

TITLE: PRODUCTION OF SCP DURING BIOLOGICAL TREATMENT OF VINASSE BY SELECTED MICROORGANISMS

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ABSTRACT:

Vinasse is an industrial by-product with a high organic content, high rates of biochemical oxygen demand (BOD 5000 mgL⁻¹) and chemical oxygen demand (COD 12,000 mgL⁻¹), besides a low pH values (pH < 3). When discarded without proper biological and/or physicochemical treatment, may cause environmental damage. This by-product is generated by bioethanol production, as well as the production of alcoholic beverages, such as cachaça (Brazil) and tequila (Mexico). Approximately 10e18 L of vinasse are generated per litre of bioethanol. Several studies have discussed the consequences of vinasse dispersal in the environment and the possible forms of treatment or reuse being tried in Colombia, Australia, China, Iran and Brazil. One of the uses of fresh (untreated) vinasse is fertirrigation, a corrective method aimed at replacing inorganic phosphorus- or potassium-based fertilizers. Single Cell Protein (SCP), in particular, appears as an economically and environmentally friendly alternative. Accordingly, the pollutant residue may be used as a by-product (substrate) for the production of animal food supplements. Moreover, this practice reduces the accumulation of vinasse and its direct disposal in water or soil through systematic and continuous fertirrigation. Considering the exposed, this study evaluated the use of vinasse as a substrate for the production of microbial biomass and its impact of disposal in the environment. After grown in vinasse, the microbial biomass (SCP) of two *Saccharomyces cerevisiae* strains, CCMA 0137 and CCMA 0188, showed high levels of essential amino acids (3.78%), varying levels of chemical elements, and low nucleic acid content (2.38%), i. e, good characteristics to food supplements. Following biological treatment, spent vinasse biochemical oxygen demand (BOD) and chemical oxygen demand (COD) decreased to 51.56 and 29.29%, respectively. Cultivation with *S. cerevisiae* significantly reduced short term phytotoxicity and toxicity on soil microbiota of spent vinasse.

Keywords: Wastewater, *Saccharomyces*, Biological treatment, Microbial biomass, Single cell protein

Development Agency: FAPEMIG, CAPES, CNPq