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STUDIES ON THE BIOLOGICAL TREATMENT OF INDUSTRIAL WASTEWATER STREAMS

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Abstract

Two experimental periods have been undertaken to investigate the biodegradability of sewage streams (mainly regarding the organic substances) produced by a gas cartridge production, filling and distribution company. A sequencing batch reactor (SBR) was used for the laboratory examinations launched with municipal sewage sludge with a concentration of approx. 3 g MLSS/L. The various conditions in the reactors followed each other cyclically (fill, anoxic, aerobic, settle, draw) three times a day. The anoxic to aerobic time ratio was ~1:3. First, an emulsion sewage stream was studied (cartridge production). The adaptation of microorganisms resulted in the increase of the organic compound removal from 0.07 gCOD/(gMLVSS*d) to 0.2 gCOD/(gMLVSS*d) parallel to increasing the hydraulic load. The other examined sewage stream was a 500 ppm activated MDEA (aMDEA – N-methyl-diethanolamine, used in gas sweetening processes). The SBR reactor was continuously loaded with sewage streams generated at the company, leaving enough time for the adaptation of microorganisms to the contaminants. In the last period, MDEA stream was also added, and then the previous sewage streams were taken away. In the last two weeks the influent was solely 500 ppm aMDEA. The removal efficiency of organic substances still remained over 95% with an effluent COD_{tot} concentration below 50 mg/L.

Oxygen uptake rate measurements were carried out with both sewage streams at the beginning of the experimental period and at the end of it (with the adapted sludge). The results obviously show the necessity of microbial adaptation in the biological treatment of special industrial sewage streams.

Key words: activated sludge, adaptation, aMDEA, emulsion sewage, oxygen uptake rate

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