Waste Not Want Not: Promoting Sustainability by Turning Agricultural Waste into Biofuels

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Purpose: As the demand for fossil fuels grows, finding alternative energy sources for biofuel production that are sustainable, renewable, and efficient is becoming increasingly more important to world economies and the climate. The purpose of this project is to compare glucose (mg/dL) and ethanol (proof) production from local agricultural wastes (corn stover, hickory sawdust, swine manure, and cattle manure) to standard corn-based production. Procedure: Biomass samples were collected from local agricultural farms. One hundred grams of each sample were pretreated using heat and manual grinding. The enzyme Cellulast was used to degrade the cellulose in an incubator at 55° C for 24 hours. Glucose levels were measured using a glucometer. Yeast was then added for fermentation. The final product was distilled and ethanol was measured using a Proof and Tralles hydrometer for distilled alcohol. Conclusion: The corn produced significantly more ($p<0.05$) glucose and a higher percentage of ethanol as compared to the agricultural wastes. It was hypothesized that the cattle manure would produce the highest proof of ethanol. Based on the results this hypothesis was rejected. Both the swine and cattle manure did produce 5.3 proof ethanol however, this was significantly lower ($p<0.05$) than both corn and the other biomass samples.

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