Physicochemical characterization of kappa-carrageenan (Euchema cottoni) based films incorporated with various plant oils

ABSTRACT

This study investigated the effects of different types of plant oil (olive oil, corn oil, soybean oil and sunflower oil) on the physical and mechanical properties of kappa-carrageenan films from Euchema cottoni species. The incorporation of plant oils increased the film thickness significantly ($P < 0.05$). However, the moisture content, solubility and tensile strength of films decreased significantly ($P < 0.05$) as plant oils were added. The incorporation of plant oils also contributed to a plasticizing effect, whereby the values for elongation at break increased significantly ($P < 0.05$), from 22.3% to 108.8%. Higher oil content also led to carrageenan films with lower opacity, which contradicted with previous studies. In conclusion, the plant oils used in this research significantly improved film properties, thus demonstrating the potential of these materials to be used as food packaging films and coatings.

Keyword: Biodegradable film; Edible films; Kappa-carrageenan; Euchema cottoni; Plant oils; Water vapor permeability