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Enhanced Decolourization and Biodegradation of Textile Azo and Xanthene Dyes by Using Bacterial Isolates

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Abstract : In Sri Lanka, the largest contribution for the industrial export earnings is governed by textile and apparel industry. However, this industry generates huge quantities of effluent consists of unfixed dyes which enhance the effluent colour and toxicity thereby leading towards environmental pollution. Therefore, the effluent should properly be treated prior to the release into the environment. The biological technique has now captured much attention as an environmental-friendly and cost-competitive effluent decolourization method due to the drawbacks of physical and chemical treatment techniques. The present study has focused on identifying dye decolourizing potential of several bacterial isolates obtained from the effluent of the local textile industry. Yellow EXF, Red EXF, Blue EXF, Nova Black WNN and Nylosan-Rhodamine-EB dyes have been selected for the study to represent different chromophore groups such as Azo and Xanthene. The rates of decolorization of each dye have been investigated by employing distinct bacterial isolates. Bacterial isolate which exhibited effective dye decolorizing potential was identified as Proteus mirabilis using 16S rRNA gene sequencing analysis. The high decolorizing rates of identified bacterial strain indicate its potential applicability in the treatment of dye-containing wastewaters.

Keywords : azo, bacterial, biological, decolourization, xanthene
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