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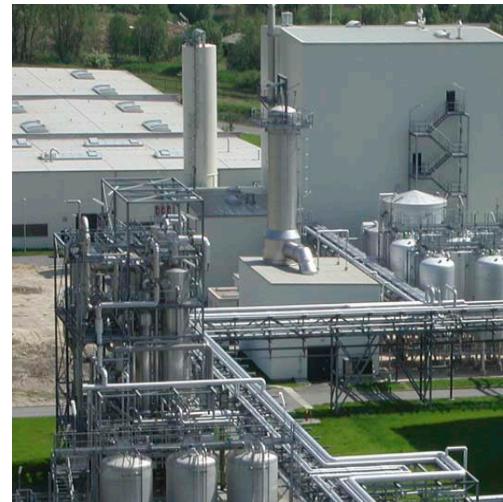
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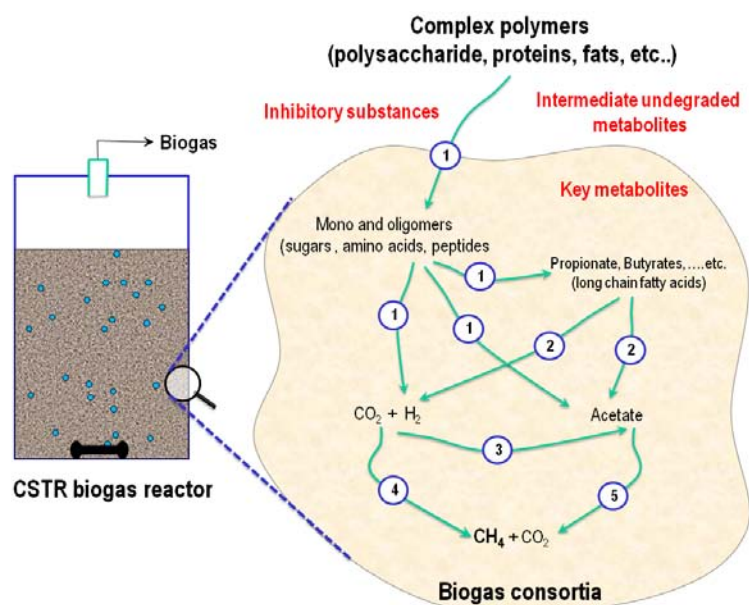
## Description:

Bioethanol is presently the world's most widely used biofuel, and will continue to grow in the future, especially because of the oil prices and the environmental concern. In Germany the Zeitz Bioethanol pilot plant (Fig.1) produces bioethanol and DDGS (animal feed) as main products. However, for optimizing the cost of this biofuel in a biorefinery concept, the process byproduct like stillage stream is used in anaerobic digester to produce methane rich biogas.



**Fig. 1: Bioethanol production plant, Zeitz, Germany**

Generally, the transformation of organic wastes into biogas is considered to occur in four steps: hydrolysis followed by acidogenesis, acetogenesis and finally methanogenesis (Fig. 2). For the stillage anaerobic fermentation, it is not known however, which metabolites are the determinate(s), and whether inhibitory substances or degradation products accumulate in the biogas reactors. Aiming to further develop the thermophilic microbial consortia and through the use of different analytical methods GC, HPLC, GC-MS, or LC-MS, different metabolites in the stillage (substrate) and in the continuous biogas reactors are investigated. Identifying the undegraded or accumulated components is crucial for the introduction of exogenous 'helper' microorganism(s).



**Fig. 2: steps involved in the anaerobic digestion of stillage**

W. Sabra, D. Dietz, D. Tjahjajari and A.-P. Zeng (2010) **Biosystems analysis and engineering of microbial consortia for industrial biotechnology**. Engineering in Life Sciences, 10, 407-421..

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