



DEVELOPMENT OF A CONFECTIONERY PRODUCT FORTIFIED WITH PROTEIN-RICH MILKY MUSHROOM (*CALOCYBE INDICA*) AND FIBER-RICH KORAİKILANGU (*CYPERUS ROTUNDUS*)

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Abstract:

The increasing demand for nutritious and functional foods has encouraged the development of value-added food products with enhanced health benefits. Conventional confectionery products are mainly consumed for taste and convenience but are often limited in essential nutrients such as protein and dietary fibre. This review focuses on the development of a fortified confectionery product using protein-rich milky mushroom (*Calocybe indica*), fibre-rich koraikilangu (*Cyperus rotundus*), and wheat flour as a base ingredient. Milky mushroom contributes high-quality protein, minerals, and bioactive compounds, whereas koraikilangu provides dietary fibre and phytochemicals with functional properties. Wheat flour supports product structure and texture development. The combination of these ingredients offers potential for improving the nutritional quality, antioxidant properties, and functional value of confectionery products. This review highlights the nutritional significance and application potential of these ingredients in the development of healthier confectionery products.

Keywords: Functional food, Fortified confectionery, Milky mushroom, *Calocybe indica*, Koraikilangu, *Cyperus rotundus*

1. INTRODUCTION

The growing interest in health-conscious diets has increased the development of functional foods that provide additional benefits beyond basic nutrition. Functional foods contain bioactive components that may support health and reduce the risk of nutrition-related disorders. Among various food categories, confectionery products are widely accepted due to their taste, convenience, and consumer preference[17]. However, most conventional confectionery products are mainly rich in carbohydrates and fats, with comparatively lower amounts of protein and dietary fibre. Food fortification using natural ingredients is an effective approach to improve the nutritional quality of confectionery products. Protein and dietary fibre are essential components that support body growth, tissue repair, digestion, and metabolic health. Therefore, incorporation of protein-rich and fibre-rich ingredients into food products has gained importance in functional food development[9]. Milky mushroom (*Calocybe indica*) is an edible mushroom recognized for its nutritional value, particularly its high-quality protein content, essential amino acids, minerals, dietary fibre, and bioactive compounds. Koraikilangu (*Cyperus rotundus*) is a medicinal plant known for its fibre content and phytochemicals, including phenolic compounds and flavonoids with antioxidant potential. Wheat flour is commonly used in confectionery products due to its functional properties and ability to provide texture and structure[11]. The

combination of milky mushroom, koraikilangu, and wheat flour provides an opportunity to develop a nutritionally enhanced confectionery product with improved protein, fibre, and functional properties. This review discusses the nutritional significance and potential application of these ingredients in developing fortified confectionery products[2].

2. Overview of Milky Mushroom (*Calocybe indica*)

Milky mushroom (*Calocybe indica*) is an edible mushroom belonging to the family Lyophyllaceae and is widely cultivated in tropical regions, particularly in India. It is preferred for cultivation due to its adaptability to warm climatic conditions, attractive white colour, firm texture, and nutritional value. Owing to its rich nutrient composition, *Calocybe indica* has gained importance as a potential functional food ingredient[5]. Milky mushroom is a good source of high-quality protein, dietary fibre, vitamins, minerals, and bioactive compounds. The presence of essential amino acids enhances its nutritional value and makes it suitable for protein enrichment of food products. It also contains minerals such as potassium, phosphorus, calcium, iron, and zinc, which contribute to various physiological functions [1]. The bioactive compounds present in *Calocybe indica*, including phenolic compounds, flavonoids, polysaccharides, and β -glucans, contribute to its antioxidant and functional properties. Due to these nutritional and health-promoting characteristics, milky mushroom has been incorporated into bakery products, snacks, and fortified foods. Therefore, *Calocybe indica* can serve as a promising ingredient for developing protein-enriched functional confectionery products[2].

Overview of Koraikilangu (*Cyperus rotundus*)

Koraikilangu (*Cyperus rotundus* L.) is a medicinal plant belonging to the family Cyperaceae and is traditionally valued for its therapeutic properties[7]. The tubers of koraikilangu contain dietary fibre, minerals, and bioactive compounds such as phenolic compounds and flavonoids, which contribute to its functional and antioxidant properties. The presence of dietary fibre supports digestive health and improves the nutritional quality of food products. Due to its fibre-rich nature and functional benefits, koraikilangu can be considered a potential ingredient for the development of value-added functional foods, including fortified confectionery products[12].

Overview of Wheat Flour

Wheat flour is a widely used cereal ingredient in bakery and confectionery industries due to its nutritional composition and functional properties. It contains carbohydrates, proteins, dietary fibre, and minerals, with starch contributing to energy supply and gluten proteins providing structure and texture to food products[16]. Although wheat flour provides desirable processing characteristics, its nutritional quality can be improved through fortification with protein-rich and fibre-rich ingredients such as milky mushroom and koraikilangu.[18]

Development of functional confectionery product

Functional confectionery products are developed to improve the nutritional quality of conventional products by incorporating natural nutrient-rich ingredients. In this study, milky mushroom (*Calocybe indica*) and koraikilangu (*Cyperus rotundus*) are used as functional ingredients with wheat flour as the base material.[19] Milky mushroom enhances protein content through its high-quality proteins, essential amino acids, and bioactive compounds, while koraikilangu improves dietary fibre content and contributes antioxidant properties. Wheat flour provides the required structure and texture for product development. Proper optimization of ingredient levels is essential to maintain nutritional benefits and sensory acceptability of the final product. The combination of these ingredients offers a potential approach for developing a value-added confectionery product with improved protein, fibre, and functional properties.[10]

3. Health benefits of the developed product

The incorporation of milky mushroom (*Calocybe indica*) and koraikilangu (*Cyperus rotundus*) into a wheat-based confectionery product can improve its nutritional and functional properties. Milky mushroom enhances protein content by providing high-quality proteins and essential amino acids, which support body growth and tissue maintenance[13]. Koraikilangu contributes dietary fibre that supports digestive health, improves satiety, and enhances the nutritional value of the product[15]. The presence of bioactive compounds such as phenolics and flavonoids in both ingredients may contribute to antioxidant activity by reducing oxidative stress. The combination of protein-rich milky mushroom, fibre-rich koraikilangu, and wheat flour provides a balanced nutritional profile with improved protein, fibre, mineral, and functional properties[15]. Therefore, the developed product can serve as a healthier alternative to conventional confectionery products.

4. Conclusion

The development of fortified confectionery products using natural functional ingredients is an effective approach to improve nutritional quality and provide health benefits. Milky mushroom (*Calocybe indica*) contributes high-quality protein, essential nutrients, and bioactive compounds, while koraikilangu (*Cyperus rotundus*) enhances dietary fibre content and functional properties. Wheat flour provides the required structural and textural characteristics for confectionery product development[13]. The combination of these ingredients offers a promising strategy for producing value-added confectionery products with improved protein, fibre, and antioxidant potential. Such functional products may serve as healthier alternatives to conventional confectionery foods while maintaining consumer acceptability[8]. Further studies on formulation optimization, sensory evaluation, and storage stability can support the development of commercially viable functional confectionery products.

References

1. Ahlawat, O. P., & Tewari, R. P. (2007). Cultivation technology of paddy straw mushroom and milky mushroom. *National Research Centre for Mushroom, Indian Council of Agricultural Research*.
2. Badshah, B., Awan, M. S., & Khan, S. M. (2018). Nutritional and medicinal importance of edible mushrooms: A review. *International Journal of Current Research in Biosciences and Plant Biology*, 5(3), 1–10.

3. Barros, L., Ferreira, M. J., Queirós, B., Ferreira, I. C. F. R., & Baptista, P. (2007). Total phenols, ascorbic acid, β -carotene and lycopene in Portuguese wild edible mushrooms and their antioxidant activities. *Food Chemistry*, 103(2), 413–419.
4. Cheung, P. C. K. (2013). Mini-review on edible mushrooms as source of dietary fiber: Preparation and health benefits. *Food Science and Human Wellness*, 2(3–4), 162–166.
5. Deepalakshmi, K., & Mirunalini, S. (2014). Therapeutic properties and current medical usage of mushrooms: A review. *International Journal of Pharmaceutical Sciences and Research*, 5(3), 842–850.
6. Finimundy, T. C., Gambato, G., Fontana, R., Camassola, M., Salvador, M., Moura, S., & Dillon, A. J. P. (2013). Aqueous extracts of *Lentinula edodes* and *Pleurotus sajor-caju* exhibit antioxidant and antiglycation activities. *Food Research International*, 50(1), 95–101.
7. Gupta, S., Summuna, B., Gupta, M., & Annepu, S. K. (2018). Edible mushrooms: Cultivation, bioactive molecules and therapeutic applications. *International Journal of Medicinal Mushrooms*, 20(7), 1–15.
8. Kala, C. P. (2011). Health traditions of Buddhist community and medicinal plants in Himalayan region of India. *Current Science*, 101(12), 1659–1664.
9. Manzi, P., Gambelli, L., Marconi, S., Vivanti, V., & Pizzoferrato, L. (1999). Nutrients in edible mushrooms: An inter-species comparative study. *Food Chemistry*, 65(4), 477–482.
10. Mattila, P., Könkö, K., Euro, M., Pihlava, J. M., Astola, J., Vahteristo, L., Hietaniemi, V., Kumpulainen, J., Valtonen, M., & Piironen, V. (2001). Contents of vitamins, mineral elements, and some phenolic compounds in cultivated mushrooms. *Journal of Agricultural and Food Chemistry*, 49(5), 2343–2348.
11. Mau, J. L., Lin, H. C., & Chen, C. C. (2002). Antioxidant properties of several medicinal mushrooms. *Journal of Agricultural and Food Chemistry*, 50(21), 6072–6077.
12. Mizuno, T. (1999). The extraction and development of antitumor-active polysaccharides from medicinal mushrooms. *International Journal of Medicinal Mushrooms*, 1(1), 9–29.
13. Muthusamy, S., & Rani, S. (2017). Nutritional and medicinal properties of *Calocybe indica*: A review. *International Journal of Current Microbiology and Applied Sciences*, 6(10), 3435–3442.
14. Nagulendran, K. R., Velavan, S., Mahesh, R., & Begum, V. H. (2007). In vitro antioxidant activity and total polyphenolic content of *Cyperus rotundus* rhizomes. *Journal of Biological Sciences*, 7(2), 291–295.
15. Peer, S., & Saroj, P. L. (2018). Nutritional and medicinal importance of *Cyperus rotundus*: A review. *Journal of Pharmacognosy and Phytochemistry*, 7(4), 146–150.
16. Rani, P., & Kaur, R. (2016). Functional foods: Nutritional and health benefits. *International Journal of Food Science and Nutrition*, 1(4), 12–15.

17. Roncero-Ramos, I., & Delgado-Andrade, C. (2017). The beneficial role of edible mushrooms in human health. *Current Opinion in Food Science*, 14, 122–128.
18. Singh, R., & Singh, G. (2014). Functional properties of wheat flour and its application in food products. *Journal of Food Science and Technology*, 51(11), 3104–3112.
19. Valverde, M. E., Hernández-Pérez, T., & Paredes-López, O. (2015). Edible mushrooms: Improving human health and promoting quality life. *International Journal of Microbiology*, 2015, Article 376387.
20. Wani, B. A., Bodha, R. H., & Wani, A. H. (2010). Nutritional and medicinal importance of mushrooms. *Journal of Medicinal Plants Research*, 4(24), 2598–2604.