

Thermal properties of polyfurfuryl alcohol absorbed/adsorbed on arylated soy protein films

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Abstract

In this study, polyfurfuryl alcohol was absorbed/adsorbed on soy protein isolate films by immersing the SPI films in acid-catalysed furfuryl alcohol solution for 60 h followed by complete curing at 145–150 °C for 2 h. PFA absorbed/adsorbed soy protein films designated as SPI-PFA were then arylated in the presence of 0.5% (w/v) 2,2-diphenyl-2-hydroxyethanoic acid for 4 h to fabricate arylated soy protein films designated as SPI-PFA-Ar. The incorporation of PFA and introduction of aromatic backbone through arylation is revealed from Fourier transform infrared study. Thermal studies of SPI, SPI-PFA and SPI-PFA-Ar were carried out by thermogravimetric analysis, differential scanning calorimetry and dynamic mechanical thermal analysis. In addition, mechanical properties, surface morphology and water uptake of all the three different types of the films were evaluated. Results indicated that PFA absorbed/adsorbed arylated soy protein films showed higher thermal stability than native SPI films.