

TITLE: ECOLOGICAL SUCCESSION OF MICROALGAE IN WASTEWATER FROM FISH FARMING SUPPLEMENTED WITH CHEMICAL FERTILIZER AND VINASSE

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ABSTRACT

The study of the kinetics of microalgae growth in a laboratory environment is fundamental for understanding its role in fish farming systems, promoting an integrated production chain focused on the sustainability premises. So, this work aims to evaluate the influence of the temporal variation's scale (successional) on the community of microalgae cultivated in wastewater from fish farming, contributing to the limited knowledge about the structure and diversity of this community. Wastewater was collected from fish tanks with a bottle of Van Dorn (5 liters). To evaluate the influence of the wastewater developed in the culture of autochthonous microalgae, three treatments were delineated: (i) only wastewater; (ii) wastewater supplemented with chemical fertilizer N:P:K (20-5-20 g / L-1); (iii) wastewater supplemented with 1% sugar cane vinasse. The cultures with the treatments were kept in suspended plastic bags (1000 mL), in a non-axenic static culture system, constant aeration, room temperature and controlled photoperiod (12 h light / 12 h dark). The experiments were performed over a period of 35 days, with triplicates that were collected every seven days and the density measured in the Neubauer chamber. A constant successional period in the relative density of *Chlorella* sp., *Koliella longiseta* and *Closterium gracile* was observed in the wastewater without supplementation of chemical fertilizer or vinasse until the 35th day of experiment; the species *Monoraphidium circinale* showed a late development only on the 28th day of the experiment. In the culture with wastewater enriched with NPK fertilizer, the ecological succession to the relative density for all the sampled microalgae was marked by a peak in the relative density of up to four times on the 21st day, followed by fall for most sampled microalgae, except for *Koliella longiseta* and *Chlorella* sp. *Raphidiopsis curvata* and *Monoraphidium circinale* that were present only after the 7th day. In the cultivation in wastewater supplemented with vinasse, the succession in the relative density of microalgae was similar to the culture only in wastewater from fish farming. *Raphidiopsis curvata* and *Kirchneriella irregularis* had a late development at day 21 with a higher peak than the others and drop at day 28; *Chlorella* sp., *Koliella longiseta* and *Closterium gracile* showed a continuous successional development throughout the experiment period. In short, the cultivation of autochthonous microalgae in wastewater supplemented with chemical fertilizer NPK showed a different successional adjustment of the other treatments, marked by a late development peak only on the 21st day for all microalgae. Cultivation with only wastewater and wastewater enriched with vinasse presented a pattern marked by peaks, falls and late development throughout the successional period.

Keywords: Ecology of microalgae; Environmental biotechnology; Environmental microbiology.

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