

PRODUCTION OF BIOETHANOL FROM A LIGNOCELLULOSIC MATERIAL

(WHEAT STRAW, CALLIANDRA CALOTHYRSUS)

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SYNOPSIS

Considerable efforts have been made to convert wood biomass to liquid fuels and chemicals since the oil crisis in mid-1970s. Nearly 100 types of biomass have been tested, ranging from agricultural wastes such as straw, olive pits, to energy crops.

Lignocellulose is a structural material that comprises much of the mass of plants. It is composed mainly of cellulose, hemicellulose and lignin. Production of ethanol from lignocellulose has the advantage of abundant and diverse raw material compared to sources like corn and cane sugars, but requires a greater amount of processing to make the sugar monomers available to the microorganisms that are typically used to produce ethanol by fermentation.

Our aim is to make ethanol a viable substitute to gasoline, from cheaper, non-edible, abundant and readily available source.

Here in our work we have used wheat as a lignocellulosic material which predominantly consists of cellulose (35 - 40%), is a agricultural crop residues used for production of ethanol which is a promising alternative energy source for the limited crude oil.

Wheat straws are first reduced to a powder form of 0.3mm size. Powder is pretreated using hydrothermal explosion (new technique) to separate holocellulose from unwanted materials from straw. The product is acid hydrolyzed to produce reducing sugars. Glucose and xylose obtained is fermented using *Saccharomyces cerevisiae*, a yeast to convert simple sugars to ethanol. From the broth biomass is separated and supernatant was tested for the presence of ethanol. Supernatant is distilled to separate ethanol which is estimated qualitatively and quantitatively.

Keywords: Cellulose; Lignocellulosic; Pretreatment; Ethanol; Hydrolysis; Fermentation; Wheat; hydrothermal explosion.