NOVEL TECHNIQUE FOR MICRONISATION OF WASTE PAPER AND IMPLICATION FOR BIOETHANOL PRODUCTION

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ABSTRACT

This work aims to develop effective low cost pretreatment and micronisation steps for lignocellulosic waste paper prior to hydrolysis and fermentation steps. A simultaneous two-steps wetting and drying protocol was developed, and then followed by the milling step. For the milling step, a novel application of electrically powered milling machine was adopted. The machine combines the impact, cutting and frictional shear effects to produce micronised waste paper. The waste paper was thereafter hydrolysed using acid and enzymes hydrolytic techniques and conversion to bioethanol evaluated with Aspergillus flavus. An effective waste paper micronisation was observed and the size range of $20 \mu m < x \leq 425 \mu m$ was obtained. Also, increased surface area of the micronised waste paper enhanced interactions with the acid catalyst and cellulose enzymes. It consequently resulted in higher conversion rate into simple sugar and the final bioethanol production.