

عنوان مقاله:

Structural and Morphological Characterization of Nanocellulose Extracted from Cotton Straw Residue

محل انتشار:

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خلاصه مقاله:

This study is focused on the synthesis and characterization of cotton straw residue. Nanocellulose was synthesized by chemical method and followed by ultrasonication and cryocrushing. The results of the present study show that the cotton straw residue consists of lignin (۲۷%), hemicellulose (۱۵%), cellulose (۳۲%), and ash content (۲.۳%). Nanocellulose was characterized by FTIR, XRD, FESEM, TEM, DSC, TGA, and AFM. Two aromatic rings were observed at wavelength $۱۶۵۰.۴۷\text{cm}^{-۱}$ and $۱۴۳۶.۵۳\text{cm}^{-۱}$ which indicates that there is a presence of cellulose in the prepared sample which was characterized by FTIR. The structural analysis shows that the material was amorphous and the nanocellulose crystallinity is ۲۳ %. The morphological analysis using FESEM indicates even elongated fiber with a smooth surface and it contains pore in the nanocellulose of cotton residue. TEM analysis indicates that nanocellulose has an irregular shape with a circular rod-like structure of different sizes. The enthalpy of nanocellulose changes at ۱۶۸.۴۸ due to endothermic transition. TGA results show that the nanocellulose is degraded in the temperature range $۳۰۰-۳۵۵$ and low thermal stability was observed during the experiment. AFM result shows the .needle shape particle (root square mean roughness = ۰.۱۷۳۸nm) and the size of nanocellulose was observed ۷.۱nm

کلمات کلیدی:

Nanofibre, Structural analysis, Cellulose, Bleaching, ultrasonication

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