

REDUCTION OF TOXICITY IN EFFLUENTS TREATED BY BIOREACTOR: PHYSICOCHEMICAL AND ECOTOXICOLOGICAL ANALYSES

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INTRODUCTION: The accumulation of toxic compounds in aquatic ecosystems has intensified, primarily due to the discharge of domestic and industrial effluents that either undergo inadequate treatment or are only partially treated. This highlights the limitations of conventional treatment technologies, which exhibit low efficiency in removing emerging contaminants. In this context, the adoption of new technologies, such as bioreactors, becomes necessary. Their efficiency can be assessed through ecotoxicological tests with *Ceriodaphnia silvestrii*, enabling the measurement and analysis of improvements in wastewater treatment.

OBJECTIVE: To evaluate the efficiency of a bioreactor in removing toxicants from sewage by comparing pre- and post-treatment samples using acute toxicity bioassays with *C. silvestrii*, with mobility inhibition as the parameter. **MATERIAL AND METHODS:** Samples of influent (raw) and effluent, treated by a Structured Bed Reactor with Intermittent Aeration (SBRA), were collected at the Bortolan Sewage Treatment Plant (ETE Bortolan) in Poços de Caldas, MG, on August 24, 2024. Physicochemical analyses were performed (pH, hardness, conductivity, dissolved oxygen, temperature, COD, and nitrogen compounds). For the acute toxicity bioassays in *Ceriodaphnia silvestrii*, sample concentrations of 100, 50, 25, 12.5, 6.25, and 3.125% were used. The EC50 was calculated to assess the treatment efficiency of the bioreactor. **RESULTS AND CONCLUSION:** Alkalinity decreased, and pH remained close to neutral. There was a significant reduction in COD in the treated effluent, suggesting that the bioreactor was efficient in removing a large portion of organic matter. The influent showed a high concentration of nitrogen compounds compared to the effluent sample, likely due to the action of nitrifying and denitrifying bacteria in the system. The influent exhibited lethal toxicity starting at the 6.25% concentration, resulting in an EC50 of 3.3%. When comparing the data with the treated effluent, an increase in EC50 to 12.97% was observed, indicating a reduction in the acute toxicity of the effluent due to the bioreactor treatment. Therefore, the bioassays demonstrated a significant reduction in the toxic effects of the effluent after bioreactor treatment, highlighting its efficiency in removing toxic substances.

Keywords: Biodegradation system; Bioassays; Acute toxicity; *Ceriodaphnia silvestrii*.

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