Making Biofuel Using Waste Maize Cobs Pretreated With a White Rot Fungus

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Zimbabwe is a net importer of petroleum-based fuels. These are non renewable, expensive and environmentally unfriendly. Petroleum based fuels are expensive and the country has suffered from fuel shortages from 1999 to date. Over 80 % of the population consumes cooked or roasted green mealies and this results in production of waste cobs which contribute towards pollution in urban areas when garbage is uncollected. Maize cobs contain carbohydrates and hence can be used to produce a renewable biofuel ethanol. The concentration of reducing sugars in the untreated ground maize cobs was estimated using a semi quantitative Benedict's test. Two samples of ground maize cobs were treated differently, one sample was pre-treated with a culture of a white rot fungus and the other sample was not treated Both samples were incubated at 30 degrees Celsius for 72 hours after which each sample was mixed with distilled water and a filtrate was obtained. The filtrate from each sample was mixed with yeast and incubated for 72 hours. Ethanol was then extracted by fractional distillation from each sample. Untreated maize cob yielded an average of 0.330 grams of ethanol per gram of ground maize cob while the treated ground maize yielded 0.4480 g of ethanol per gram of ground maize cob. Each experiment was repeated 10 times. The results show that the pre-treatment of maize cobs with a white rot fungus result in significantly higher yield of ethanol ($p=0.05$, $v=18$, tabulated t -value = 2.1000, calculated t -value = 2.4952).

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