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Study of hydrolysis of sugarcane bagasse in pilot plant for obtaining fermentable sugars for second generation ethanol

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The main objective of this work was to design and build a system at pilot plant scale capable of performing the conversion of bagasse from sugar cane in higher added value products based on a hydrolysis reactor operating in subcritical conditions of temperature and pressure semi-batch system. To study the hydrolysis of sugarcane bagasse three temperature conditions (100, 200 - 250°C) and two pressure conditions (25-50 bar) were tested besides of adjusting other operational parameters. The results of the hydrolysis kinetics indicate with respect to the effect of the pressure in the system that glucose concentration steadily increases throughout kinetic period independent of pressure. Although increasing pressure from 25 bar to 50 bar shows a small increase in yield of reducing sugars, there was no significant difference. As for the effect of temperature on the system it was observed that glucose concentration increases steadily throughout kinetic period with the increase of temperature from 100 to 250°C. With respect to the effect of pH all testing carried out independent of temperature showed a greater decrease in pH from 6.5 to 4.0, though the experiment with 250°C has pH lower than 4.0 throughout the testing time. These results suggest a direct relationship of association to higher temperatures with higher hydrolysis rate and thus greater yield of glucose equivalent reducing sugars.

Biography

Tania Forster Carneiro is a professor in Bioengineering and Biotechnology - Research Line - biological treatment of industrial waste. Graduated in Agronomy from the Federal University of Lavras (1997), Master in Plant Physiology, Federal University of Viçosa (2001), PhD in Chemical Engineering from the University of Cádiz- Spain (2005) and Post-doctorate in Food Engineering at UNICAMP (2011). Experience in Bioengineering area, Sanitation and Environment, working mainly in the following research areas: Energy Use Waste with High Load Organic; Applied Microbiology Sanitary Engineering; Supercritical Technology: Hydrolysis and Gasification.

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