

Cellulosic ethanol: Expanding options, identifying obstacles

April 9 2010

Agricultural Research Service (ARS) scientists are figuring out how to turn wheat straw into ethanol "gold," and learning more about the bacteria that can "infect" ethanol plants and interfere with fuel production.

At the ARS National Center for Agricultural Utilization Research (NCAUR) in Peoria, Ill., ARS chemist Badal Saha conducted a 5-year study that examined whether wheat straw--a [crop residue](#) left over after the grain has been harvested--could have commercial potential for cellulosic ethanol production.

Saha found he could access and ferment almost all the plant sugars in the biofeedstock when it was pretreated with alkaline peroxide and then broken down by enzymes. This process released even hard-to-reach sugars in [plant cell walls](#), which significantly boosted the overall ethanol output to around 93 gallons per ton of wheat straw.

But the same environments that facilitate fermentation can also nurture microorganisms that "infect" ethanol production facilities and disrupt output. ARS geneticist Tim Leathers collected bacteria from samples at commercial ethanol facilities, including a wet-mill facility that had never been dosed with antibiotics and a dry-grind facility that periodically dosed with antibiotics after bacterial outbreaks. He found that most of the bacterial isolates he collected from both facilities were different types of lactic acid bacteria.

Meanwhile, ARS microbiologist Ken Bischoff developed a model for simulating [bacterial contamination](#) and infection. He found that when test cultures were inoculated with *Lactobacillus fermentum*--one of the most common sources of bacterial infections in ethanol plants--ethanol yields decreased by 27 percent. Sometimes the "infection" could be cured with antibiotics, but he also found one [bacterial strain](#) that was already resistant to treatment.

Results from this research have been published in several journals, including *Biotechnology and Bioengineering*, the *Journal of Biobased Materials and [Bioenergy](#)*, and the *Journal of Industrial Microbiology and Biotechnology*.

Provided by United States Department of Agriculture

Citation: Cellulosic ethanol: Expanding options, identifying obstacles (2010, April 9) retrieved 19 April 2024 from <https://phys.org/news/2010-04-cellulosic-ethanol-options-obstacles.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.