

Cellulose Nanofibers from Corn Husks: extraction and characterization

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Key words: nanofibers, nanowhiskers, corn husk, cellulose.

Lignocellulosic agricultural byproducts are renewable and cheap source for cellulose fibers. Agro-based fibers have the structure, properties, and composition that make them suitable for uses such as composite, chemicals, textile, pulp and paper manufacture. Actually, corn husks are used as packaging, crafts and cigarette. Studies have been growing to understand the corn husk composition to product ethanol¹. The aim of this work is to extract and to characterize cellulose nanofibers from corn husks. The extraction of nanofibers was realized by acid hydrolysis accordingly Orts et al. 2005² and Moran et al., 2008³. Nanostructures of cellulose were characterized by thermogravimetry (TGA), atomic force microscopy (AFM), Fourier transformed infrared spectroscopy (FTIR), and X Ray Diffraction (XRD). Thermogravimetry results in air atmosphere showed that onset oxidative temperature of nanofibers was 120°C, the volatile content observed was 5.1% and residue at 650°C was 28.9%. It was observed from AFM images that de diameter and length of nanofibers is approximately 5nm and 150nm respectively. FTIR results showed that chemical modifications after acid hydrolysis are happening during extraction process. Cellulose crystallinity, determined by XRD, to corn husks was 52% and to cellulose nanofibers 82%. The results showed that is possible to extract cellulose nanofiber from corn husks, with potential application in polymer nanocomposites.

[1] http://www.novozymes.com/NR/rdonlyres/9ACF6420-D484-4070-957A-F0E62FFF2503/0/PT_ethanol.pdf (05/14/2008 accessed)

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Acknowledgment: Fapesp, FINEP and Embrapa.