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IN-VITRO APPLICATION OF MIXED FUNGAL CONSORTIUM FOR DECOLORISATION OF AZO DYES

Ekanayake EMMS[1,2], Udayanga D[3] and Manage PM[1,2*]

[1]Centre for Water Quality and Algae Research, Department of Zoology,
University of Sri Jayewardenepura, Sri Lanka
[2]Faculty of Graduate Studies, University of Sri Jayewardenepura, Sri Lanka
[3]Department of Biosystems Technology, Faculty of Technology,
University of Sri Jayewardenepura, Sri Lanka
pathmalal@sjp.ac.lk

Abstract

Mycoremediation is an environmental friendly treatment method to remove hazardous textile dyes from textile wastewater effluents. Therefore, the present study was focused on decolorisation and detoxification of two azo dyes: CI Direct Blue 201 (DB201) and Moxillon blue GRL (MBGRL) by *Aspergillus aculeatus* and *Aspergillus nomius,* isolated from textile wastewater effluent sites in Sri Lanka. Two discs (10 mm diameter) of pre-grown fungal mycelia from each species were introduced into 100ml of mineral salt medium with 50mg l^{-1} of each dye, separately. Flasks were incubated at 28 ºC for 7 days at shaking conditions (100rpm). Percentage dye decolorisation was calculated by measuring the changes of absorbance at 570nm and 620nm for DB201 and MBGRL dyes respectively, through UV-Vis spectrophotometer. Dye decolorisation was optimized for different pH, temperature, co-substrates and shaking conditions. Bio-sorption assay was performed for both dyes using 5-day-old, live and autoclaved fungal consortia. All the experiments were carried out in triplicates while controls were maintained without the addition of fungi. Toxicity of the decolorized dye solution was evaluated by phyto-toxicity assay for *Oryza sativa* and *Vigna radiata* seeds. The consortium showed complete decolorization (100%) of MBGRL and DB201 dyes at 24 and 48h of incubation respectively, while control showed less than 2% of decolorisation for both dyes. Presence of urea or yeast in the medium and shaking at 100rpm enhances the dye decolorisation by the test fungal consortium. The autoclaved fungal biomass showed 7±1% and 6±1% of bio-sorption for MBGRL and DB201 dyes, respectively. Seed germination assay confirmed that intermediate products of dye degradation by the fungal consortium was not toxic (100% germination for both seed species) compared to the original dyes (less than 12% of germinations of *O. sativa* and *V. radiata* for both dyes). Therefore, the results of the present study provide a promising tool for the development of low-cost textile dye treatment method in future.

Keywords: decolorization, Moxillon Blue GRL, CI Direct Blue 201, fungal consortium, *Aspergillus* sp.