

Functional and antioxidant properties of protein-based films incorporated with mango kernel extract for active packaging

ABSTRACT

This research is focused on developing active packaging by using food industries' by-products. Soy protein isolate (SPI) and fish gelatin (FG) were used as the sources of biopolymers and different concentrations of mango kernel extracts (MKE) from 1 to 5% were added as natural antioxidants. Thicker and more translucent films ($p < 0.05$) were produced when a greater concentration of MKE was incorporated in both films. The mechanical test revealed that the addition of MKE increased the tensile strength of both films ($p < 0.05$), with higher tensile strength recorded in FG films than in SPI films. The incorporation of MKE significantly ($p < 0.05$) decreased the water solubility up to 22 and 33%, in FG and SPI films, respectively. The water vapor permeability (WVP) of SPI with the incorporation of MKE improved up to 10%. In contrast, FG films incorporated with MKE showed higher WVP in comparison with the control. The antioxidant activity increased with a greater concentration of MKE incorporated in both antioxidant films ($p < 0.05$) with more impact in SPI films compared to FG film in DPPH, FRAP and ABTS analysis. DPPH analysis on SPI films revealed the highest antioxidant activity (89%) with the inclusion of 5% MKE extract. Though both films were found to have the potential to be developed as antioxidant films, yet the overall observations revealed that SPI outperformed FG as active packaging films.

Keyword: Mango kernel extract; Fish gelatin; Soy protein isolate; Active packaging; Antioxidant packaging

