

# Lignocellulosic biomass as potential for Bioethylene production to protect the Environment from hazardous outputs of the Source material

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## ABSTRACT

*Parthenium hysterophorus* which is an annual herb is a lignocellulosic biomass. Lignocelluloses refer to plant dry stuff (biomass). It is the most copiously accessible raw material on the Earth for the production of bio-ethanol. It is composed of carbohydrate polymers (cellulose, hemicelluloses), and an aromatic polymer (lignin). These carbohydrate polymers contain various sugar monomers (six and five carbon sugars) and they are tightly bound to lignin. Lignocellulosic biomass serve as a raw material for production of ethanol examples include switch grass (*Panicum virgatum*) and Elephant grass, *P. hysterophorus* etc.

*Parthenium hysterophorus* is an annual herb that uncompromisingly colonises disturbed sites. Inhabitant to southern United States, Mexico and Central and South America, it has been by accident introduced into several countries and has become a serious agricultural weed in parts of Australia, Asia, Africa and the Pacific Islands, also India. It grows on any type of earth and in a wide range of habitats. It affects the production of crops, animals, human and animal health, and biodiversity.

*P. hysterophorus* being Lignocellulosic mass can be utilize as a potential for the production of ethanol and then ethylene.

## INTRODUCTION

Lignocellulose—a major constituent of biomass is accessible on earth, is a renewable and in large quantities available with great potential for bioconversion to value-added bio-products.

General name of *Parthenium hysterophorus* L. is carrot weed; chatak chandani; gazar ghas; osadi *P. hysterophorus* is an upright, much-branched with strong development tendency, fragrant, yearly (or a short-lived perennial), herbaceous plant with a deep taproot. The species reproduces by seed. This Lignocellulosic biomass, can be fermented to ethanol.

Biomass is a carbon-neutral source of energy: as it comes from plant life, the incineration of lignocellulosic ethanol produces no net carbon dioxide into the earth's atmosphere. *P. hysterophorus* being Lignocellulosic mass can be utilize as a potential for the production of ethanol and then ethylene.

## LIGNOCELLULOSIC BIOMASS COMPOSITION

Lignocellulosic biomass is a major component of plants that provides them structure and is usually present in stalks, leaves and roots. Lignocellulosic biomass consists mainly of three types of polymers: Cellulose, hemicelluloses, and lignin. Which are interlinked to each other in a hetero-matrix, approximately 90% of dry matter in lignocellulosics consists of cellulose, hemicelluloses and lignin, whereas the rest comprises of ash and extractives.

## Materials and method: Ethanol production technologies

To obtain Bio ethanol following steps is proposed:

Preparation of raw material → Pretreatment of raw Material → Saccharification of Pretreated Substance → fermentation of sugar to alcohol → product separation/ distillation.

## RAW MATERIAL PREPARATION

Carrot grass was obtained from the field of agriculture college, Indore. It was air dried and chopped into small size (2–5 cm), and was stored in an airtight polyethylene bag at room temperature for further use.

## PRETREATMENT OF RAW MATERIAL

Pretreatment is required to modify the biomass structure so that hydrolysis of carbohydrate portion to monomeric sugars can be achieved more quickly and with superior yields (Pretreatment affects the structure of biomass by solubilizing hemicelluloses, dropping crystallinity and raise the accessible surface area and pore volume of the substrate.

## ALKALI PRETREATMENT

Alkali pretreatment involves the adding up of bases to biomass, leading to an improving of inside surface by swelling, a decrease of polymerization degree and crystalline, destruction of links among lignin and other polymers, and lignin breakdown (Badiei et al. 2014) NaOH or KOH are mainly reported chemicals used in alkaline pretreatment, in this

process conditions are relatively mild but reaction times can be long (Harmsen et al. 2010).

The alkaline pretreated lignocellulosics can be saccharified enzymatically to get fermentable sugars (Ghose and Bisaria, 1979; Kuhad et al., 1997; Itoh et al., 2003; Tucker et al.

#### SACCHARIFICATION OF PRETREATED SUBSTANCE

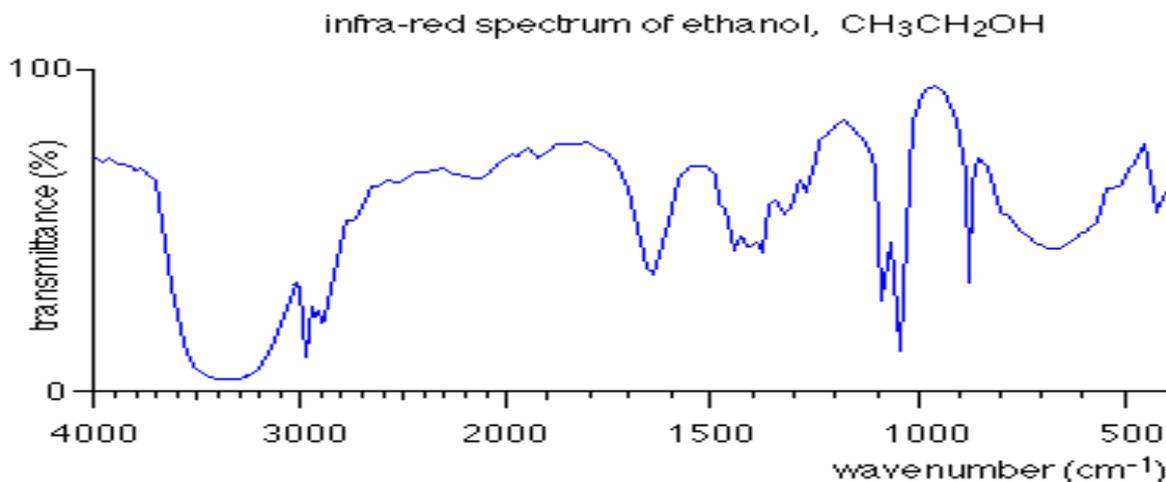
Enzymatic saccharification of lignocellulosic materials such as carrot grass celluloses for bioethanol production is being investigated. Bioconversion of lignocellulosic materials into helpful and higher value products normally requires multistep processes. These processes include; pretreatment (mechanical, chemical, or biological), hydrolysis of the polymers to produce

readily metabolizable molecules (e.g., hexose and pentose sugars), bioconversion of these smaller molecules to carry microbial growth and/or produce chemical products, and the separation and decontamination of the desired harvest.

After hydrolyzing, enzyme yeast was added to the mixture, and was left for 40 days. After fermentation, mixture was filtered and the filtrate is subjected to distillation. The distillate is checked for the presence of ethanol.

#### RESULTS AND DISCUSSION

The filtrate is subjected to infrared spectroscopic analysis. The result confirms the presence of ethanol in the sample. IR of the ethanol is as under.



#### CONCLUSION

Lignocellulosic biomass like *Parthenium hysterophorus* could be a good source of ethanol that could be used for further production of bioethelene.

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