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The Hormetic Effect of of X-rays on Biosynthesis of Gold Nanoparticles by Actinobacteria.

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Background: Gold nanoparticles (GNPs) play an important role in medical, health and environmental applications. All kinds of microorganisms were found to be able to synthesize GNPs. This study assesses the enhancing effect of low-level X-rays on the biosynthesis of GNPs by Actinomycetals isolated from Angouran mine in Zanjan province in North West of Iran.

Methodology: The isolated Actinomycetes were grown aerobically in MGYB broth media. The cultures were centrifuged and the harvested bacteria were suspended in 50 mL aqueous HAuCl₄ in 12 Erlenmeyer flasks in 3 groups of 4. Two groups of samples were irradiated by 30mGy and 5mGy X-rays. The third group was considered as control without any radiation. The solutions were shake- incubated for 120 h.

Results:After 5 days, the color of first group samples were changed from milky to purple, while the color changing occurred after 10 days in the 2nd group samples and the control samples. The UV-vis absorption spectrometry of the irradiated aqueous medium by 30 mGy X-rays confirmed the formation of GNPs.

Conclusion: The findings showed that 30 mGy ionizing radiation stimulated the microorganism to form GNPs in a half time in comparison to other groups.

Country/Organization invited to participate

Iran, Islamic Republic of

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