MILLENNUM YOUTH CAMP

Renewable Resources

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TOWARDS A GREENER TOMORROW

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Humanity's history is deeply

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connected with the concept of fuels, for they are the driving force behind every economical and industrial process our progress is based on. However due to our heavy reliance on these fuels, many global issues have come to light and a more sustainable lifestyle needs to be adopted.

Our Bio Refinery

Our proposal is a bio refinery which integrates ligno cellulosic biomass conversion processes to produce fuels and value-added chemicals, replacing many products currently produced

Ligno Celulosic material,

mainly composed of cellulose, hemicellulose and lignin, is the most abundantly available raw material on Earth. It is easily found in agricultural and forestry residues.



ADVANTAGES

- ✓ Low economic cost
- ✓ Independent from world's food supply
- ✓ Optimises the use of land and excess waste
- \checkmark Lower greenhouse gas emissions than first generation biomasses

CHALLENGES

X Technical barriers X Diverse quality of biomass

Ligno cellulosic materials (e.g. birch, bagasse)

from petroleum.

Experimental Work

performing certain reactions After on cellulosic biomass (bagasse and birch), we managed to achieve a 12 % 5-HMF yield by using microwave assisted dehydration of cellulose. Furthermore, we achieved 35.8% glucose and 40.9 % xylose yields by microwave assisted hydrolysis of pre-treated birch.



5-HMF

5-Hydroxy methyl furfural is widely seen as a platform chemical and can be used in the production of:

- Furan: further used to produce: THF, the raw materials for nylon-6.6 and solvents
- **Biofuel: 2,5-dimethylfuran which has a** greater energy content than bioethanol.

Glucose

Glucose has many well known uses including:

- Ethanol, which can be further reacted to **Polyethylene;**
- 1-Propanol, which further reacts to Polypropylene.

Xylose

se is used to produce furfural, an Xylo industrial solvent and a precursor to synthetic polymers.

Lignin Lignin can also be used in producing: • Ethanol;

• Synthetic Polymers.