelf-life and microbial studies confirmed satisfactory stability under ambient conditions. Cost analysis demonstrated that the product could be produced economically at ₹75 per 100 g. The study concludes that lotus petals can be effectively utilised as a functional ingredient in traditional snacks, offering potential for commercial application in the functional food sector.

Keywords: Lotus petals, *Nelumbo nucifera*, Peanut chikki, Functional food, Nutritional analysis.

I. INTRODUCTION

Traditional Indian sweets such as burfi are widely consumed for their taste and cultural significance; however, they are often high in sugar and fat while lacking essential nutrients. With the growing awareness of health and nutrition, there is an increasing demand for value-added traditional foods that combine sensory appeal with improved nutritional quality. Coconut inflorescence sap (*neera*), obtained from the immature spadix of the coconut palm (*Cocos nucifera*), is rich in natural sugars, vitamins, minerals, antioxidants, and bioactive compounds. Incorporating coconut inflorescence into burfi provides a functional, nutrient-dense product. The present study aims to formulate and standardise coconut-inflorescence-incorporated burfi and evaluate its sensory acceptability, nutritional composition, shelf-life potential, and cost-effectiveness, providing a healthier alternative to conventional sweets.

II. MATERIALS AND METHODS

2.1 Raw Materials

Fresh lotus petals, groundnuts, jaggery, ghee, and cardamom were procured locally from standard suppliers. Lotus petals were washed, chopped, shade-dried, and ground coarsely along with roasted peanuts and cardamom. Jaggery was melted in ghee until brittle, then the powdered ingredients were mixed into the syrup. The mixture was poured onto greased trays, cooled, and cut into uniform pieces. Three formulations were prepared by incorporating lotus petals at 2%, 3%, and 5% levels. Sensory evaluation was conducted using a five-point hedonic scale by a semi-trained panel. Nutritional analysis, including moisture, protein, fat, carbohydrates, fibre, minerals, and vitamins, was performed using standard methods. Cost analysis was calculated per 100 g of product.

2.2 Standardisation and Formulation

The pie chart represents the proportion of lotus petal powder incorporated into three different formulations. Sample B (3%) was found to be optimal in sensory evaluation.

2.3 Sensory Evaluation

The samples were assessed on appearance, colour, flavour, texture, taste, and overall acceptability by a semi-trained panel of ten people using a five-point hedonic scale (1 = Dislike very much, 5 = Like very much).

2.4 Nutrient Analysis

Nutrient composition of Lotus Petals Peanut Chikkis (per 100 g)

Nutrients	Value
Moisture (g)	30.95
Energy (kcal)	470.05
Protein (g)	13.03
Fat (g)	22.33
Fibre (g)	2.34
Calcium (mg)	100.81
Phosphorus (mg)	262.7
Iron (mg)	293.02
Carbohydrates (g)	71.49
Thiamine (mg)	0.307
Riboflavin (mg)	0.07
Niacin (mg)	9.54
Vitamin C (mg)	27.4
Choline (mg)	77.5

2.5Cost Analysis

The cost analysis of lotus petals incorporated peanut chikki was carried out based on the cost of raw materials, processing, packaging, and miscellaneous expenses. The total production cost for 100 g of lotus petal peanut chikki was estimated to be ₹65.93, which included the cost of lotus petals, groundnuts, jaggery, ghee, cardamom, and packaging materials. A profit margin of ₹9.07 was added, resulting in a final market price of ₹75 per 100 g. The cost analysis indicated that the developed product is economically feasible and comparatively affordable when compared to commercially available peanut chikkis, thereby demonstrating its potential for small-scale production and commercialization.

III. RESULTS

Sensory evaluation showed that the 3% lotus petal incorporation formulation (Sample B) achieved the highest overall acceptability score of 4.6/5, with superior colour, flavour, taste, texture, and appearance. Samples A (2%) and C (5%) had slightly lower scores. Nutritional analysis per 100 g revealed moisture 30.95 g, protein 13.03 g, fat 22.33 g, carbohydrates 71.49 g, fibre 2.34 g, calcium 100.81 mg, phosphorus 262.7 mg, and iron 293.02 mg, indicating enhanced nutrient content due to lotus petals. Cost analysis showed the production cost was ₹65.93, with profit margin of ₹9.07, making the product economically feasible.

IV. DISCUSSION

The 3% lotus petal formulation was most acceptable, demonstrating a balance of sensory appeal and nutritional enrichment. Lower (2%) levels provided less functional benefits, while higher (5%) levels slightly affected taste and texture. Lotus petals contributed bioactive compounds, minerals, and antioxidants, enhancing the functional value of the chikkis. Economic analysis confirmed that the product is cost-effective and feasible for small-scale production. Overall, moderate inclusion of lotus petals provides a value-added, nutrient-dense, and market-viable traditional sweet.

V. CONCLUSION

Lotus petals incorporated peanut chikkis were successfully standardised with three levels of lotus petal inclusion (2%, 3%, 5%). The 3% formulation was optimal for sensory acceptability, providing enhanced flavour, colour, and texture, as well as improved nutritional content. It is rich in protein, fibre, carbohydrates, calcium, phosphorus, and iron, offering functional benefits. Cost analysis confirmed economic feasibility. The product represents a healthy, value-added alternative to conventional chikkis and has potential for commercialisation And Wider Consumption as A Nutrient-Dense Traditional Snack.

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