
Evaluation of the antioxidant potential of the extracts of three green leaves in stabilizing Nile Tilapia (*Oreochromis niloticus*) fish nuggets under frozen Storage

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Antioxidants are used to minimize lipid oxidation in the food system to prevent associated negative effects on the quality of foods such as fish and meat products. There has been a growing interest in natural antioxidants over synthetic products as consumers are health conscious. Green leafy vegetables are rich in phenolic compounds that have a wide range of biological functions, including antioxidant and antimicrobial activities. The present study was aimed to evaluate the effect of locally available three culinary leaf extracts (katuru murunga-*Sesbania grandiflora*, murunga-*Moringa oleifera* and curry leaves-*Murraya koenigii*) as antioxidants on the stability of a tilapia fish (*Oreochromis niloticus*) based nuggets. Three different levels (1, 1.5 and 2%) of leaf extracts were mixed with fish nuggets and frozen (-18°C), and were compared with control samples. The pH, total plate count, free fatty acid values (as% oleic) and peroxide value in fish nuggets were analyzed, and the changes in sensory properties at 2 week intervals for 2 months storage period were studied. Total phenolic content, total antioxidant capacities of the leaf extracts and nuggets were also evaluated. The results indicated Karapincha leaf extract showed the highest phenolic content (445.63 mg Gallic Acid Equivalent/100g) and 85.55% of radical scavenging activity whereas Murunga leaf extract showed the highest antioxidant capacity (464.63 mg Ascorbic Acid Equivalent/100g). Incorporation of leaf extracts significantly increased the antioxidant properties of nuggets compared to nuggets without leaf extracts. Free fatty acid values and peroxide values of fish nuggets incorporated with leaf extracts were within the acceptable level of consumption compared to the control. Sensory results revealed that the incorporation of leaf extracts has no effect on the overall acceptability of nuggets, however during the storage, there was a significant reduction in the sensory properties of nuggets without leaf extracts when compared with the leaf extract added nuggets. Overall, the addition of leaf extracts has significant antioxidant and antimicrobial effects on tilapia fish nuggets for minimum of 8 weeks at frozen storage.

Key words: Lipid oxidation, free radicals, green leaf extracts, natural antioxidants, Tilapia nuggets

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