

STRUCTURAL CHARACTERISTICS OF BATCH PROCESSED AGRO-WASTE FIBRES

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Abstract : The characterisation of agro-wastes fibres from Nigeria using X-ray diffraction (XRD) and Scanning Electron Microscopy (SEM) has been done. Fibres extracted from groundnut shell, coconut husk, rice husk, palm fruit bunch and palm fruit stalk are processed using two novel cellulose fibre production methods developed by the authors. Cellulose apparent crystallinity calculated using the deconvolution of the diffractometer trace shows that the amorphous portion of cellulose was permeable to hydrolysis yielding high crystallinity after treatment. All diffratograms show typical cellulose structure with well-defined 110, 200 and 040 peaks. Palm fruit fibres had the highest 200 crystalline cellulose peaks compared to others and it is an indication of rich cellulose content. Surface examination of the resulting fibres using SEM indicates the presence of regular cellulose network structure with some agglomerated laminated layer of thin leaves of cellulose microfibrils. The surfaces were relatively smooth indicating the removal of hemicellulose, lignin and pectin.

Keywords : x-ray diffraction, SEM, cellulose, deconvolution, crystallinity

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