عنوان مقاله:

Innovation of Bacillus subtilis spore display technique to synthesis of Au nanoparticles

محل انتشار:

بیستمین کنگره بین المللی میکروب شناسی ایران (سال: 1398)

تعداد صفحات اصل مقاله: 1

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خلاصه مقاله:

Introduction and objectives: According to the wide applications of Au nanoparticles in electronic and medicine especially in biosensor technology, eco-friendly and cost-effective methods for synthesis are considered. Enzymes are one of the powerful tools in this approach. In this study, tyrosinase was displayed on the surface of Bacillus subtilis spores and the spores were used to synthesis Au nanoparticles. Materials and Methods: We used a protease deficient Bacillus subtilis DB104 as a host strain for the surface display of the tyrosinase-histidine6-tag on B. subtilis spore. We chose CotE protein as an anchoring motif because it's located in the outer coat layer and has a high abundance. We inserted tyrosinse with histidine6-tag at the C-terminal end of anchoring motif. Western blot confirmed proper expression of the fusion protein. Surface expression of the CotE- tyrosinase-His6 fusion protein was also confirmed using flow cytometry. The production of AuNPs analyzed by transmission electron microscopy and X-ray diffraction technique. Results: The results revealed that AuNPs were produced due to reducing Au3+ to Au0 by spore displayed tyrosinase. These biogenic nanoparticles showed mixed structures including spherical, triangular and hexagonal with the approximate size 2.5 to 35 nm. Furthermore, purified Bacillus megaterium tyrosinase and Streptomyces tyrosinase also produced AuNPs. Conclusion: The supposed mechanism of AuNPs synthesis by tyrosinase, is electron transferring from copper ions to Au3+. The results represent a green environmentally friendly simple method in synthesis AuNPs by spore displayed tyrosinase.

کلمات کلیدی:

Au nanopaerticles, Spore Displayed Tyrosinase, Tyrosinase