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AEROBIC BIODEGRADATION OF PHENOL BY ACTIVATED SLUDGE IN A BATCH REACTOR

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Abstract

The aim of present work is to study the potential of activated sludge sampled from the wastewater treatment plant of Iasi city, Romania, for phenol biodegradation from aqueous solutions under aerobic conditions in a batch reactor. The effects of various factors involved in phenol biodegradation by activated sludge were investigated. The experimental results revealed that the biodegradation of activated sludge is highly affected by the factors mentioned above. Thus, the removal of phenol increases with increasing the pH of solution, reaching a maximum of 99 % at pH 7, for 100 mg/L initial phenol concentration and 25 °C. The ability of activated sludge to degrade phenol is optimized at 30 °C where the biodegradation reaches 100%. The exposure to low temperatures (10 °C) diminishes the activity of microbial community from the activated sludge. Although phenol concentrations up to 100 mg/L are significantly reduced, higher phenol concentrations (up 400 mg/L) are inhibitory for growth, thus reducing the removal efficiency. Functional groups present on the cell surface of activated sludge and involved in the biodegradation of phenol were identified by Fourier transform infrared (FTIR) spectroscopy.

Key words: activated sludge, biodegradation, bioreactor, kinetics, phenol

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