

The Feasibility of Using Bamboo as a Source of Ethanol for Fuel

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The creation of corn-based ethanol fuels is an expensive process, which in some cases produces twice the emissions of a petroleum alternative -such as gasoline- over the entire life cycle of the fuel. The importance of finding an alternative source of ethanol is crucial, because at even the highest levels of efficiency the U.S.A. imports 25% of its needed petroleum. Bamboo and other cellulosic biomasses can be acquired cheaply and processed to produce ethanol via the enzymatic hydrolysis of cellulose which makes up a large portion of the biomass. After the cellulose within the plant has been isolated and purified via an organosolv method, the biomass can undergo hydrolysis in order to produce glucose which can then be fermented into ethanol. The enzyme has been demonstrated to self-inhibit at concentrations approaching 500mg/dL, but an iterative decanting process has been shown to be effective at circumventing this limitation. Tested yields were 33% conversion of cellulose to glucose which can be converted to ethanol. The implications of the production of a bamboo based ethanol are that an effective competitor could exist in the ethanol market that would not have competition in other unrelated areas. This would drive innovation and increase efficiency in the ethanol market.

Awards Won:

Fourth Award of \$500