

## **Growth of *Chlorella vulgaris* on anaerobically treated sugarcane vinasse supplemented with biogas**

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Brazil is the world leader in the production of ethanol from sugarcane (33 billions of liter yearly). On the other hand, for each liter of ethanol it is also produced 13 liters of vinasse. This is a byproduct with significant polluting impact and it cannot be straightforwardly discarded in the environment. However, vinasse can be biologically transformed into methane within anaerobic digesters. In this way, the anaerobically treated vinasse not only produces biofuel (methane) but also shows significant reduction in organic and toxic contents. The anaerobically treated vinasse (anaerobic digester effluent) contain significant amounts of inorganics (nitrogen and phosphorus) that can sustain the growth of algal biomass for lipid and biodiesel production. The objective of this work is to evaluate the growth of *Chlorella vulgaris* in crude vinasse (10 g / COD) and anaerobic treated vinasse with and without CO<sub>2</sub> supplementation from the same digesters used for vinasse treatment. The vinasse was collected at Agrovale (Agro-Industries of the São Francisco Valley) and the anaerobic sewage slurry provided by the EMBASA. The culture was maintained under light intensity (3500 lux), agitation (85rpm), aeration with atmospheric air, photoperiod 12h: 12h (light / dark) and temperature of 25 (±2) °C). Growth was monitored by assessing biomass and chlorophyll using a spectrophotometric approach. The lipid productivity was assessed using a chloroform / methanol (2: 1) extraction approach. The best lipid accumulation results were observed in the trials using anaerobically treated vinasse (261 mg/L). The results using crude vinasse showed values 122 mg/L fold smaller. It is possible that the algal mixotrophic growth in crude vinasse was responsible for reducing biomass/lipid ratios. Although the idea of redirecting biogas to stimulate algal growth showed to be a viable practice, the results of this research did not identify a significant increase in algal production with such a practice.

**Keywords:** *Chlorella vulgaris*, microalgae, vinasse, anaerobic digester, CO<sub>2</sub>, sequestration.

**Development Agency:** Universidade Federal da Bahia