

Study on bee bread extracts as active ingredients in SGC-Active film for food packaging application

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ABSTRACT

Globally, the adverse effect of synthetic preservatives on human health remains a challenge. Thus, the development of biodegradable active films is a potential step in realizing environmentally-friendly solutions. The objective of this study is to produce biodegradable active films made of semi-refined carrageenan and stingless bee bread extracts [5, 10, and 20 (v/v %)] as natural antioxidants. Moreover, the film stability was improved by adding glycerol and cellulose nanofibers as a plasticizer and reinforcing agents, respectively. The physical and mechanical properties of biodegradable active films were examined with the antioxidant release test. The antioxidant release tests were carried out in 95% of food simulants over 28 storage days with four-day intervals. The Fourier-Transform Infrared Spectroscopy (FTIR) and Scanning Electron Microscopy (SEM) results confirm the good compatibility of the bee bread (BB) extracts with the polymer matrix of semi-refined carrageenan, glycerol, and cellulose nanofiber (SGC). In this study, the formulation of active packaging films incorporated with stingless bee bread extracts demonstrated competitive qualities, which implies that it could be a viable alternative to biodegradable films.

KEYWORDS

Antioxidant; Bee bread; Biodegradable active films; Mechanical and physical properties; Semi-refined carrageenan

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