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*Research Article*

# ULTRASOUND-ASSISTED EXTRACTION OF FLAXSEED MUCILAGE AND ITS APPLICATION AS A FAT AND EGG REPLACER IN CUPCAKES

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**Abstract**

The present study was designed to investigate the effects of two extraction techniques—conventional hot water extraction and ultrasound-assisted extraction—were compared for flaxseed mucilage (FM) in terms of yield, composition, and antioxidant activity. The yield by hot water extraction technique was 5.30%, while Ultrasound-assisted extraction (from 10 to 30 min) enhanced the yield from 5.25 to 6.95%. Additionally, carbohydrates content decreased, while protein, phenols and lignan contents increased with longer ultrasound treatment. The extracted FM with ultrasound technique showed higher scavenging ability on DPPH and ABTS radical. This research supports the development of functional, value-added flaxseed products and highlights the potential used of FM as a novel food hydrocolloid, including and its application as fat and egg replacer in cupcakes.

Cupcakes were prepared with varying substitution levels (25, 50, 75, and 100%) from egg and oil, and their sensory, physical, and textural properties were evaluated. Results showed that 25–50% replacement levels provided acceptable quality and consumer acceptability, demonstrating the functional viability of flaxseed mucilage in cupcakes. In general, the replacement of FM (25%) as fat or egg replacement in cupcake formulation showed higher scores in all sensory attributes as compared to the control. Results demonstrated that flaxseed mucilage enhanced the total phenolic content of cupcakes when used as a substitute for fat, eggs, or both.