**TITLE:** SECOND GENERATION ETHANOL PRODUCTION WITH TREATMENT OF LIQUOR AND MIX OF SORGO BIOMASS AND CANE ENERGIA

**AUTHORS:** FREITA, C.M.; FREITA, L.A.; FERREIRA, A.S.; TEIXEIRA, V.; RIBEIRO, N.N.; NONATO JUNIOR, C.; MUTTON, M.J.R.; MUTTON, M.A.

**INSTITUTION:** PROGRAMA DE MICROBIOLOGIA AGROPECUÁRIA FACULDADE DE CIÊNCIAS AGRÁRIAS E VETRINÁRIAS – UNESP, JABOTICABAL, SP (VIA DE AECSSO PROFESSOR PAULO DONATO CASTELANE CASTELLANE S/N - VILA INDUSTRIAL, 14884-900)

## ABSTRACT

The perspective for the next years is the increase of ethanol production by 50%, this fact is associated with the agreement to reduce greenhouse gases. Therefore, only the use of sugarcane will not be enough for the demand in the medium and long time. In this context, the development of research with the intention of making possible the cultivation of raw materials and complementing the production of ethanol is necessary. Biomass sorghum (BS) and energy cane (EC) can be promising to produce second generation ethanol from the lignocellulosic material. A crucial step for the development of the 2G ethanol production is to perform the hydrolysis, which converts the bagasse polysaccharides, mainly cellulose, into glucose. Several chemical or enzymatic pretreatment methods are proposed to facilitate this procedure. Among the chemical process, the acid hydrolysis has a low cost compared to the enzymatic one. In this context, the present study has the goals to evaluate acid hydrolysis for the production of second generation ethanol, evaluating the availability of sugars for use in the fermentation process. The experimental design was completely randomized, with a graded mix of biomass sorghum and energy sugar (SB:EC), in proportions of 25:75%; 50:50%; 75:25% and 100% EC, 100% SB as the main treatment. The hydrolysis showed that the time of 20 minutes at 120°C, with 1% concentration of H<sub>2</sub>SO<sub>4</sub> was the one that obtained the most sugars, being this condition to be applied in the work. The quantification of sugars it was by HPLC, the results for xylose (target sugar from the pentoses fermentation) were in the proportions: 25 (SB): 75 (EC) 8.05 g.L<sup>-1</sup> of xylose; 50 :50% 9.77 g.L<sup>-1</sup> of xylose; 75 (SB) :25 (EC) % 11.69 g.L<sup>-1</sup> of xylose; 100% EC 6.66 g.L<sup>-1</sup> of xylose; 100% SB 12.78 g.L-1 of xylose.

**Keywords:** Lignocellulosic material; Acid hydrolysis; Enzymatic hydrolysis; Ethanol second generation.

**Development Agency**: CAPES - Coordenação de Aperfeiçoamento de Pessoal de Nível Superior e Fapesp – Fundação de Amparo a Pesquisa do Estado de São Paulo.