Hemicellulose Extraction via Biomass Hydrolysis for Food Packaging

INTRODUCTION

Create an alternative to plastic food packaging from sustainable sources. The focus is to start in BC.

Feed = Softwood

Hemicellulose is extracted to create a thin film of biodegradable plastic. The product has the following desirable properties:
1. Food Safe
2. Water and Oxygen Resistance
3. Sufficient Tensile Strength

PROCESS OVERVIEW

Comminution
The biomass is fed into a grinder for a comminution operation to create a wood powder that is 2mm in size

Hydrolysis Reactor
At a temperature of 180 °C, the wood powder is solubilized with water in a reactor to create the slurry

Separation (Filter Press)
The slurry is fed through a filter press to separate the unreacted wood powder with by-product, while the rest is further separated

Separation (Ultrafiltration)
By the last separation, low and high molecular weight (MW) hemicellulose will be extracted as the final end product

ECONOMICS

OPEX Value: $33M

CAPEX Value: $25M

NPV $8.5M
PAYBACK 13 years
IRR 6%

INNOVATION

Hemicellulose is underutilized in the industry.

Design: Extraction process to isolate hemicellulose

Novelty
1. Novel Reactor: This reactor is specifically designed for hydrolyzing wood for hemicellulose
2. Variable Application: Hemicellulose can be used to make several useful secondary products
3. New Product Market: Hemicellulose has the potential to disrupt other existing markets

SOCIAL FACTORS

Rejuvenate Economy
This new operation aims to synergize the stagnating pulp and paper industry in British Columbia

Advance Research
Partnering with the BioProducts Institute to implement pilot plants and scale-up research

Reduce Landfill Space
Diminish the usage of plastics and decrease landfill contributions to reduce effects of climate change

Globally Export Goods
Lift Canada’s global presence as an exporter of sustainable packaging to international partners

3D PLANT MODEL

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ENVIRONMENT

11 tonnes/hr Utilization of waste biomass
600 GJ/hr Energy savings due to waste heat recovery
465 tonnes of CO₂ emitted annually

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