

Sustainable Carrageenan/Nanocomposite Films Incorporated with Optimized *Zingiber officinale* Extracts for Active Packaging Systems

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ABSTRACT

Optimized Bentong ginger (BG) extract using ultrasonic-assisted extraction (UAE) was incorporated in hybrid carrageenan/nanocomposite biopolymers for active packaging films. The design of experiments based on central composite design was applied for the study of the operating parameters (amplitude, sonication time, and solvent concentration) of UAE in the recovery of phenolic compounds from BG. Optimized extracts were analyzed for the content of 6-gingerols in liquid chromatography quadrupole time-of-flight mass spectrometry and formulated in carrageenan/nanocellulose hybrid films for active packaging applications. The mechanical properties of the films and release behavior of antioxidant compounds into food simulants were investigated. The optimized UAE BG extract was found efficacious as an antioxidant agent in active packaging.

KEYWORDS

Active packaging films; Bentong ginger; Biopolymers; Nanocomposite films; Ultrasonic-assisted extraction

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