

Pre-treatment is important in the utilisation of food waste for the production of high value products

Proper disposal of food industry waste is a problem that developed as well as developing economies face alike. Conversion of food waste is a pioneering idea which can lead to huge financial gains while ensuring a healthy environment. Owing to their high nutritional content and environmental problems caused by their accumulation, the European Commission has put forward regulation policies for their effective utilisation and disposal. Fortunately, wastes generated during different stages of production may well turn out to be secondary raw materials for new products. Lignocellulose is a common term used to describe the chemical composition of plant biomass. It is the most abundant renewable carbon resource in the world. It is composed of two polymers viz. lignin, cellulose and hemicellulose (hence the name lignocellulose). Cellulose and hemicellulose are polymers of sugar building blocks. Most of the wastes generated from agriculture and food processing industries are lignocellulosic in nature. It is estimated that the total waste generated from the food processing industry along with food waste amount up to 1.3 billion tons/year. Additionally, the EU generates a total of almost 100 million tons of food waste every year.

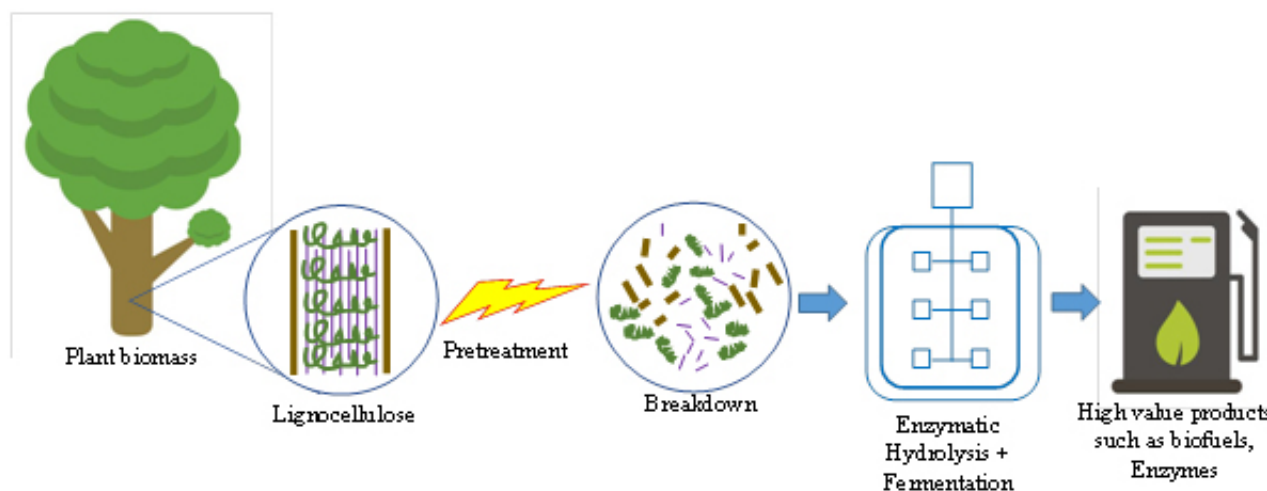


Fig. 1. Pre-treatments degrade lignocellulose into individual components, leads to high value products production.

Lignocellulosic derivatives can be broken down into individual sugars. This fact is taken advantage of when using them as raw materials for production processes involving fermentation. Thus several studies have been conducted on the use of lignocellulose for the production of value-added products such as bioethanol, organic acids, enzymes and biosorbents. In most processes, the raw materials need to be enzymatically treated to release the sugars (Fig 1). However, lignocellulose

also contains pectin and a higher fraction of lignin content compared to polysaccharides. This, along with high degree of crystalline cellulose prevents enzymes from accessing the polysaccharides. Pre-treatment is techniques that eliminate these factors thereby facilitating enzymes to better access their respective substrates. The application of high temperature and pressure or harsh chemical treatments to break the covalent bonds that bind lignin to cellulose and hemicelluloses are common methods of lignocellulose pre-treatments.

The insatiable need for renewable resources of energy has globally led to a lot of research being performed in the conversion of lignocellulosic biomass in to biofuel. Plenty of reports are available on the production of fuels such as bioethanol, bio-butanol, methane, biogas, bio-oil etc. from lignocellulose. However, there are a lot of value added products than can be synthesized using waste from food industries besides as a primary carbon source. This idea arises from the need to adopt a clean production strategy for the food industry which shall result in the formation of zero waste.

Publication

[A comprehensive review on pre-treatment strategy for lignocellulosic food industry waste: Challenges and opportunities.](#)

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