TITLE: ISOLATION OF MICROORGANISMS WITH POTENTIAL FOR TEXTILE AZO DYES BIORREMEDIATION.

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ABSTRACT:
The water quality is an environmental challenge for the textile industry, with ~40-65L of water dispensed for every kilo of tissue produced. Azo-dyes represent 60% of the dyes consumed in the world, and their release in the environment have hazardous effects on the aquatic as well as human life. The use of Eco-friendly methods emerges as a biotechnological tool for dye remediation. This study aimed to isolate microorganisms capable to discoloring the azo-dyes: reactive red BF-4B (RR-BF-4B), reactive blue BF-5G (RB-BF-5G) and reactive yellow BF-3R (RY-BF- 3R). Soil and rot wood samples were collected from Atlantic Forest remnants, subjected to serial dilutions, seeded on solidified culture medium containing the dyes (50mg/mL) and incubated at 28°C/5 days. Microorganisms were selected on their ability to form clear zones around colonies. Dye discoloration was monitored by UV-Vis spectroscopic analysis. Bacterial discoloration was evaluated at 0 and 48 hours post-incubation (inocula of $1x10^6$ CFU/mL). The biosorption of dyes by fungi was performed by adding 5mg/mL of wet mycelium in a water/dye solution (50mg/mL) for 18 hours. Twenty-five bacteria were isolated, of which 92% were gram-negative, and 8% were gram-positive. A total of 44% of bacterial isolates were able to decolorize reactive azo dyes. Bacterial isolates F1Bac11, F2Bac29, M6Bac39 showed capacity for discoloration on dye-agar plates, which was also confirmed by UV-vis analysis. F2Bac29 and M6Bac39 isolates were capable to decolorize reactive yellow (RY-BF-3R) and reactive blue (RB-BF-5G), respectively, although at lower percentages (up to 5.26%). A total of 7 filamentous fungi were isolated, of which 3 (42.8%) showed discoloration abilities. Isolates FNG2AZ and FNG11AM showed greater discoloration (clear zones around colonies). UV-Vis analysis showed discoloration of 85.28% of reactive red dye and 50.70% of reactive yellow dye, for FNG2AZ and FNG11AM, respectively. These results showed promising isolation of microorganisms with ability to decolorize the most common azo dyes employed in textile industry. Fungal discoloration of these dyes may be an economical, eco-friendly and less sludge producing process.

Keywords: bioremediation, biodiscoloration, reactive blue, reactive red, reactive yelow.

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