

Title: Comparative study of methane production from different concentration of sugar cane vinasse

Authors: Iltchenko, J¹ ; Maccagnan, B¹, Leite, C.D.¹; Paesi, S¹; Beal, L, L¹;

Institution: Biotechnology Institute - University of Caxias do Sul – Brazil

Abstract:

Brazil is among the largest producer of ethanol. The production process generate 10 to 15 liters of vinasse per liter produced, being reused in fertirrigation. Because its composition it can be accumulated in the environment producing large environment impact, mainly due to high COD value. To treat the vinasse with anaerobic process to produce biogas and energy is a great opportunity and to minimize the impact from COD. Methanogenic archaea can be found in wastewater, alone or in partnership in the biotransformation of organic matter into biogas. Then, it is important to know which are the most important methanogenic archaea that are established in this process to optimize it. The main goal of this research is to compare methane productions through different concentration of vinasse, with or without addition of nutritive medium (basal medium Zinder). The biomass came from anaerobic wastewater treatment reactor from vegetable oil industry. The experiments were carried out in 61ml glass bottles at 37 °C and controlled agitation at 150 rpm and without pH control for 10 days. The following concentrations of vinasse were teste: 5 COD/L, 10 COD/L and 15 COD/L, totalizing 27.45 ml of medium (55% of headspace) and 10% of inoculum; basal medium Zinder (NH₄Cl, KH₂PO₄, MgCl₂.6H₂O, CaCl₂.2H₂O and metal traces solution), without nutritive medium. All the essays were made in duplicate and the biogas composition was analyzed in gas chromatograph. The chromatographic analysis of the tests obtained from the headspace of fermentation showed that the best methane production was at the enriched medium with 5 COD/L, at the tenth day of incubation with 48.8 +- 9.33 mol/L 10⁻⁵. These results can be to point the potentiality of mixed microbiota presents in effluents at the methane production and to contribute to optimize the biogas production from vinasse generate of the alcohol industry.

Keyword: biogas, fermentation;

Support: Petrobras, UCS.