Environmental Engineering and Management Journal March 2019, Vol.18, No. 3, 587-595
http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu

"Gheorghe Asachi" Technical University of Iasi, Romania

APPROACHES FOR ACCELERATION OF WASTEWATER TREATMENT IN THE DAIRY INDUSTRY

Irina Schneider*, Yana Topalova

Department of General and Applied Hydrobiology, Faculty of Biology, Sofia University "St. Kliment Ohridski", 8 Dragan Tzankov Blvd., 1164 Sofia, Bulgaria

Abstract

The application of complex ecological approaches in biological wastewater treatment, assessment of its effect on the effectiveness of the process and comparison of the obtained data to the restrictions in the environmental legislation are key elements of the study. The processes in an anaerobic sequencing batch biofilm reactor, the first module from diphase anaerobic-aerobic biotechnology for dairy wastewater treatment, are investigated. The creation of highly specialized biological system by means of complex approaches based on adaptation, immobilization and bioaugmentation, as well as purposely designed process control are the eco-innovation in this study. A model wastewater with whey (a waste product from cheese manufacture when technologies for it utilization are missing) was used. The main components of whey are proteins and lactose. The dynamics of organic matter concentration (measured as chemical oxygen demand – COD), concentration of proteins and lactose were investigated during the process.

The obtained results showed that the anaerobic process with immobilized biomass was appropriate for initial decrease of organics. The most effective approach for creation of active biofilm was the combination of purposely accomplished adaptation with immobilization because it increased with 67% protein biodegradation and with 5% COD removal. In the same time, that approach accelerated COD removal process from 135 hours to 14 hours and protein hydrolysis from 135 hours to 72 hours.

Keywords: anaerobic-aerobic technology, biofilm, dairy wastewater

Received: November, 2015; Revised final: April, 2016; Accepted: April, 2016; Published in final edited form: March, 2019

*Author to whom all correspondence should be addressed: e-mail: i.schneider@abv.bg; Phone/Fax: +359 2 8167289