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Antibacterial activity of green synthesized iron nanoparticles from *Plumbago zeylanica*

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Nanoparticles are widely utilized for various applications in scientific field due to their specific characteristics like size, distribution and morphology. Development of biologically inspired experimental processes for synthesis of nanoparticles is evolving into an important branch of nanotechnology. To meet the increasing demands for commercial nanoparticles new eco-friendly "green" methods of synthesis are being discovered. Iron nanoparticles synthesis using plant extract has great potential as it is environment-friendly, cost-effective, reproducible and energy saving compared to physical or chemical synthesis. The present investigation deals with iron nanoparticles synthesis from in vitro-grown *Plumbago zeylanica*. Colour of the solution changes from light brown to brick red which indicated formation of iron nanoparticles. Formation of iron nanoparticles was confirmed using UV-Vis spectroscopy. UV/Vis absorption showed a characteristic absorption peak of iron nanoparticles in the range of 250-300 nm. Further characterization of nanoparticles was done using scanning electron microscopy (SEM), and X-ray diffraction (XRD). XRD analysis illustrated their crystalline structure. The shape of synthesized nanoparticles was confirmed by using SEM. The antibacterial activity of iron nanoparticles was evaluated against two bacteria using the disk diffusion method, This indicates that synthesized iron nanoparticles are capable of bactericidal activity. This approach can be utilized for large scale synthesis of iron nanoparticles.

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