

(203)

Myco-Remediation of Textile Wastewater and its Re-Usability in Irrigation

Ekanayake E.M.M.S.¹, Udayanga D.², Jayawardana D.T.³, Manage P.M.^{1*}

¹Centre for Water Quality and Algae Research, Department of Zoology, University of Sri Jayewardenepura, Nugegoda, Sri Lanka

²Department of Biosystems Technology, Faculty of Technology, University of Sri Jayewardenepura, Nugegoda, Sri Lanka

³Department of Forestry and Environmental Science, University of Sri Jayewardenepura, Nugegoda, Sri Lanka
*pathmalal@sjp.ac.lk

Abstract

Environmental pollution by synthetic dye contained textile wastewater effluents disturb the human health and ecological equilibrium. Therefore, present study was focused on myco-remediation of textile wastewater effluents that generated from local textile dyeing industries. Three fungal strains; *Aspergillus niger*, *A. aculeatus* and *A. nomius* which previously isolated and identified as potential dye decolorising agents, were screened for its potential applicability on decolorisation of textile wastewater effluents. Four cylinders of each fungal isolates were introduced into 100 mL of three textile wastewater effluents obtained from Biyagama (BW), Pugoda (PW) and Negambo (NW) in Sri Lanka, without addition of further nutrients. All the experiments were carried out in triplicates and controls were maintained without addition of fungi. Samples were incubated at 28°C under shaking conditions (100 rpm). Percentage color removal was calculated by measuring the changes of the absorbance at maximum wavelength for each effluent. *A. niger* showed complete decolorisation of BW, PW and NW effluents within 48h of incubation while *A. aculeatus* and *A. nomius* taking 72 h for the same. Controls showed no decolorisation after 72 h. The treated effluents by *A. niger*, which showed rapid decolorisation of wastewater samples compared to the other two species, was used for the assessment of phytotoxicity for evaluation of the potential applicability on two commercially important edible plants (*Oryza sativa* and *Vigna radiata*) in Sri Lanka. The germination percentages of both *O. sativa* and *V. radiata* were less than 10% for all three wastewater effluents. Remarkably, 100% germination performance was observed for both *O. sativa* and *V. radiata* for the biologically treated effluents confirming the re-usability of selected wastewater effluents for the irrigation purposes. Though the biologically treated textile wastewater effluents cannot used for the drinking purposes directly without further purifications, present study confirmed the potential usability of biologically treated textile wastewater effluents on irrigation purposes.

Keyword: Decolorisation, Myco-remediation, Fungi, *Aspergillus*