PURDUE INNOVATES | Office of Technology Commercialization

# Localized Boiler Fuel from Lignin Residues

**A new process for biomass-to-ethanol production increases energy efficiency and environmental sustainability by generating onsite power from the controlled combustion of fermentation residue.**

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. Ethanol can be produced through the fermentation of cellulose created by lignocellulosic biomass materials, such as corn stover, corn fiber, and wheat straw, among others. A problem with using lignocellulosic biomass materials in ethanol production includes the disposal of residual non-ethanol materials formed during the fermentation process. Traditionally, the disposal of these materials take place at a wastewater treatment plant, wasting potential energy through a disposal process that is neither environmentally friendly nor efficient.

Researchers at Purdue University have developed a process for converting biomass into ethanol that addresses the problem of residue utilization from biomass ethanol formation. The process described includes heating, collecting, drying, and burning at least a portion of the non-ethanol forming materials left after processing. Burning these materials generates heat, which can be burned onsite to produce energy to feedback into the production system.

**Advantages**:

-Environmentally friendly

-Economical

**Technology ID**

64989

**Category**

Biotechnology & Life Sciences/Bioprocessing & Biomanufacturing

GreenTech/Circular Economy & Waste Reduction

Energy & Power Systems/Power Generation

**Authors**

Michael R Ladisch

Nathan Scott Mosier

Jerry Warner

**Further information**

Aaron Taggart

adtaggart@prf.org

**View online**

-Energy efficient

Potential Applications:

-Biofuels

-Ethanol production

-Alternative fuel production

**TRL:** 4

**Intellectual Property:**

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

**Keywords:** Biomass conversion, ethanol production, residue utilization, lignocellulosic biomass, renewable fuel, biofuel, alternative fuel, energy efficient, environmentally friendly, fermentation byproduct utilization, Biofuels, Chemical Engineering, Clean Energy, Ethanol, Green Technology, Lignin