Using sequential strategies (physicochemical detoxification-Membrane technology) to Pretreat Hydrolyzed Sugarcane Bagasse for Bioethanol Production

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Introduction: In last years the use of renewable sources for the bioethanol production has been recommended. However its application is conditioned to solids removal and sugar concentration steps.

In this work the application of the sequential strategies (detoxification-microfiltration) to pretreat (suspended solids removal: clarification) hydrolyzed sugarcane bagasse (HB) was studied.

Methodology: Microfiltration (MF) of BH and detoxified BH was performed using a MF membrane (0.1µm, PVDF) under different hydrodynamic conditions. In addition the effect of detoxification before MF was evaluated in terms of permeates flux, inhibitors and membrane resistance.

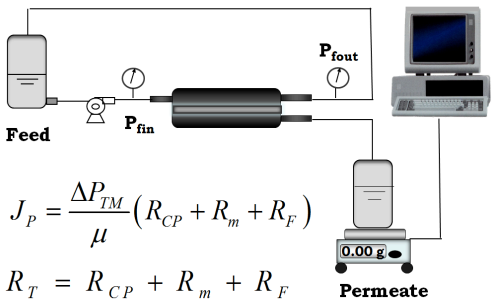

Figure 1. Experimental set up

Results: The highest permeate flux and lowest membrane resistance were encountered at ΔP_{TM}=10 psi y 0.125m.s^{-1}. The use of detoxification improves the permeate flux and the quality of hydrolyzed permeate in the membrane technology tested.

Table 1. Effect of pretreatments on quality of BH clarified (Vx= 0.125 m.s^{-1}, ΔP_{TM}= 10 psi)

		% Increase of	% Reduction of		
Feed	pH	SST (Brix)	Inhibitors	Color	Turbidity
BHN	5.5	8	63	28	35
BHCAN[a]	5.5	11.2	76	64	78
BHNCA[b]	5.5	13.5	90	92	95
	6.0	11.8	86	88	90
	7.0	11.4	82	85	88

[a]HB + (Adsorption with activated charcoal- Neutralization)
[b]HB + (Neutralization-Adsorption with activated charcoal)

Figure 2. BH (pH 5.5) clarified by sequential strategies

Conclusions: Pretreatment conditions largely determined process performance and quality of BH clarified by MF. Results from these work point out that strategies evaluated are promising alternatives suitable not only for clarification but also for concentration of fermentable sugars from BH making easier the use of the second generation renewable sources for bioethanol production as an alternative to fossil fuels.

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