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Process for Preparing Enriched Glucan Biomass Materials

A novel process uses dicarboxylic acid treatment to efficiently convert lignocellulosic biomass into high-yield ethanol, minimizing degradation and reducing the need for enzymes or yeast purification.

In 2005, the U.S. government created the Renewable Fuel Standard (RFS) program, which was further expanded in 2007 with the Energy Independence and Security Act (EISA). Both programs mandate reducing greenhouse gas emissions, expanding renewable fuel sources, and reducing reliance on imported oil, resulting in increased emphasis on developing new methods to efficiently produce fuel from renewable, non-petroleum resources.

Ethanol, a renewable fuel, is commercially produced from feedstocks of cornstarch, sugar cane, and sugar beets; however, these products have competing uses in the food industry, which increases their price and leads to seeking alternative feedstock sources. Current processes use acids, which cause degradation of minerals in the biomass to form substances that can inhibit the subsequent fermentation steps, increasing the cost of such processes.

Researchers at Purdue University have developed a process for converting lignocellulosic biomass to ethanol that results in an ethanol yield of approximately 90 percent. This process includes treating lignocellulosic biomass with a dicarboxylic acid to hydrolyze hemicellulose and lignocellulosic biomass to xylose. This results in minimal formation of degradation products. Lower amounts of degradation product allows for less enzymes or yeast used, resulting in a ready fermentation of the xylose to ethanol using a yeast without the necessity of purifying material.

Advantages:

-Minimal degradation in ethanol production

Technology ID

64990

Category

Biotechnology & Life Sciences/Bioprocessing & Biomanufacturing

Chemicals & Advanced Materials/Green & Bio-Based Chemistry

Energy & Power Systems/Power Generation

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-Decreases the number of enzymes or yeast used in the fermentation of ethanol

Potential Applications:

-Biofuels

-Ethanol production

-Alternative fuel production

TRL: 4

Intellectual Property:

Provisional-Patent, 2009-10-13, United States | NATL-Patent, 2010-10-13, Brazil | PCT-Patent, 2010-10-13, WO | NATL-Patent, 2010-10-13, China | NATL-Patent, 2010-10-13, Canada | Utility Patent, 2012-04-13, United States

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