Effects of Combined Growth of Biogenic and Xenobiotic Substrates on Degradation of Xenobiotic by Activated Sludge

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ABSTRACT

Xenobiotics are considered as persistent and toxic compounds. Hence, it is very hard to treat them in water treatment systems. For all methods commonly used in pollutant treatment, rate of degradation of the pollutant is one important factor for the evaluation of efficiency and applicability of the treatment method. This study aims to research about supplementation of different concentrations of auxiliary substrate on the degradation rate of xenobiotic, and to determine the optimal concentrations of the auxiliary substrates that are most beneficial to the degradation rate. In this research, 2,4-Dichlorophenol acid (2,4-D) was used as the representative xenobiotic substance, while peptone and sugar were the representative of auxiliary substrates. The activated sludge was the acclimated one that had completely break down 100 mg/l of 2,4-D for three (3) consecutive times. Different sugar and peptone concentrations were fed separately or combined into the medium containing 200 mg/l of 2,4-D and 140 mg SS/l of activated sludge. Supplemental sugar concentrations consisted of 20, 40, 60, 80, 100 and 150 mg/l, while supplemental concentrations of peptone were 20, 40, 100, 150, 200, and 300 mg/l. The obtained results showed that both sugar and peptone could affect 2,4-D degradation rate to different degree at different concentrations. In separate supplementation, 2,4-D degradation completed within 25 hours, 40 mg/l sugar and 150 mg/l peptone concentration were found to be the optimal concentrations. In combined case, 2,4-D was consumed totally within 20 hours and the optimal concentration of the combined sugar and peptone concentrations were 40 and 150 mg/l, respectively.

Keywords : Activated sludge

Table of Contents

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