

Effect of cinnamon essential oil on morphological, flammability and thermal properties of nanocellulose fibre–reinforced starch biopolymer composites

ABSTRACT

The effect of different cinnamon essential oil (CEO) contents on flammability, thermal stability and morphological characteristics of nanocellulose fibre–reinforced starch biopolymer composites was studied. This sugar palm nanocellulose reinforced with sugar palm starch, containing 0–2% CEO, was prepared through solution casting technique. From scanning electron microscopy analysis, the cross-sections of the CEO-containing films showed appearance of micro-porous spots as micro-porous holes because of the occurrence of partial evaporation on the cryo-fractured surface as a result of the vacuum condition. Increment in CEO concentration resulted in increasing trend of the number and size of the micro-porous holes. Significant increase was observed in the thermal stability with the CEO loading when compared with neat composites. Besides that, increasing CEO loading also resulted in decrement of linear burning rate of the composites.

Keyword: Morphological properties; Flammability; Sugar palm nanocellulose; Sugar palm starch; Essential oil