

CONVERSION BYPRODUCTS OF THE SUCROENERGETIC CHAIN THROUGH METHANOGENIC PROCESS

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Currently the Brazilian ethanol production is 27.5 million m³. According to previous studies, for each liter of ethanol produced, they are generated about 55.55 L of sugar cane wash water, 10 liters of vinasse, and other byproducts. These numbers show us the importance of adequately dispose of byproducts. One way to use properly this material is for methane production. The methanogenic activity basically is consisted of four phases: hydrolysis; that is the breakdown of organic matter in smaller particle size and simple materials; at this stage, factors such as temperature and pH may affect the anaerobic process; the acidogenic bacteria are sensitive to the presence of oxygen to produce fatty acid among others. The acetogenesis is responsible for the oxidation of the product from the previous stage producing hydrogen, carbon dioxide and acetate; and methanogenic stage, which consists on converting these volatile fatty acids and ethyl methane and carbon dioxide. For these reasons, this study aimed at mitigating the effect of pH reduction on methanogenesis inhibition. Maximize methane production by pH control was aimed as well. For trials, substrate was prepared using a mixture of vinasse, with initial COD of 30 gL and pH 4.5, and wash water, with initial COD of 3 gL and pH 11.5. The purpose was to set pH values such as 7.0, 7.5 and 8.0. Treatments had four replications and over 90 days. The efficiency of methanogens was evaluated by the amount of produced methane (by chromatography gas); the amount of COD scaled by USEPA Method Reactor Digestion method (Hach Method 8000) was evaluated at the beginning and at the end of the experiment. The results showed that the COD conversion rate in grams methane (mL) is most satisfactory for treatment pH 7.5, comprising 39% and 61% of vinasse and wash water. Its initial COD was COD 10.34 gL⁻¹ and final COD of 2.14 gL⁻¹, producing 14.47 mL⁻¹ (+/- 0.245) methane during the 90 days. In this condition, it was possible to obtain 38.19 mL of methane per gram of COD per liter of substrate. Therefore, the substrate concluded it is that addition of wash water could be used for pH setting for methanogenesis, aiming at reducing the organic pollutant load and increased methane production.

Keywords: *Vinasse, Anaerobic Digestion, Methane*

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