

Extraction and characterization of potential biodegradable materials based on Dioscorea hispida tubers

ABSTRACT

This study was driven by the stringent environmental legislation concerning the consumption and utilization of eco-friendly materials. Within this context, this paper aimed to examine the characteristics of starch and fibres from the *Dioscorea hispida* tuber plant to explore their potential as renewable materials. The extraction of the *Dioscorea hispida* starch and *Dioscorea hispida* fibres was carried out and the chemical composition, physical, thermal, morphological properties, and crystallinity were studied. The chemical composition investigations revealed that the *Dioscorea hispida* starch (DHS) has a low moisture t (9.45%) and starch content (37.62%) compared to cassava, corn, sugar palm, and arrowroot starches. Meanwhile, the *Dioscorea hispida* fibres (DHF) are significantly low in hemicellulose (4.36%), cellulose (5.63%), and lignin (2.79%) compared to cassava, corn hull and sugar palm. In this investigation the chemical, physical, morphological and thermal properties of the *Dioscorea hispida* fibre and *Dioscorea hispida* starch were examined by chemical composition investigation, scanning electron microscopy (SEM), particle size distribution, thermogravimetric analysis (TGA), X-ray powder diffraction (XRD), and Fourier transform infrared (FTIR), respectively. It was found that *Dioscorea hispida* waste is promising alternative biomass and sustainable material with excellent potential as a renewable filler material for food packaging applications.

Keyword: *Dioscorea hispida* tubers; Starch; Natural fibres; Polymer from renewable source; Sustainable materials