Factorial analysis of the biokinetic growth parameters and CO₂ fixation rate of Chlorella vulgaris and Botryococcus braunii in wastewater and synthetic medium

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ABSTRACT

Microalgae strains, Botryococcus braunii and Chlorella vulgaris were cultured in urban wastewater as monoalgal cultures and together in co-cultures; the same experiments were performed in synthetic growth medium to establish comparisons between both media. A fully crossed factorial design was used to design and carry out the experiment, resulting in 18 tests, and this procedure allowed the development of regression models that defined experimental factors and their interactions. Results indicated that both strains were able to grow in wastewater, but productivities in this medium were halved respective to those obtained in the synthetic medium. Specific growth rates presented higher values in wastewater than in synthetic medium. B. braunii was the most productive strain, but when both strains were grown together in co-cultures C. vulgaris dominated the reactor. The use of microalgae in wastewater treatment systems demonstrates to minimize anthropogenic environmental pollution load and to generate valuable biomass.

Keywords: Microalgae; Wastewater; Factorial design; Co-cultures; Botryococcus braunii; Chlorella vulgaris

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