

## **Carrageenan-Nanocomposite Film Incorporated with Bentong Ginger Extracts for Active Food Packaging: Synthesis and Characterization**

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### **Abstract**

Bentong Ginger (BG), Malaysia patented ginger consist of various bioactive compounds such as gingerols which account for the various pharmacological benefits in human including antioxidant, antimicrobial, and anticancer. This study was conducted to analyze the potential of BG extracts different concentrations (5, 10 and 20 % v/v) incorporated in plasticized carrageenan nanocellulose (CN) as active film packaging in foods. The bioactive constituents in BG extracts were identified using Liquid Chromatography Quadrupole Time-of-Flight Mass Spectrometry (LC-QTOF/MS) and the possible interaction between the carrageenan-nanocellulose film network and BG were confirmed using Fourier-Transform Infrared (FTIR) Spectroscopy. The effects of BG extracts formulated in CN film on the antioxidant release, physical and mechanical properties of the films were studied. The CN film with 20% BG showed the best improvement on its tensile strength, elongation at break, thickness, opacity, water solubility and moisture content. Antioxidant release test showed continuous release of antioxidant and total phenolic content in food simulant 95 % food simulants for 28 days. This study validated that incorporation of BG extract can a promising natural additive for active packaging materials.

*Keywords:* Carrageenan; Nanocellulose; Active packaging film; Bentong ginger; Antioxidant; Mechanical properties; Physical properties