

Protozoan and metazoan communities treating a simulated petrochemical industry wastewater in a rotating disc biological reactor

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Abstract

The microfauna of adhered biofilms treating a simulated petrochemical plant wastewater was investigated in relation to the organic loading and the toxicity. Experiments in a six-compartment laboratory rotating biological reactor were performed at organic loadings of 0.99, 1.38 and 1.97 g/l.day. The concentration of organic compounds in the artificial wastewater (phenol, acetophenone and styrene), toxicity of the wastewater, number of representative types of microfauna, their biomass and species diversity were monitored along the reactor. During this study 25 species were identified and attributed to seven classes of the three types Sarcomastigophora, Ciliophora and Nematelminthes. Eight species from 18 ciliates have been reported in the literature as being commonly found inhabitants of aerobic wastewater treatment plants. An inverse relationship between the number of microfauna representatives and the organic loading was found. The presence of the most common species was related to the reactor operating conditions. A correlation between the toxicity of the wastewater measured by the Paramecium express-test and the distribution and abundance of microfauna was established. This express-test made it possible to predict the biological quality of the biofilm of activated sludge. Therefore, it is recommended as one of the control parameters to monitor systems of biological wastewater treatment.

Keywords

Acetophenone, Biotechnology of wastewater treatment, Micrometazoa, Phenol, Protozoa, Styrene, Toxicity