Biomass to Biofuel: Using Mushrooms for the Production of Cellulosic Ethanol

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Studies have shown that fungi can be very beneficial in the production of biofuels directly from agricultural waste. The purpose of this experiment is to determine if mushrooms can be used to break down cellulose from plants, in order to turn it into ethanol. If mushroom extracts are added to a substrate (ground up corn stover and wood bits) than the reaction rate of cellobiase breaking down cellulose should be increased. The mushroom enzymes should reduce the energy needed to make the reaction occur. Once the activation energy is lowered, the chemical reaction should occur at a much faster rate. In order to test this hypothesis, a Biofuel Enzyme Kit was used to test the ability of an enzyme to increase the conversion rate of a clear substrate to a colored product. The rate at which the substrate is converted to sugar can be detected quantitatively. Additionally, an independent inquiry that tested the ability of mushroom extracts to increase cellobiase activity was conducted. My hypothesis was correct. The enzyme cellobiase proved to increase the reaction rate of the breakdown of the substrate into a simple sugar. The results also showed that mushroom extracts can also increase the rate of this breakdown. Mushrooms are expert decomposes, they produce enzymes that are efficient at reducing biomass, and they may prove to be an efficient and cost effective way of producing ethanol for transportation fuel.

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