

Effect of agar on flexural, impact, and dynamic mechanical properties of thermoplastic sugar palm starch

ABSTRACT

Development of a new polymer from renewable resources is getting serious attention from researchers due to the environmental issue caused by petroleum based polymer. The aim of this paper is to study the behavior of sugar palm starch (SPS) based thermoplastic containing agar in the range from 10 to 40 wt%. The thermoplastics were melt-mixed and then hot pressed at 140 oC for 10 minutes followed by flexural, impact and thermogravimetric analysis. Thermogravimetric analysis (TGA) showed that incorporation of agar increased the char residue content from 9.17 to 10.87 wt%. For mechanical properties, the addition of agar improved the flexural strength and modulus of SPS/agar blends. The impact strength of thermoplastic SPS was increased respectively with the addition of agar. However, at higher agar content (30 wt% to 40 wt%), the impact strength was decreased which attributed to high rigidity of the material at this ratio. In conclusion, incorporation of agar has improved the flexural, impact and thermal properties of thermoplastic SPS which widened the potential application of this biopolymer in future.

Keyword: Biopolymer; Thermoplastic; Agar; Starch; Sugar palm; Flexural; Impact; Thermal