VISVESVARAYA TECHNOLOGICAL UNIVERSITY
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PROJECT WORK

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"INVESTIGATIONS ON HYDROTHERMAL PRE-TREATMENT OF COB CORN FOR ETHANOL ACTIVITIES"

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ABSTRACT

Cellulosic ethanol is a biofuel produced from wood, grasses, or the non-edible parts of plants. It is a type of biofuel produced from lignocelluloses, a structural material that comprises much of the mass of plants.

Lignocelluloses are composed mainly of cellulose, hemicellulose and lignin. Cornstover, switchgrass, miscanthus, woodchips and the byproducts of lawn and tree maintenance are some of the more popular cellulosic materials for ethanol production.

Lignocelluloses biomass can be utilized to produce ethanol, a promising alternative energy source for the limited crude oil, there are mainly two processes involved in the conversion:

- hydrolysis of cellulose in the lignocellulosic biomass to produce reducing sugars
- Fermentation of the sugars to ethanol.

The cost of ethanol production from lignocellulosic materials is relatively high based on current technologies, and the main challenges are the low yield and high cost of the hydrolysis process. Considerable research efforts have been made to improve the hydrolysis of lignocelluloses materials. Pre-treatment of lignocellulosic materials to remove lignin and hemicelluloses can significantly enhance the hydrolysis of cellulose. Optimization of the cellulase enzymes and the enzyme loading can also improve the hydrolysis. Simultaneous saccharification and fermentation effectively removes lignin and hemicellulose, which are inhibitors to cellulase activity, thus increasing the yield and rate of cellulose hydrolysis.