TROPICAL *Pennisetum* GLASSES HYDROLYSIS TO OBTEIN FERMENTABLE SUGARS AS SUBSTRATE FOR BIOFUELS PRODUCTION

Nancy D. Uresti Durán[1], Erika Nava Reyna[1], Baltazar Gutiérrez Rodríguez[1], José L. Martínez Hernandez[1], Jesús Uresti Gil[2]; [1]Facultad de Ciencias Químicas, Universidad Autónoma de Coahuila, V. Carranza Blvd. w/o. Republica, CP 25280, Saltillo, Coahuila, Mexico; [2]Campo Experimental Cotaxtla, INIFAP, Carretera Córdoba-Veracruz km 34, Paso del Toro, Veracruz, México; uresti.jesus@inifap.gob.mx

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Introduction. Lignocellulose, the main component of plant cell wall produced by photosynthesis, is the most promising renewable carbon source to overcome the energy crisis. So that have been developed several methods to improve lignocellulosic material hydrolysis to remove lignin and hemicellulose, as well as reducing cellulose crystallinity in order to release glucose units that can be used as a carbon source for fermentation processes to obtain biofuels (1).

This research had as objective the chemical characterization of three different grasses to be applied to produce fermentable sugars for ethanol producing.

Methodology. Three different *Pennisetum* grasses were analyzed: Roxo, Elephant and Taiwan. Varfolomeev (2) methodology was followed for grasses characterization, which consists in partial acid hydrolysis to determinate hemicellulose, cellulose and lignin contends. Enzymatic hydrolysis of grasses were performed in a stationary reactor (200 ml) jacketed for temperature control (50°C) and stirred at 240 rpm. Reaction volume was 50 ml (49.5 ml buffer/0.5 ml Celluclast enzyme = 7UI) and 1 g of each glass was analyzed. Reactors were monitored at 15 min, 30 min, 1 h and thereafter every 2 h during 12 h and reducing sugars concentration were determinated (3).

Results. Results showed that Roxo grass had the lowest content of cellulose and lignina, but it presented the highest percent of hemicellulose (Table 1). Elephant and Taiwan grasses had similar level of all lignocellulosic compounds. Sung & Chen (4) reported similar lignocellulosic materials content for grasses waste.

On the other hand, Roxo grass showed the highest concentrations of reducing sugars after enzymatic hydrolysis, having the highest level between 6 and 12 h, followed by elephant grass and finally Taiwan one (Fig. 1).

Table 1. Polysaccharide composition (% Dry matter) of the analyzed grasses after partial acid hydrolysis.

Strain	Lignocellulosic compounds (% Dry matter)		
	Cellulose	Hemicellulose	Lignin
Taiwan	28.73±4.52	47.62±1.66	20.43±3.26
Roxo	20.6±0.42	53±0.80	16.72±0.59
Elephant	29.25±2.58	49.35±0.85	20.23±3.58

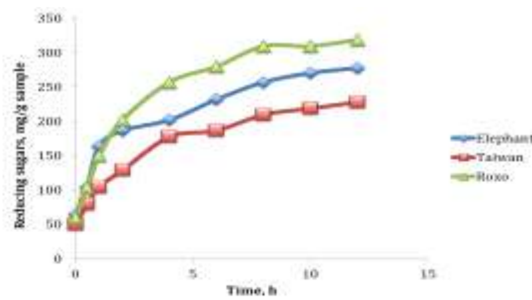

Figure 1. Kinetics of reducing sugars after Celluclast enzyme degradation of grasses.

Conclusions. Roxo grass showed the highest potential for fermentable sugars production due to its lower contained of cellulose and lignin, making this grass a viable alternative for second generation ethanol production.

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