STUDY OF MOISTURE EFFECT OF SUGARCANE BAGASSE TO OBTAIN GLUCOSE BY ENZYMATIC HYDROLYSIS

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Introduction. Given the increasing shortage of fossil fuels, are seeking alternative energy sources. Alcoholic fermentation is an option for the production of renewable energy from agricultural waste (lignocellulosic materials) (1). The lignocellulosic material is mainly composed of cellulose, hemicellulose and lignin, natural polymers characteristic hardwood composition (2). To be economically feasible to obtain ethanol from such materials is necessary to optimize each stage of the process (3). This type of material is applied to acid hydrolysis and enzymatic hydrolysis for obtaining fermentable sugars such as xylose and glucose (4).

Methodology. Obtaining glucose involves 3 stepts: 1) *Acid Hydrolysis*, which sugarcane bagasse (SCB) is hydrolyzed wtih H_2SO_4 2% v/v, with a solid liquid ratio (RLS) 6:1 by 40 min; 2) *Delignification,* SCB obtained in step 1, is treated with H_2O_2 to 4.7 % w/v, with RLS 17:1 by 27 h, and 3) *Enzymatic Hydrolysis,* per gram of SCB is used 9 mL of sodium acetate an acetic acid solution 0.05M, 90 µL of Tween 80, 47 µL of cellulase and 62 µL of beta-glucosidase, at 50 ^{o}C and 200 rpm (5). Enzymatic hydrolysis was performed using an experimental design 2^2 to delignified bagasse with two levels of moisture percentages (15% and 4.34 %) and two level of mass (50 and 100 g).

Results. Acid hydrolysis gives a solution with 19.3 g/L of Xylose concentration and 3 g/L of glucose. Figure 1, shows the behavior of enzymatic hydrolysis is observed that a low level of moisture improved significantly the glucose production yielding 50 % more than using a higher level. The higher amount of glucose obtained was considering 4.34 % moisture and 50 g of SCB. An ANOVA with NCSS was performed (Table 1). Moisture proved to be the most significant factor followed by iteration moisture-mass.

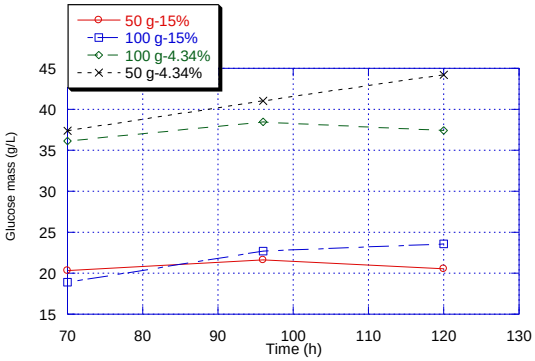

Fig. 1. Glucose mass obtained considering different percent moisture and amount of SCB

Table. 1. The Analysis of Variance of enzymatic hydrolysis

Source Term	DF	MS	Prob level
A: weight	1	7.0312	0.0873
B: Moisture	1	702.1878	0.000023*
AB	1	48.2776	0.004118*
S	4	1.384925	
Total (Adjusted)	7		
Total	8		

Conclusions

The use of SCB with low moisture promotes enzymatic hydrolysis. Glucose obtained increasing up to 50% with respect to higher moistures.

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