

8th World Congress on

Biopolymers & Bioplastics

June 28-29, 2018 | Berlin, Germany

Jute cellulose based biodegradable packaging material: Towards commercialization

Mubarak A Khan

Bangladesh Atomic Energy Commission, Bangladesh

Modified cellulose was prepared from jute fiber originated cellulose and polymer blend was formulated with binder, cross-linker and glycerol as a plasticizer. The formulated solution was subjected to solution casting for preparing biodegradable sheets for packaging purposes. Physical, chemical and morphological properties of the developed biodegradable packaging were characterized by the means of mechanical properties testing like tensile strength (TS) and elongation at break (Eb), water uptake, solubility in water, moisture absorption, X-ray Diffraction (XRD) study, X-ray photoelectron spectroscopy (XPS), contact angle study, thermal properties analysis, transparency, FTIR study as well as various microscopic studies i.e. scanning electron microscopic (SEM) study, transmission electron microscopic (TEM) study, atomic force microscopic study, optical microscopic study. Biodegradation of the blend film was studied by soil burial test. The highest TS and Eb of the cross-linked films were recorded 22.11 MPa and 72.2% respectively. Water uptake, moisture uptake, water solubility and contact angle studies suggested increased hydrophobicity of the blend sheet with respect to the crosslinking catalyzed by acid. FTIR and XPS studies showed the shifting of binding energy due to formation of ester bond. Differential Scanning Calorimetry (DSC-TG) studies showed increased thermal properties due to the esterification. Microscopic studies revealed the distribution of cellulose micro and nano fiber throughout the blend sheet. However, the fiber was not found evenly dispersed. Biodegradation studies revealed that the developed sample undergoes biodegradation within three to four months. Moreover the sample showed similar transparency compared to the polyethylene sheet. Considering these tests and characterization it has become evident that the optimized blend film will be very suitable as a low cost, environment friendly biodegradable packaging material.

makhan.inst@gmail.com