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Production of ethanol and longer chain alcohols by fermentation

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The use of fermentative microorganisms for efficient C₂-C₅ alcohol production from renewable feedstocks has been a subject of intense investigation over recent decades. While the physiology of microorganisms involved in alcohol production from first generation feedstocks is well established, the utilization of microorganisms for the production of second generation bioalcohols from complex biomass, such as lignocellulose, remains challenging. At present, there are no “all in one” bioprocessing organisms that have been used on an industrial scale capable of both complex biomass conversions to fermentable substrates and fermentation to alcohols. Extensive investigations on bioalcohol-producing organisms and related processes have targeted challenges ranging from the conversion of feedstock biomass to fermentable substrates, process design, and organism improvements. Recent advances in the production of liquid fuel carriers such as ethanol, propanol, and butanol as well as branched-chain alcohols will be the subject of this presentation. The main emphasis is on thermophilic bacteria capable of producing ethanol with high titers as well as branched-chain alcohols (isopropanol, 2-methylbutanol and 3-methylbutanol) from branched-chain amino acids.

Recent Publications

1. Carvalho DMde, Queiroz JHde, Colodette JL (2017) Hydrothermal and acid pretreatments improve ethanol production from lignocellulosic biomasses. *BioResources* 12(2):3088-3107.
2. Carvalho DMde, Colodette JL (2017) Comparative study of acid hydrolysis of lignin and polysaccharides in biomasses. *BioResources* 12(4):6907-6923.
3. Carvalho DMde, Queiroz JHde, Colodette JL (2016) Assessment of alkaline pretreatment for the production of biethanol from eucalyptus, sugarcane bagasse and sugarcane straw. *Industrial Crops and Products* 94:932-941.
4. Carvalho DMde, Sevastyanova O, Queiroz JHde, Colodette JL (2016) Cold alkaline extraction as a pretreatment for bioethanol production from eucalyptus, sugarcane bagasse and sugarcane straw. *Energy Conversion and Management* 124:315-324.

Biography

Johann Orlygsson has expertise in physiology of thermophilic anaerobic bacteria with main emphasis on bioethanol and biohydrogen production. Additionally, recent investigations have been towards producing high value – low volume compounds like 1,2-propandiol using extremophiles like *Caldicellulosiruptor* and branched-chain alcohols with *Thermoanaerobacter* and *Caldanaerobacter* species.

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