Abstract RM 15

DECOLORIZATION OF MIXTURE OF TWO TEXTILE DYE CLASSES USING *Alcaligenes faecalis* ISOLATED FROM TEXTILE WASTEWATER EFFLUENT

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Textile industry generates excessive volumes of wastewater creating various negative impacts on aquatic organisms and on the balance of ecosystems. Therefore, the present study was aimed to evaluate the effectiveness of *Alcaligenes faecalis* (MK166784), isolated from textile wastewater effluent collected from a site in Sri Lanka, for decolorization of a mixture of two dyes; CI Direct Blue 201 (direct dye) and Cibacron Blue FR (reactive dye). Exactly 5% (v/v) of equalized bacterial suspension (A590 = 0.35) was introduced into the sterile dye mixture at concentration of 50 mg L^{-1} (1:1 w/w) and incubated at 28+1 °C under static conditions. Decolorization was quantitatively determined through absorbance measurements at 578 nm. Effects of temperature, pH, carbon and nitrogen sources, and initial dye concentration on the extent of decolorization were studied by changing one parameter at a time to determine the optimal conditions required for maximum decolorization. All experiments were carried out in triplicate, while the control was maintained without addition of bacteria. Seed germination assay for *Oryza sativa* and *Vigna radiata* seeds was employed to assess the toxicity of decolorized dye solution by *A. faecalis*. The selected strain showed complete decolorization (100%) at 28±1 °C under static conditions within three days of incubation, while the control showed no decolorization. Complete decolorization was observed within two days of incubation of *A. faecalis* when the medium contained peptone or yeast. The changes in pH (7 to 9) and temperature (24 to 40 °C) did not reduce decolorization ability as more than 90% decolorization was observed within 3 days of incubation. Lower initial dye concentrations were more favorable (100% decolorization of 25 mg L^{-1} of dye within 2 days), and a descending decolorization pattern was observed with increasing initial dye concentrations. Seed germination assay confirmed (100% germination of both species) the removal of the toxic nature of dyes with the treatment by *A. faecalis*. Thus, the present study confirms that *A. faecalis* can be used to remove a mixture of both direct and reactive dyes effectively indicating its potential application in the treatment of real wastewater which is usually a mixture of various dye classes. Further studies on the dye decolorizing mechanism are being undertaken.

Keywords: Decolorization, *Alcaligenes faecalis*, textile dye, reactive dye, direct dye

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