

Effect of storage temperature on the antioxidant properties of active bilayer polyethylene/soy protein isolate (PE/SPI) film

ABSTRACT

Polyethylene (PE) is considered to be one of the most widely used plastic in the world due to its vast array of applications depending on the particular type. It is well known that petroleum-based plastic is a good material for food packaging for its good mechanical properties. Meanwhile, biopolymer films have poor mechanical and water barrier properties compared to conventional plastics. Soy protein isolate (SPI) with mangosteen pericarps extract (MPE) was laminated on PE film to form a bilayer film with antioxidant property. The PE/SPI film was stored at two different temperatures; 25°C and accelerated temperature at 40°C for 9 weeks. The color and opacity of the film increased significantly ($P \leq 0.05$) after 9 weeks observation. There is no change in the morphology of the film after 9 weeks stored at both temperatures. The antioxidant properties of film were measured by total phenolic content (TPC) and 2,2-diphenyl-1-picrylhydrazyl (DPPH) scavenging assay for each week interval. The antioxidant activities of films decreased significantly ($P \leq 0.05$) throughout the storage time at both temperatures. Higher temperature also reduced the antioxidant properties of bilayer film significantly ($P \leq 0.05$). Addition of mangosteen pericarps extract contributes to the enhanced antioxidant properties of bilayer film.

Keyword: Bilayer film; Active packaging; Soy protein isolate; Mangosteen pericarps extract; Polyethylene