

Growth of *Pseudokirchneriella subcapitata* on crude and anaerobically treated sugarcane vinasse supplemented with nitrogen and phosphorus

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Biodiesel from microalgal lipid has shown to be a viable alternative to fossil fuels. Oils from microalgae have advantages over vegetable oils, such as production higher production rates (100 times more in liters / hectare / year) than the annual production of vegetable oil. On the other hand, to overcome the industrial scale production costs barrier, microalgal growth must focus on the use of low cost medium preparation. Vinasse, which is a residue from the ethanol Brazilian industry (~490 billion liters yearly), shows significant potential as an alternative for the preparation of such algal medium. The aim of this research of to test the growth of *Pseudokirchneriella subcapitata* in crude diluted vinasse (VIN) and anaerobically treated vinasse (effluent vinasse, EFV) with and without nitrogen and phosphorus supplementation. The vinasse was collected at Agrovale (Agro-Industries of the São Francisco Valley) and the anaerobic sewage slurry provided by EMBASA. The microalgae were maintained under light intensity (3500 lux), agitation (100rpm), aeration with atmospheric air, photoperiod 12h: 12h (light / dark) and constant temperature (25 ± 2 ° C). Microalgal growth was determined by biomass and chlorophyll assessments. The lipid production of microalgal biomass was determined by the chloroform / methanol (2: 1) extraction approach. The best biomass production (0.44g / L) was observed in the VIN treatment supplemented with 1450 mg/L de N and 64 mg/L of P. The highest production in the EFV treatment (0.37g / L) was observed in the non-supplemented treatments. These treatments showed the best results for lipid accumulation 9.71 and 2.96 mg / L / d (VIN supplemented and EFV, respectively). The nitrate, phosphate, and COD removal rate were above 69% in the supplemented VIN treatment. However, nutrient removal rates were above 90% for the EFV treatment. It should be noted that EFV already has a low COD when compared to VIN. This study demonstrated that *Pseudokirchneriella subcapitata* has the capacity to grow in agroindustrial residues. Nitrate and phosphate supplementation showed significant impact on treatments with crude vinasse.

Palavras-Chave: *Pseudokirchneriella subcapitata*, crude vinasse, anaerobically digested vinasse, microalgal lipids.

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