

AUBURN UNIVERSITY

INNOVATION ADVANCEMENT & COMMERCIALIZATION

Detoxification of Biomass for Improved Production of Biofuels

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Reference: Detoxification

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Reference

Xie, et al, Detoxification of biomass hydrolysates with nucleophilic amino acids enhances alcoholic fermentation. *Bioresource Technology*, 186, 2015, pp 106-113. ([Link](#))

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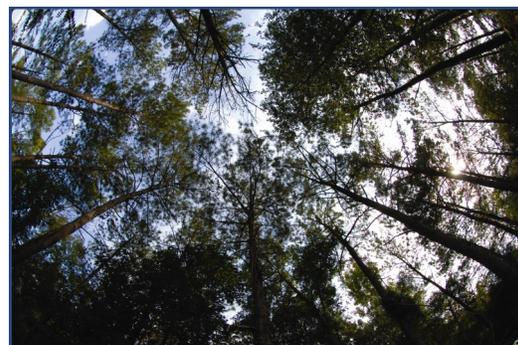
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Overview

In order to produce biofuels by fermentation of woody biomass, a pre-treatment step is required to form a fermentable material. A variety of pre-treatments are possible, all of which take time, energy, and have significant associated monetary costs and time consumption. Auburn University is seeking a licensee or development partner for a simple, amino acid-based technology which can speed up both the pre-treatment process and the subsequent rate of biofuel production.

Advantages

- Simple to implement: invention should be compatible with existing biofuel manufacturing processes
- Improved cost-effectiveness: the cost of amino acids is minimal compared to existing specialized enzymes
- Efficient: less than 1g of amino acid is required per gallon of biofuel produced



Description

Currently, fermentation of lignocellulosic (woody) feed stocks requires pre-treatment to form a hydrolysate. This biomass hydrolysate is then hydrolyzed using enzymes allowing it to be fermented. However, during the production of the hydrolysate, there are a myriad of chemicals formed, many of which significantly reduce the efficiency of the fermentation process. Thus, not only do the costs of the pre-treatment need to be considered, but also the negative effects it may have on efficiency and costs of fermentation. The cost of pre-treatment is estimated to account for 10% of total production costs for ethanol, with the fermentation step being up to 18%. Any method which can enhance the efficiency of these two steps is desirable.

Auburn researchers have developed a simple, cost-effective pre-treatment method to enhance fermentation. The addition of amino acids neutralizes many of the toxic compounds that inhibit fermentation. Initial studies show that this allows an increase in the rate of ethanol productivity of up to 130% (compared with a glucose fermentation control), using materials that would cost less than 1 cent per gallon of ethanol produced.

Status

- US ([20160215305](#)) and PCT patent applications have been filed
- Proof of concept has been demonstrated on a lab scale
- Studies have determined basis for action and temperature & pH dependence

Licensing Opportunities

- This technology is available for exclusive or non-exclusive licensing
- Partnering opportunities include licensing and funded development