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The effect of green synthesized gold nanoparticles on rice germination and roots

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In this paper, gold nanoparticles were synthesized by means of a green approach with T. triandra leaf extracts under different conditions. No additional reducing or capping agents were employed. The gold nanoparticles were characterized using UV-visible spectrometry, transmission electron microscope, X-ray diffraction and Fourier transform infrared spectroscopy. Gold nanoparticles that had been synthesized at temperatures of 80oC were further used to treat rice (Oryza sativa L.) grains at different concentrations (0, 10, 100, 500, 1000, 2000 mg/L) for one week. While germination percentages were high (95 to 98.38 %), a slight decrease in root and shoot lengths relative to the control was observed. Phytotoxicity results indicated that the plant synthesized gold nanoparticles were of minimal toxicity to rice seedlings. Increases in cell death, hydrogen peroxide formation and lipid peroxidation in roots and shoots were noted. However, these increases were not statistically significant($p \leq 0.05$). The overall results confirmed that T. triandra synthesized gold nanoparticles are biocompartible and can be potentially used as nanocarriers in agriculture.

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