Effect of different fruit peels on the functional properties of gelatin/ polyethylene bilayer films for active packaging

ABSTRACT

This study investigated the effect of different fruit peel powders on the functional properties of gelatin/polyethylene bilayer (GPB) films for active packaging. Fruit peels are often regarded as waste products, despite having antimicrobial and antioxidant properties that are beneficial, particularly in food packaging systems. Pomegranate (PMG), papaya (PPY) and jackfruit (JF) peel powders were incorporated into fish gelatin film-forming solutions before being casted on a polyethylene (PE) layer. GPB films without fruit peel powders and with chitosan (CHI) were used as controls. The physical and functional properties of the GPB films were determined. The incorporation of fruit peels into GPB films significantly ($p < 0.05$) increased film thickness and moisture content but reduced film solubility in water. The opacity of the modified films was significantly ($p < 0.05$) higher than that of the control films. Films with PMG exhibited the best antimicrobial and antioxidant activities. In conclusion, the study revealed that the incorporation of fruit peel powders resulted in films with good physical and water-barrier properties and improved antimicrobial and antioxidant properties, especially in the GPB films with PMG peel powders.

Keyword: Fruit peels; Gelatin; Bilayer films; Active packaging