



## Exploring bioaugmentation strategies for the decolourization of textile wastewater using a two species consortium (*Bacillus cereus* and *Bacillus pumilus*) and characterization of produced metabolites

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### ABSTRACT

Two bacterial strains, *Bacillus cereus* and *Bacillus pumilus*, were isolated from the sludge of an aerobic reactor treating textile wastewater containing indigo dye. These strains were chosen as augmented decolourizers which were mixed in various ratios with the activated sludge and the effect of their concerted metabolism on the decolourization and the biodegradation efficiencies were studied. Results showed that there was an equilibrated ratio between the bioaugmented bacteria and the other microorganisms of the activated sludge. However, the best yields were observed for the combination 33% activated sludge, 33% *Bacillus cereus* and 33% *Bacillus pumilus*, with a colour and carbon oxygen demand (COD) removal of 98% and 99% respectively, obtained after 48 h of incubation. The high performance liquid chromatography (HPLC), Proton Nuclear Magnetic Resonance (<sup>1</sup>H NMR) analysis of the produced metabolites after the biodegradation of the dye by the bioaugmented consortium showed the presence of protons on an aromatic cycle 1,2-disubstituted and possessing an axial symmetry similar to the phthalate groups.

**Keywords:** Bioaugmentation; Decolourization; Response surface methodology; HPLC; <sup>1</sup>H NMR analysis; Indigo

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