TITLE: DECOLORIZATION OF MALACHITE GREEN USING BACTERIA STRAIN

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ABSTRACT:
Malachite green (MG) is a triphenylmethane dye widely used in the textile industry, aquaculture and has also been reported as toxic to living things. When discarded in effluents, they cause bioaccumulation in the local biota, in addition to preventing the transmission of light in the receiving body due to strong colorings reducing photosynthesis and causing damage to the environment. Various physical and chemical methods are used to discolor this dye. However, biological methods are economically viable in addition to being eco-friendly. Therefore, this work aimed to isolate bacteria from the environment of water with potential degradation of MG. The optimal performance condition for both bacterial growth and decolorization of MG was at 30 and 37 °C and pH 7.0–8.0, at 24 and 48 h. The strain denominated LAMBA3.8 was selected was potential degradation of MG. The highest decolorization rate was up to 85.0% when the initial MG concentration was 150 mg/L, which could be considered completely decolorized in 24 h. The number of colony forming unit (CFU) was also higher at pH 7 and 8. The laccase enzyme was measured at 1.66 U / L. The degraded dye was evaluated by UV-Vis and FTIR. The UV-Vis absorption spectrum (618 nm to 608 nm), obtained for the control and treatment showed changed the absorption intensity, indicating dye degradation. FTIR analysis revealed a significant difference between MG and discolored products. The absence of varying peaks in the 500-1,500 cm^{-1} region indicated the loss of benzene or aromatic rings. The vibration peaks at 1167 cm^{-1} and 1365 cm^{-1} were characteristic peaks of C - N and CH_2 elongation. Also, a peak at 1585 cm−1 for the C = C elongation of the benzene rings. The phytotoxicity test, the treated solution continued to present toxicity in *Vigna radiata* seed, since germination and root elongation were still sensitive to residual MG metabolites present after decolorization by LAMBA 3.8. Whereas the microtoxicity test showed that the treated solution no longer inhibited the *Enterococcus* sp isolate, sensitive to the MG dye. We concluded that the LAMBA3.8 isolate effectively degraded the MG in addition to losing toxicity after treatment, showing that it is a viable isolate for the bioremediation process.

Keyword: bioremediation, textile dye, triphenylmethane.

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