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Performance analysis of different textile effluent treatment processes involving marine diatom *Odontella aurita*

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ABSTRACT:

This study investigated the efficiency of different treatment processes in the removal of pollutants from Raw textile Effluent (RE) collected from Common Effluent Treatment Plant (CETP), Perundurai, Tamil Nadu, India. The maximum decolourization was achieved in chemical process (90% with H_2O_2), followed by physical (85% in electrocoagulation), and bacterial (84% involving *Lysinibacillus sphaericus SK 13*) treatment processes. Phycoremediation involving marine diatom *Odontella aurita* demonstrated least decolourization (65%). Physical treatment showed better reduction in turbidity (93%), bacterial treatment could significantly reduce BOD (84%) and COD (88%), while phycoremediation could effectively remove metal ions. Individual treatment process was unable to reduce effluent parameters complying with the water discharge limits. So combination of different treatment processes has been investigated for remediation of RE with higher efficiency. The integration of chemical - phycoremediation demonstrated maximum removal of colour (95%), turbidity (99%), BOD (86%) and COD (90%). Further it was estimated that the recovery of water after a treatment process (treated wastewater) was 93 % and sludge production was 0.2 g/ L, when compared to the current CETP process which recovers 85% treated wastewater and produces 1.4g/L of sludge. This combined chemical and phycoremediation processes showed greater promise when compared to the treatment methodology followed at CETP, in obtaining treated effluents that meet the discharge limits further reducing the production of sludge as secondary pollutant.

Keywords: Textile effluent, Bioremediation, Advanced Oxidation Processes, Electrocoagulation, *Lysinibacillus sphaericus SK 13, Odontella aurita*