

Energetic, techno-economic and environmental analysis of a biorefinery from sugarcane bagasse of different scales

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Abstract

The sugarcane bagasse is a residue obtained from the processing of the sugarcane, from which it is possible to obtain 280 kg of bagasse per ton of sugarcane (Cardona, Quintero, & Paz, 2010). This is generated in high quantities in several countries like Brazil, India, China, Thailand, Pakistan, Mexico, Colombia, Indonesia, Philippines and United States ("Top Sugarcane Producing Countries," n.d.). Between 2014 and 2015, the world production of sugarcane accounted 175.1 million metric tons (The Statistics Portal, n.d.). For this reason, it is used as raw material for a biorefineries. Under the biorefinery concept, from the sugarcane bagasse is possible to obtain products as ethanol, xylitol, electricity, PHB, antioxidants and lactic acid, among others (Moncada, El-Halwagi, & Cardona, 2013). Among the main aspects for a biorefinery to be viable is that it must be economically, socially, environmentally and energetically viable.

In this sense, an analysis of the size of the biorefinery (scale analysis) was carried out to determine the point of economic viability. In addition, an energy analysis was carried out, which allowed to identify the influence that has the scale of processing on the energy changes presented throughout the process.

As a result it is possible to observe the importance of the analysis of scale of a process for the determination of the point in which it is obtained not only an energetic but also economic viability.

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