Fuel Ethanol Potential of Barley

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Today, gasoline made from petroleum products is primarily used to power vehicles. These products cause pollution and one day these resources may run out. Our nation has been researching alternative ways to create power such as ethanol. The main purpose of this project was to determine if ethanol could be made out of barley and if varying temperatures during the process would affect yield. Therefore, temperature was also a main factor in this project. During the process, ground barley along with other ingredients such as yeast, water, and enzymes were mixed together to form a mash. The mash was cooked or fermented at three different temperatures – 55, 65, 85 degrees Celsius. The mash was weighed every eight hours for weight loss. Once the fermentation was complete, the final mash product was analyzed by an HPLC to determine the ethanol content. Barley, due to its hard hull and abrasiveness, has been challenging to break down. A new enzyme called beta glucosidase, which was used in this project, has been recently introduced into the market. This enzyme alleviates these issues and will allow ethanol plants to use barley as a feedstock. The results of this project indicate that ethanol can be made out of barley. More than two gallons of ethanol per bushel was made by increasing the temperature. At 85 degrees Celsius, 2.2 gallons of ethanol was yielded. Ethanol made from barley will provide another renewable source of power which will benefit agriculture, lessen pollution, and create economic value.

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