Hydrolysis of waste newspaper and bioethanol production

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ABSTRACT

Investigation on optimizing the conditions for saccharification of waste newspaper to produce high quality hydrolysate with minimal inhibitors that ensured its complete fermentability to bioethanol was performed. The waste newspaper was pretreated with NaOH followed by sequential acid and enzyme hydrolysis to afford a total of 11.76 g/L of fermentable sugars, which accounts for 88.7% of saccharification efficiency. The results showed that pretreatment is necessary in order to unlock the fermentable sugars in the newspaper. The mixed mono sugars (glucose, mannose and galactose) in hydrolysate of waste newspaper were easily converted to bioethanol by a yeast strain Saccharomyces cerevisiae, 97% conversion efficiency was obtained after fermentation at 24 °C in a static culture for 48 h. Overall, 1000 kg of waste newspaper will produce nearly 280 kg (390 L) of ethanol by the process developed. This study has shown that waste newspaper is potentially the most favorable feedstock for ethanol production in comparison with bioethanol production potential of various feedstocks.

Keywords: Waste newspaper, Lignocellulosics, Hydrolysis, Fermentation, Bioethanol

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