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Evaluation of the chemical properties, physical properties and sensory attributes of cinnamon (*Cinnamomum zeylanicum* Blume) oleoresin incorporated cookies

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Cinnamon and its oleoresin are commonly used in food and beverages as a natural flavoring agent and preservative. The aims of the present study was to; develop cinnamon oleoresin incorporated cookies, evaluate the sensory attributes, analyze the nutritional composition, discover the Total phenolic content (TPC) and antioxidant activity through DPPH assay and to determine the effect of three different packaging materials (PET/LLDPE, PET/AL/LLDPE, PET/Met.CCP) on physico-chemical properties of developed cookies. Cinnamon oleoresin, extracted by solvent extraction using ethanol, was incorporated in to cookies in three different concentrations (0.5%, 1.0% and 1.5%) and the best formulation was selected through sensory analysis with 30 untrained panelists. Moisture content, pH, nutrients, texture characteristics were tested for, the selected formulation and control samples. Effect of selected packaging materials on physico-chemical properties of the cookies were analyzed every two weeks for two months from the date of manufacturing.

Statistical analysis of sensory evaluation data revealed the best formulation as 0.5% oleoresin incorporated cookies ($p<0.05$) and it is used for physico-chemical analysis. Addition of oleoresin had no significant effect to the nutritional composition and a_w of cookies. Color and pH have been affected by the oleoresin incorporation since lower L* value and lower pH compared to the control. The highest Total phenolic content and antioxidant activity were detected from the oleoresin incorporated cookie (0.645±0.002 mgGAE/g, IC50= 400.387ppm) than control cookie (0.286±0.001 mgGAE/g, IC50= 667.959 ppm). There is a significant effect of packaging material on the physico-chemical properties of cookies during storage ($p<0.05$) and the best as it showed lesser deviations in L*, moisture content, a_w and the textural characteristics of developed cookie even after two months. Therefore, cinnamon oleoresin can be incorporated in to cookies to enhance flavor and antioxidant properties.

Key words: *Cinnamon oleoresin, packaging materials, physico-chemical properties, sensory evaluation*

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