

Corn Silk-Enriched Cupcakes: A Functional Food Approach for Urinary Tract and Kidney Health

Muskan Aliha, Dua Nawab, Zoha Mansoor, Ibadat Afridi, Dur-e-Shahwar Sattar*

Department of Mathematics, University of Karachi, Karachi, Pakistan.

*E-mail: dsattar@gmail.edu.pk

ABSTRACT

Introduction: Corn silk (*zea mays* L.) has been used for traditional medicinal purposes in cases such as diuretic (Naeem, 2022), antioxidant (Lapčík *et al.*, 2023) and anti-inflammatory effects (Wang *et al.*, 2012), providing it as a promising natural ingredient for supporting urinary tract and renal health.

Objectives: This study aimed to formulate and examined the functional cupcakes enriched with corn silk extract and powder as a convenient dietary strategy for the group of people facing urinary tract infections (UTIs) and mild renal issues.

Methodology: To prepare these functionalize cupcakes number of steps followed starting from cleaning, drying, powdered, and subjected to aqueous extraction of the corn silk has been carried out to have maximum bioactive compounds and functions (Lapčík *et al.*, 2023). The extract and powder were incorporated in cupcakes formulation at different levels to determine its balanced therapeutic benefits with sensory acceptability. Physiochemical analysis were carried out to determine the moisture content, pH, texture profile, nutritional profile, color and other attributes, while phytochemical screening were provided the flavonoids, phenolics, tannins, and saponins contents. The functional potential of the product was determined through antioxidant and antimicrobial activities analysis.

Results: The incorporation of corn silk extract and powder has slightly influenced the physicochemical characteristics of cupcakes. Moisture content has been increased marginally with higher levels of corn silk due to its fiber-rich nature and water-holding capacity. Minor level changes observed in pH, shift from basic to mild acidic indicating presence of phenolic content. Texture profile analysis has been carried out that provide acceptable firmness and softness at moderate inclusion levels. Refractometer findings indicate a gradual decrease in lightness (L^*) and an increase in yellowness (b^*), reflecting the natural pigments present in corn silk. Phytochemical analysis provide the presence of phenolic compounds, flavonoids, glycosides, terpenoids with lower level presence of some antinutritional factors such as saponins and tannins (Singh *et al.*, 2022). Antioxidant activity of functional cupcakes has been observed to be slightly higher than that of control group in DPPH and FRAP assays (Khushe *et al.*, 2024). It is anticipated that corn silk-fortified cupcakes exhibited inhibitory activity against common urinary tract infection pathogens, particularly *Escherichia coli* (Marok *et al.*, 2024). For sensory point of view they are considered as acceptable for cupcakes containing low to moderate levels of corn silk extract and powder.

Key Findings: The antimicrobial composition indicated significant role and capacity as an inhibitory effect against common UTI pathogens, particularly *Escherichia coli*, likewise the sensory evaluation demonstrate its high acceptability for formulations containing moderate levels of corn silk, showing minimal effect on taste, aroma, flavor and texture.

Conclusion: The finding suggested that corn silk base cupcakes can serve as a functional food that was palatable with its potential benefits in promoting diuresis, reducing oxidative stress, inhibitory effects against harmful microbes, anti-inflammatory effects and supporting urinary and renal health. These future

clinic research may provide help in exploring the therapeutic efficacy and long-term health benefits of corn silk fortified bakery products.

Keywords: Corn Silk, Functional Foods, UTIs, Renal Health, Antioxidant Activity, Cupcakes.

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