



Biorenewable Insights: Conventional Sugars

Conventional Sugars is one in a series of reports published as part of NexantECA's 2016 Biorenewable Insights program.

Overview

Sugar is the most important feedstock currently for the bio-economy. It is abundant and low cost, globally. Sugar is one of three main feedstocks: sugar, natural oils, and biomass. Natural oils-based technologies are generally limited by the relatively small volumes of oils available from crops, animals and wastes. Besides, natural oils have significant uses in foods and oleochemicals, and have industrial uses as well, thus substantial additional quantities would come at a high environmental, societal, and economic cost. Biomass based technologies are limited by the current developmental arc of the technologies that can utilize them. There simply are not enough next generation technologies fully commercialized to replace the existing sugar based industries nor substitute downstream for substantial quantities of petroleum based chemicals and fuels. Sugars in various natural forms, resulting from the nature of plant biology, are far more abundant than natural oils, and if any of the large number of next generation biomass conversion technologies in development that are targeting conversion of biomass to sugars become commercially available, it could mean large quantities of next generation sugars would become available, further expanding the size of the sugar market..

Sugar is both a food additive (sweetener), as well as a feedstock for fermentations and chemical transformations. It is its far greater use as a sweetener mostly drives demand

Technologies

Sucrose, table sugar, is a disaccharide of glucose and fructose that is produced directly by milling sugar crops such as either sugarcane or sugarbeets. Dextrose (D-Glucose) is produced from the starch obtained by milling starchy crops such as corn and cassava. Other sugars such as fructose and High Fructose Corn Syrup (HFCS) are produced by isomerization of dextrose, (e.g., with enzymes). At the present, NexantECA has investigated:

- Sugar from Starchy Feedstocks:
 - Corn
 - Cassava
 - Wheat
 - Potato

- Sugar from Sugar Crops
 - Sugarcane
 - Sugar beet

Process Economics

Cost of production models for USGC, Brazil, Western Europe and China are shown for:

- Dextrose
 - Wet Corn Milling
 - High HFCS
 - High Dextrose Model
 - High Starch Model
 - Dextrose Only Model
 - Cassava Dextrose
- Sucrose
 - Sugar beet
 - No Ethanol Model
 - Sugar with Ethanol Model
 - Sugar with Maximum Ethanol Model
 - Sugarcane
 - No Ethanol Model
 - Minimum Ethanol Model
 - Moderate Ethanol Model
 - Maximum Ethanol Model

Capacity

NexantECA catalogues industry supply by region.



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