

## **Determination of total phenolic content produced by pretreatments of sugarcane bagasse and correspondent reducing sugar released by enzymatic hydrolysis for cellulosic ethanol production.**

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Our research group on bioenergy has investigated the application of alkaline and acid microwave pretreatments of sugarcane bagasse aiming cellulosic ethanol by enzymatic hydrolysis. Beyond the natural recalcitrance of the fiber, another serious hindrance is the presence of inhibitors of the alcoholic fermentation, mainly lignin-derived phenolic compounds.

The experiments were carried out impregnating 3.0 g of sugarcane bagasse with 1-mm particle size with diluted NaOH and H<sub>2</sub>SO<sub>4</sub> (both at 0.05 M) in solutions of water in glycerol (0%, 5% and 10% v/v). These systems were irradiated with microwave (2.45 GHz) during 120 seconds at atmospheric pressure in 250-mL round flasks coupled to a condenser and the temperature was monitored with a infrared sensor. After that, 20 mL of distilled water were added into the flasks and shaken for 5 min. Samples of 1 mL were collected, centrifuged and filtered in 40- $\mu$ m pores size membrane and kept at -20°C. Total phenolic compounds content (TPC) were quantified using by Folin-Ciocalteu methodology in a UV-Vis spectrophotometer at  $\lambda=760$  nm. Vanillic acid was employed as reference for the analytical curve. The fibers were then washed with distilled water and hydrolyzed with Powercell®, a lignocellulolytic enzyme complex from Prozyn (São Paulo, Brazil). Total reducing sugars content (TRS) was determined by DNS method using glucose as reference. In absence of NaOH and H<sub>2</sub>SO<sub>4</sub>.

The maximum TPC obtained in solution was 12 mg/g of dry bagasse and the maximum TRS was 237 mg/g of dry bagasse, both using only anhydrous glycerol. When NaOH (0.05M) was employed, the level of TPC raised to 43 mg/g and TRS 456 mg/g of dry bagasse, both using glycerol with 5% of water. The highest level of TRS (474 mg/g of dry bagasse) was obtained when we used a solution of NaOH (0.05M) in water/glycerol (10% v/v). The next step is to process the alcoholic fermentation with the hydrolysates.

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