Response surface methodology for the optimization of preparation of biocomposites based on poly(lactic acid) and durian peel cellulose

ABSTRACT

Response surface methodology was used to optimize preparation of biocomposites based on poly(lactic acid) and durian peel cellulose. The effects of cellulose loading, mixing temperature, and mixing time on tensile strength and impact strength were investigated. A central composite design was employed to determine the optimum preparation condition of the biocomposites to obtain the highest tensile strength and impact strength. A second-order polynomial model was developed for predicting the tensile strength and impact strength based on the composite design. It was found that composites were best fit by a quadratic regression model with high coefficient of determination () value. The selected optimum condition was 35 wt.% cellulose loading at 165°C and 15 min of mixing, leading to a desirability of 94.6%. Under the optimum condition, the tensile strength and impact strength of the biocomposites were 46.207 MPa and 2.931 kJ/m^2, respectively.

Keyword: Response surface methodology; Biocomposites; Poly(lactic acid); Durian peel cellulose; Agricultural; Agrofood