Ethanol Production through Biological Pretreatment of Miscanthus sinensis using Pleurotus ostreatus

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This research is a comparative study between varying pretreatment methods employed in the cellulosic bioethanol production process. The first pretreatment is a process known as biological pretreatment. This pretreatment uses the white-rot fungus, Pleurotus ostreatus, to degrade the cellulosic substrate and perennial grass, Miscanthus sinensis. After solid-state fermentation of the M. sinensis, the substrate was solubilized, fermented, and distilled. The distillate was analyzed using refractive index. The ethanol concentration was calculated mathematically based on a linear regression equation derived from the refractive indices of known ethanol/water solutions. The final ethanol yield per replication was determined by multiplying the calculated ethanol concentration times the total distillate volume. Four replications of this process were done. These values were compared to the ethanol yield of a sulfuric acid pretreatment. The sulfuric acid pretreatment data was taken from last year's study. Last year only one replication of the pretreatment was done. The cellulosic substrate M. sinensis was degraded by heating the substrate with 70% sulfuric acid for 30 minutes at 40 degrees Celsius. The resultant hydrolysate was fermented, distilled, and analyzed using the refractive index as above. The results showed that the biological pretreatment, on average, produced 288.2 mL of ethanol, while the sulfuric acid pretreatment produced only 5.31 mL of ethanol for an equal amount of substrate.

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