

Application of Poultry Gelatin to Enhance the Physicochemical, Mechanical, and Rheological Properties of Fish Gelatin as Alternative Mammalian Gelatin Films for Food Packaging

ABSTRACT

This study aimed to describe the properties of cold-water fish gelatin (FG) blended with poultry gelatin (PG) for a production of a sachet containing olive oil. To find a desirable film, the different ratio of FG-PG-based films were characterized in terms of mechanical properties. As the proportion of PG in PG-FG-based increased, the tensile strength and young's modulus were increased, and the elongation at break and heat seal strength of the films were decreased. The 50-50 film had favorable characteristics to use as a sachet. The amount of acid index and peroxide of the oil stored in the sachets after 14 days showed that there is a significant difference ($p < 0.05$) between the films. The barrier properties of the films including the water vapor permeability and oxygen permeability of films were increased from 1.21 to $4.95 \times 10^{-11} \text{ g m}^{-1} \text{ Pa}^{-1} \text{ s}^{-1}$ and 48 to 97 $\text{cm}^3 \text{ m}\mu/\text{m}^2 \text{ d kPa}$, respectively. Dark, red, yellow, and opaque films were realized with increasing PG. Fourier transform infrared (FTIR) spectra approved a wide peak of approximately 2500 cm^{-1} . The rheological analysis indicated that, by adding PG, viscosity, elastic modulus (G') and loss modulus (G'') were increased significantly ($p < 0.05$) about 9.5, 9.32 and 18 times, respectively. Therefore, an easy modification of FG with PG will make it suitable for oil sachet packaging applications for the food industry.