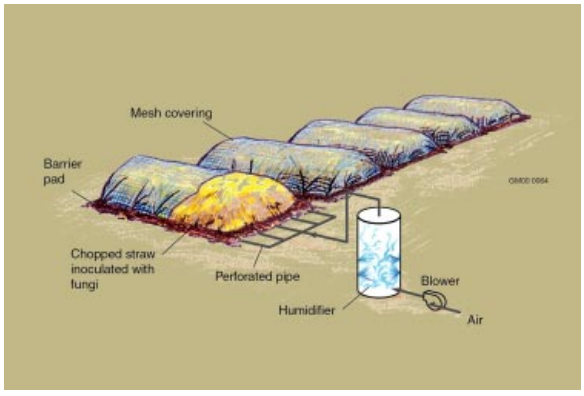
SELECTIVE HARVEST OF HIGHER VALUE WHEAT STRAW COMPONENTS

Background

An estimated 51 million tons of usable wheat straw goes to waste in the U.S. each year. The National Association of Wheat Growers and the Idaho Wheat Commission have long recognized the potential economic and environmental benefits of producing bioenergy and bioproducts from excess wheat straw residue.



The Energy Division of the Idaho Water Resources Department of the State of Idaho, the Idaho National Engineering and Environmental Laboratory (INEEL), the Idaho Wheat Commission, and the Inland Northwest Research Alliance (the University of Idaho, Washington State University, and the University of Washington) are collaborating in a federally-funded research project to develop methods of using agricultural residues from grain crops as a biomass resource.

Use of straw for bioenergy, biomaterials, fuels and chemicals has been limited because of the silica, alkali minerals, lignin, and hemicellulose contents of the straw, and the waxy cuticle that coats the straw. Currently, straw use requires transporting all the components of the straw to the point of use. No cost-efficient way exists to remove undesirable straw components before transporting it.

Project

One INEEL research objective in the collaborative development project is to find and develop a distributed, low-labor method of removing the undesirable parts of the straw residue. The first step is to develop a physical separation process to separate the undesirable leaves, sheaths, and nodes from the desirable stem sections.

Another research objective is to develop a natural biological system for degrading the cuticle, lignin, and the hemicellulose in the straw sections using naturally occurring fungi.

Applications

Once developed, the distributed straw and degradation process will potentially promote the use of straw residue to supplement conventional feedstock (i.e. coal) for energy and produce a better feedstock for production of straw-thermoplastic composites. The upgraded straw feedstock is also a potential feedstock for fuel (i.e. ethanol) production, chemical (i.e. lactic acid, glycerol, etc.) production, linerboard production, and straw particleboard production.

(continued)

Advantages

Successful research is this area will ultimately provide small grain producers a new revenue stream, while presenting an alternative to field burning. It will also

- Reduce air pollution,
- Reduce emissions of greenhouse gases,
- Result in reduced petroleum demand through its use in fuels, chemicals, and plastics,
- Relieve pressure on dwindling forest resources by providing a feedstock suitable for use in manufacturing paper and building materials.

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