

Factors Affecting Biodegradation of 2-Chlorophenol by *Alcaligenes* sp. in Aerobic Reactors

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ABSTRACT: The influence of variations in carbon source concentration, cell inocula, pH, presence of other substrates, and other organisms on the biodegradation of 2-chlorophenol (2-CP) was studied for *Alcaligenes* sp. isolated from natural sources. Assays of biodegradation were performed in batch and continuous-flow fluidized-bed aerobic reactors. Evaluation of biodegradation was performed by determining total phenols, chemical oxygen demand (COD), and 2-CP by ultraviolet (UV) spectrophotometry. Measurement of microbial growth was carried out by the plate count method. Bioassays of acute toxicity were performed to evaluate detoxification by using *Daphnia magna*. Results obtained show that under batch conditions with initial inocula of 10^6 cells/mL the strain grew exponentially with 100, 200, and 300 mg/L of 2-CP within 48 hr. A lag period was observed with low cell density inocula (10^5 cells/mL). The strain showed marked delay in the biodegradation of 2-CP at pH 5. Removal of target substrate from mixtures containing other carbon sources demonstrated the possibility of concurrent growth. Mineralization of 2-CP was assessed by gas chromatography carried out at the end of the batch assays and at the exit of the continuous-flow reactor. The presence of other organisms (bacteria, rotifers, ciliate, and algae) that developed in the fluidized-bed reactor did not affect the efficacy of the biodegradation of 2-CP. The removal of 2-CP in the two assayed systems was over 97% in all cases. Toxicity was not detected at the exit of the continuous reactor. © 2001 by John Wiley & Sons, Inc. *Environ Toxicol* 16: 306–313, 2001

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