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Biochemical degradation of Methylene Blue using a continuous reactor packed with solid waste by *E. coli* and *Bacillus subtilis* isolated from wetland soil

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ABSTRACT

Effluent from textile industries contain various azo dyes. Methylene Blue is one of the most predominant one which is hazardous for the environment and has to be degraded chemically or biochemically. A pure culture of *Bacillus subtilis* and *E. coli* cells which were already acclimatized to phenol as the sole carbon source were taken for the purpose of the present work. The rate of degradation of MB for *E. coli* had increased at a much slower rate than that of *B. subtilis* over the entire degradation period. Hence, in the batch process, overall removal efficiency of Methylene Blue by *B. subtilis* is higher than that of *E. coli*. Thus, *B. subtilis* was taken for further biodegradation of Methylene Blue studies in a continuous process in a counter current packed bed reactor packed with clay chips. In addition to a packing material, the clay chips also act as a whole cell immobilizing matrix for the *Bacillus* cells. The effect of Methylene Blue flow rate and air flow rate on percentage Methylene Blue removal efficiency was observed. The optimum air flow rate and substrate flow rate for maximum removal efficiency of Methylene Blue were 2.0 lpm and 0.5 mL/min, respectively. Maximum removal efficiency under these conditions was 84.7%.

Keywords: Methylene blue; Continuous packed bed reactor; *E. coli*; *B. subtilis*; Clay chips

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