

Influence of alkaline hydrogen peroxide pre-hydrolysis on the isolation of microcrystalline cellulose from oil palm fronds

Owolabi AF, Haafiz MK, Hossain MS, Hussin MH, Fazita MR.

Abstract

In the present study, microcrystalline cellulose (MCC) was isolated from oil palm fronds (OPF) using chemo-mechanical process. Wherein, **alkaline hydrogenperoxide** (AHP) was utilized to extract OPF fibre at different AHP concentrations. The OPF pulp fibre was then bleached with acidified sodium chlorite solution followed by the acid **hydrolysis** using hydrochloric acid. Several analytical methods were conducted to determine the **influence** of AHP concentration on thermal properties, morphological properties, microscopic and crystalline behaviour of isolated MCC. Results showed that the MCC extracted from OPF fibres had fibre diameters of 7.55-9.11. nm. X-ray diffraction (XRD) analyses revealed that the obtained microcrystalline fibre had both celluloses I and cellulose II polymorphs structure, depending on the AHP concentrations. The Fourier transmission infrared (FTIR) analyses showed that the AHP **pre-hydrolysis** was successfully removed hemicelluloses and lignin from the OPF fibre. The crystallinity of the MCC was increased with the AHP concentrations. The degradation temperature of MCC was about 300. C. The finding of the present study showed that **pre-treatment** process potentially influenced the quality of the isolation of MCC from oil palm fronds. © 2016 Elsevier B.V.

Author keywords

Alkaline hydrogen peroxide; Microcrystalline cellulose; Oil palm fronds

DOI: 10.1016/j.ijbiomac.2016.11.016