

Physical and functional properties of fish gelatin-based film incorporated with mangrove extracts

ABSTRACT

Background. The fishery processing industry produces a remarkable number of by-products daily. Fish skin accounts for one of the significant wastes produced. Fish skin, however, can be subjected to extraction to yield gelatine and used as the primary raw material for edible film production. To increase the functionality of edible films, bioactive compounds can be incorporated into packaging. Mangroves produce potential bioactive compounds that are suitable as additional agents for active packaging. This study aimed to create a fish gelatine-based edible film enriched with mangrove extracts and to observe its mechanical and biological properties. Methods. Two mangrove species (*Bruguiera gymnorhiza* and *Sonneratia alba*) with four extract concentrations (control, 0.05%, 0.15%, 0.25%, and 0.35%) were used to enrich edible films. The elongation, water vapour transmission, thickness, tensile strength, moisture content, antioxidant and antibacterial properties of the resulting packaging were analysed. Results. The results showed that the mangrove species and extract concentration significantly affected ($p < 0.05$) the physical properties of the treated films such as elongation (16.89–19.38%), water vapour transmission (13.31–13.59 g/m²), and active packaging-antioxidant activities (12.36%–60.98%). The thickness, tensile strength, and water content were not significantly affected. Potent antioxidant activity and relatively weak antimicrobial activity of this active gelatine packaging were observed.