Evaluation of agricultural wastes for the use in ethanol production by Candida shehatae TISTR 5843

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This study aimed to evaluate 4 agricultural wastes: rice straw, oil palm empty fruit bunch (oil palm EFB), sugarcane bagasse and corn stover, for their potential when used as feedstocks in ethanol production. The waste materials were subjected to acid pretreatment by autoclaving at 121ºC followed by enzyme (Accellerase 1500®) hydrolysis prior to ethanol fermentation. By varying the time period for acid pretreatment, 10 minutes was shown to be sufficient based on the test of susceptibility to cellulose hydrolysis. The enzyme dosage study resulted in the use of 60 FPU/g DS for all acid-treated materials except for oil palm EFB which required the dosage of 110 FPU/g DS. Different forms of substrates used in enzyme hydrolysis (the acid-treated solids versus the acid-treated slurries) did not affect the amount of ethanol produced from resulting oil palm EFB and sugarcane bagasse hydrolysates, but they did affect in the case of rice straw and corn stover hydrolysates. The fermentation of rice straw, oil palm EFB, sugarcane bagasse and corn stover hydrolysates by Candida shehatae TISTR 5843 resulted in 9.8, 9.3, 7.9 and 10.9 g/l of ethanol, respectively.

Keywords : ethanol, Candida shehatae, agricultural wastes, acid pretreatment, enzyme hydrolysis