

Arunya Prommakool 2011: Characterization and Film-Forming Properties of Okra Polysaccharides and Their Effects on Properties of Whey Protein Blend Films. Doctor of Philosophy (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Assistant Professor Tanaboon Sajjaanuntakul, Ph.D. 173 pages.

A hot buffer soluble solid (HBSS) and an alkaline soluble solid fraction (ASS) of okra polysaccharides (OKP) were obtained by sequential extraction. The yield of HBSS and ASS were 0.96% and 0.45% of okra pod fresh weight, respectively. Increasing glycerol to produce HBSS and ASS film decreased tensile strength (TS) and elastic modulus (EM) ($p < 0.05$) while increased %elongation (%E), water vapor permeability (WVP) and oxygen permeability (OP) ($p < 0.05$). Increasing pH from 3, 5 to 7 increased TS and EM, while decreased WVP and OP of HBSS and ASS films. Incorporation of calcium ion into HBSS and ASS films increased TS and EM of films but decreased %E, WVP and OP ($p < 0.05$).

Increasing HBSS or ASS content in whey protein isolate (WPI) film reduced TS and EM but increased %E and WVP of the blend films ($p < 0.05$). OP values for WPI-HBSS blend films were lower than OP for WPI or HBSS film ($p < 0.05$). WPI-HBSS and WPI-ASS blend films had lower WVP and OP than WPI films at similar tensile properties. Scanning electron micrographs of blend films demonstrated that the incorporation of OKP into whey protein film resulted in more rougher surface and higher heterogeneity matrix as compared to the one without OKP. These results corresponded with increasing opacity, decreasing gloss, increasing WVP and OP values of blend films. DMA thermogram of WPI-HBSS blend films exhibited two T_g values, T_{g1} at -13.3 to 11.6 °C and T_{g2} at 65.2 to 67.8 °C.

Student's signature

Thesis Advisor's signature