Environmental Engineering and Management Journal xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
http://omicron.ch.tuiasi.ro/EEMJ/

"Gheorghe Asachi" Technical University of Iasi, Romania

INTEGRATED USE OF TWO MICROALGAL SPECIES FOR THE TREATMENT OF AQUACULTURE EFFLUENT AND BIOMASS PRODUCTION

Katya Velichkova, Ivaylo Sirakov*, Yordan Staykov

Department of Biology and Aquaculture, Agricultural Faculty, Trakia University, 6000 Stara Zagora, Bulgaria

Abstract

One of the main challenges for the development of biomass algal system production is the high operational and capital costs for these technologies. A great opportunity to overcome these challenges may however exist in the integration of wastewater treatment with algal biomass production. The algae are used for treatment of industrial wastewater, for purification of effluent originating from livestock production, while the studies concerning the use of algae species for the treatment of aquaculture effluent are very few. The aim of our research was to compare the nitrogen and phosphate removal efficiency and the growth of two microalgae species – *Scenedesmus dimorphus* and *Botryococcus braunii,* cultivated in the wastewater, originating from freshwater aquaculture production.A laboratory bioreactor was used for algae cultivation. It consisted of 500 ml Erlenmeyer flasks, containing wastewater from semi closed recirculation aquaculture system. Light regime was adjusted at 15:9 h light: dark cycle, the air was enriched with CO_2 up to 1% and the water temperature was kept between 25 and 27°C. Samples for water chemical analysis and growth measurement were taken at the beginning of the trial, at the 24th, 96th and the 168th hour after the start of the experiment. A better removal efficiency of nitrogen compound from wastewater originate from aquaculture was determined for *B. braunii* and the concentration of ammonia, nitrite, nitrate and total nitrogen decreased at the end of trial by 50%, 84.4%, 63.1% and 61.5% respectively. A better phosphate removal efficiency (77.8%) and better growth rate were found for *Sc. dimorphus* when aquaculture effluent was used as a growing media.

Key words: aquaculture, *Botryococcus braunii*, *Scenedesmus dimorphus,* wastewater treatment

Received: March, 2014; Revised final: August, 2014; Accepted: September, 2014

*Author to whom all correspondence should be addressed: e-mail: ivailo_sir@abv.bg; Phone: +359896669829