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Study of the fermentation process for the n-butanol production from lignocellulosic sugars

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Nowadays, the production of fuels and petrochemical compounds from renewable sources, environmentally friendly and with high yield and productivity is one of the biggest challenges of the biotechnology industry. Among these petrochemical compounds, n-butanol stands out as an important industrial chemical because of its great potential to be used as an alternative fuel. It can be produced either from petroleum derivatives, as well as naturally (biobutanol) by anaerobic fermentation using solventogenic clostridia resulting in a mixture of acetone, butanol and ethanol (known as ABE fermentation). Hence, biobutanol has a number of significant advantages over existing biofuels. It is considered a highest value biofuel due to its energy content (29.2 MJ/L) and similarity properties with gasoline, which could require fewer changes in engines. It is worth noting that the fermentation of toxic lignocellulosic hydrolyzates has become a challenging research topic in recent decades. Bioconversion of lignocellulose by microbial fermentation is typically preceded by an acidic thermochemical pretreatment step designed to facilitate hydrolysis of cellulose. Substances formed during the pretreatment of the lignocellulosic feedstock have a serious inhibitory effect in subsequent fermentation steps. The overall goal of this project is to develop an efficient process to convert lignocellulosic sugars (from sugarcane bagasse) into n-butanol via the ABE fermentation process. The research will investigate to which extent the novel extractive fermentation - an advanced fermentation technology with integrated product recovery by means of vacuum - is more robust against inhibitory compounds formed during biomass pretreatment and the effects of the choice for the advanced technology on the design process of the pretreatment and conditioning steps.

Biography

Ana Maria Zetty Arenas has a BS. in Agroindustrial Engineering from the Universidad Nacional de Colombia-UNAL (2008) in Colombia. She also has MSc. in Chemical Engineering from the Universidade de São Paulo-USP (2012) in Brazil. Currently, she is pursuing PhD. in Bioenergy at the Universidade de São Paulo-USP, Universidade Estadual de Campinas-Unicamp and Universidade Estadual Paulista-Unesp, in Brazil. She is working on the research project entitled "Efficient bioconversion of lignocellulosic-derived sugars from sugarcane bagasse into n-butanol".

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