Silver Nanoparticles Formation Mechanism Using the Mangrove Fungi

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Introduction: The biological method in synthesis of silver nanoparticles (Ag NP) has been reported as alternative route, having enzymes and anthraquinones as reducing agents. Previously, we’ve showed the potential of three fungi isolated from Sao Paulo State’s (Brazil) mangrove in Ag NP synthesis. However, the mechanism of Ag NP formation still haven’t been established. Objectives: To elucidate the mechanism envolved in Ag NP formation by fungi considering the proteins and reducting compounds such as anthraquinones. Method: Three fungi were cultivated in PD at 28°C, 150 rpm for 72 h. After filtration the biomass was incubated at the same conditions with water. The Ag NP synthesis was performed dissolving 1 mM AgNO₃ into the fungal filtrate (FF) and the suspensions were kept in the dark at 25ºC. The protein portion present in the FF and adhered to Ag NP was analyzed by SDS-PAGE electrophoresis. Liquid-liquid extractions using organic solvents were performed to obtain anthraquinones from the FF. Chromatographic methods were applied for anthraquinones analysis; while fungi were taxonomically identified applying DNA sequencing. Results and Conclusions: SDS-PAGE revealed the presence of proteins in the FF and around the Ag NP with bands in the range of 75-328 kDa. The fungi coded as L-2-2, MGE-201 and R-2BI-4 were identified as B. ochreleuca, A. tubigensis and Cladosporium spp., respectively. Anthraquinones were not detected by the applied methods. Further investigations should elucidate the role of proteins and anthraquinones in the mechanism formation of Ag NP.

Word Keys: Brazilian mangrove; fungi; silver nanoparticles; characterization.
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