

# Bio Refinery

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## Introduction

A biorefinery could be an industrial plant that converts biomass to energy and different useful byproducts (such as chemicals). The international energy agency bioenergy task forty two outlined biorefining as "the property process of biomass into a spectrum of bio-based merchandise (food, feed, chemicals, materials) and bioenergy (biofuels, power and/or heat)". As refineries, biorefineries will offer multiple chemicals by fractionating AN initial stuff (biomass) into multiple intermediates (carbohydrates, proteins, triglycerides) which will be any born-again into added merchandise. Every refinement section is additionally named as a "cascading phase". The employment of biomass as feedstock will offer a profit by reducing the impacts on the setting, as lower pollutants emissions and reduction within the emissions of hazard merchandise. additionally, biorefineries square measure supposed to realize the subsequent goals:

Biorefineries is classified primarily based in four main features:

## Platforms

Refers to key intermediates between stuff and final merchandise. the foremost necessary intermediates are:

- o Biogas from anaerobic digestion
- o Syngas from chemical process

## Products

Biorefineries is sorted in 2 main classes in line with the conversion of biomass in an exceedingly energetic or non-energetic

- o Hydrogen from water-gas shift reaction, steam reforming, water electrolysis and fermentation
- o C6 sugars from chemical reaction of plant product, starch, polysaccharide and hemicellulose
- o C5 sugars (e.g., xylose, arabinose: C5H10O5), from chemical reaction of hemicellulose and food and feed facet streams
- o Lignin from the process of lignocellulosic biomass.
- o Liquid from transmutation (pyrolysis oil)

- product. During this classification the most market should be identified:
- o Energy-driven biorefinery systems: the most product could be a second energy carrier as biofuels, power and warmth.
  - o Material-driven biorefinery systems: the most product could be a biobased product

## Feedstock

Dedicated feedstocks (Sugar crops, starch crops, lignocellulosic crops, oil-based crops, grasses, marine biomass); and residues (oil-based residues, lignocellulosic residues, organic residues and others).

## Processes

Conversion method to remodel biomass into a final product:

- Mechanical/physical: The chemical structure of the biomass parts is preserved. This operation includes pressing, milling, separation, distillation, among others
- Biochemical: Processes below vasoconstrictive and pressure, mistreatment organism or enzymes.
- Chemical processes: The substrate suffer modification by the action of AN external chemical (e.g., hydrolysis, transesterification, chemical change, oxidation, pulping)
- Thermochemical: Severe conditions square measure apply to the feedstock (high pressure and warm temperature, with or while not catalyst).

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Received Date: April 7, 2021; Accepted Date: April 22, 2021; Published Date: April 29, 2021

Citation: Herianto (2021) Bio refinery. Oil Gas Res 7:e117.

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