

EVALUATION OF CELL RECYCLE ON THE FERMENTABILITY OF THE MIXTURE OF HYDROLYSATE AND MOLASSES FOR BIOETHANOL PRODUCTION

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One of the main targets in bioethanol production to achieve sustainability is the increase in the productivity per area of sugarcane cultivated. This is possible through the use of the cellulosic portion of sugarcane as a substrate source in the fermentation.

Among the drawbacks in the second generation biofuel technology is the presence of inhibitory products in the hydrolysates (acetic acid, furfural and hydroxymethylfurfural (HMF)), which inhibits the kinetics and reduces the productivity of alcoholic fermentation. The inhibitory effect is increased especially when cell recycle is done.

In this work, the fermentability and kinetics of a mixture of sugarcane molasses and the hydrolysates was evaluated with cell recycle. Successive experiments in batch mode were performed, and the cells recycled, after centrifugation. The kinetic parameters of the alcoholic fermentation were investigated for each fermentation to evaluate the impact of inhibitors on yeasts for a long time of cultivation.

The media used was a mixture of sugarcane molasses and enzymatic hydrolysates of hydrogen peroxide pretreated bagasse, the microorganism was a lineage of *Saccharomyces cerevisiae*. The hydrolysate was cold sterilized by a membrane of 0.22 μm in order to maintain the original concentrations of furfural, HMF and acetic acid in the media to evaluate their inhibitor impacts.

For each fermentation, 11 kinetic parameters were optimized, and a relevant reduction of rate of ethanol production was noted comparing to molasses fermentation after successive cell recycling when the hydrolysate is used as culture media.

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