

Active packaging material for food preservation

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Abstract

The effects of heat-treatment and the addition of tarragon essential oil on physical and mechanical properties of films prepared with 5% whey protein isolate (WPI) and 5% glycerol were investigated in this study. Heat-treatment of the film-forming solution caused increases in thickness, moisture content, swelling degree, water vapor permeability (WVP), b^* -value, ΔE^* -value, transmittance values in the 200–300 nm region, transparency, and puncture resistance of the film, but decreases in water solubility, L^* -value, a^* -value, transmittance values in the 350–800 nm region, and puncture deformation. When incorporated with tarragon essential oil, heat-treated films have the potential to be used as antimicrobial food packaging. The addition of tarragon essential oil in film-forming solution caused increases in moisture content, solubility in water, WVP, a^* -value, b^* -value, ΔE^* -value, and transparency of the film, decreases in L^* -value, transmittance values in the range of 600-800 nm, respectively variations in swelling degree, transmittance values in the range of 300-550 nm, puncture resistance, and puncture deformation. Nevertheless, different tendencies were noticed in UNT- and HT films with regards to transparency, light transmittance, puncture resistance, and puncture deformation. Based on these findings, HT films show improved physical and mechanical properties; therefore, are more suitable for food-packaging applications.

Keywords: active packaging; whey protein isolate; tarragon essential oil; physicochemical parameters; mechanical parameters