Characterization of the Potential of Soda Cooking to Extract Fibrous Residues From Rice Hulls.

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Abstract

In this paper, the potential of soda cooking to extract fibrous residues from rice hulls was investigated. Soda cooking was carried out at 170°C for 60 minutes using 5 to 13% NaOH. The goal was to selectively degrade silica and lignin from the structure of the rice hulls and produce fibrous carbohydrates that could be used as fillers in polymer biocomposites. This was studied by characterizing the physical and chemical properties of the fibrous residues and the spent liquor products. Results of scanning electron microscopy have revealed a substantial fragmentation of rice hulls above 7.5% NaOH charge. The fragmentation was accompanied with a significant removal of silica and lignin and the reduction of fibrous residues yield to 57% at 13%NaOH. Wet chemical composition analyses, infrared spectroscopy and x-ray spectroscopy have also revealed that lignin and silica were partly retained in the fibrous residue while the carbohydrates content were not affected. It is therefore concluded that soda cooking could be among the best processes for dissolving lignin and silica from rice hulls if the cooking conditions are optimized.

Keywords: Soda cooking, Rice hulls, Reinforcement, Fibrous residues, Dissolution