



# DEVELOPMENT AND QUALITY EVALUATION OF COOKIES INCORPORATED WITH BLACK SEED (*Nigella sativa*)

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**Abstract:** This study aimed to develop and assess physicochemical and sensory attributes of cookies enriched with black seed (*Nigella sativa*) oil. Black seed oil contains polyunsaturated fatty acids, tocopherol, and bioactive compounds, which are explored as a functional ingredient to enhance the nutritional profile of cookies. Four formulations incorporating 5 percentage, 10 percentage, 15 percentage, and 20 percentage of black seed oil, whey protein powder and whole wheat flour, were examined to determine optimal composition. A sensory characteristic of the product was evaluated by thirty semi-trained panelists, utilizing a five-point hedonic scale. The cookie formulation with the highest consumer acceptance was assessed for moisture, crude fat, crude protein, ash and sugar content affirming the quality. Additionally, microbiological analysis was conducted to confirm the safety and stability of the cookies. Results revealed that that cookies enriched with 5 ml of black seed oil (T1-C205) attained the highest sensory approval ratings. Proximate analysis indicated that T1-C205 cookies maintained acceptable levels of crude fat ( $19.14\% \pm 0.04$ ), crude protein ( $8.75\% \pm 0.03$ ), moisture ( $3.19\% \pm 0.02$ ), ash ( $1.91\% \pm 0.01$ ), and sugar ( $9.10\% \pm 0.01$ ) following three weeks of storage without preservatives. Moreover, T1-C205 samples exhibited a lack of Coliform presence, displaying both a  $12 \times 10^3$  total plate count and  $11 \times 10^1$  yeast and mold count. Fatty acid profiling, using the gas chromatography technique, identified 26.82 g of unsaturated fatty acids, primarily oleic acid, and 0.11 g of essential fatty acids in T1-C205 cookies. In conclusion, cookies enriched with 5 ml of black seed oil (T1-C205) demonstrated superior sensory attributes and proximate metrics following storage, suggesting their potential as appealing and healthier functional foods. This study contributes valuable insights into enhancing bakery product nutrition through black seed oil incorporation.

**Keywords:** Black seed, Cookies, Fatty acid profile, Functional food, Proximate analysis, Sensory