Adding value with co-products

A. What is this technology?

A solid residue, produced from bacterial fermentations of cellulosic materials to ethanol, that has novel properties as a wood adhesive.

B. What problem does it address?

- Cellulosic ethanol processes are faced with narrow profit margins due to relatively high feedstock and conversion costs.
- These processes are expected to produce large amounts of residual solids in the form of microbial cells and incompletely-degraded feedstock. Capture of revenue from this residue is essential for the economic feasibility of cellulosic ethanol.
- No use for such residues has been identified beyond animal feed applications, for which distillers grains already yield an ample supply.

C. What is the significance of this solution?

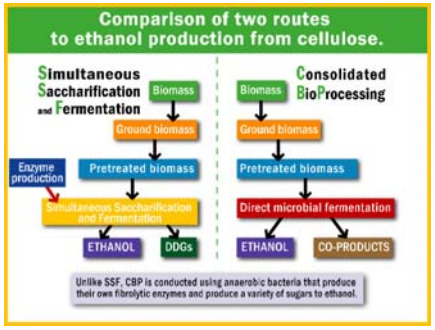
- The residues from one cellulosic ethanol platform (fermentation by anaerobic bacteria producing their own cellulolytic enzymes, so-called "consolidated bioprocessing" or CBP) have novel adhesive properties for wood adhesive applications.
- Such residues can potentially be used as partial or full replacement of certain petroleum-based adhesives (e.g., phenol-formaldehyde, currently used at a level of over one billion pounds per year in the U.S.).
- CBP, the source of the residue, is projected to be the major second-generation technology for biofuels production, eventually supplanting the fungal cellulase/yeast-based "sugar platform".

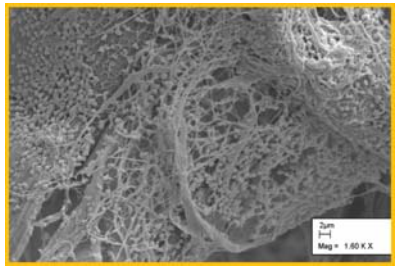
D. Who could use this technology?

The technology can potentially benefit the wood products manufacturing industry, particularly for "green" applications employing bio-based materials.

E. How is this technology unique?

This technology is unique in that it identifies a potential use for a large volume residue from a process expected to produce the bulk of the biofuels in the future. This end-use can potentially replace a major industrial chemical whose source (petroleum) is becoming less available and more expensive, and whose undesirable properties (toxicity, poor shelf life and difficulty in handling) complicate its use.





Cells of Ruminococcus albus (spherical bodies), a CBP bacterium attached to a cellulose fiber via a sticky web of extracellular polysaccharide that join individual cells to one another and to the cellulose fiber.

Stage of Development

U.S. patent application S/N 12/151,353, "Wood adhesives containing solid residues of biomass fermentations" was filed on May 6, 2008. We are currently working to improve the production process to reduce input costs (through improved medium formulation), improve yield, and improve performance properties of the residue. Several publications describing the material are available.

Moving Forward

Our primary needs are two-fold:

1. Partnering with an entity with sufficient fermentation capacity to produce enough material for testing under manufacturing conditions;
2. Partnering with a wood products manufacturer to test the residue for handling properties and adhesive performance under production conditions.

PARTNERSHIP OPPORTUNITY

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