



## RESEARCH PAPER

# Impact assessment of heavy metals spiked waste water irrigation on metals accumulation and translocation in marigold (*Tagetes patula* L.)

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**Abstract :** A pot experiment was conducted to find out the impact assessment of heavy metals spiked wastewater irrigation on growth, keeping quality and productivity of marigold (*Tagetes patula* L., cv. Pusa Arpita) at Water Technology Centre of ICAR-Indian Agricultural Research Institute, New Delhi during Rabi season of 2020-21. Seven treatments were taken as T-1: Sole Groundwater Irrigation without spiking of heavy metal, T-2: Sole Wastewater Irrigation without spiking of heavy metal, T-3: Wastewater Irrigation spiked with Cd (0.005ppm), Cr (0.05ppm), Ni (0.1ppm) and Pb (2.5ppm), T-4: Wastewater Irrigation spiked with Cd (0.01ppm), Cr (0.1ppm), Ni (0.2ppm) and Pb (5.0ppm), T-5: Wastewater Irrigation spiked with Cd (0.1ppm), Cr (0.1ppm), Ni (2ppm) and Pb (10ppm), T-6: Wastewater Irrigation spiked with Cd (0.25ppm), Cr (2.5ppm), Ni (5ppm) and Pb (30ppm), T-7: Wastewater Irrigation spiked with Cd (0.5ppm), Cr (5.0ppm), Ni (10ppm) and Pb (50ppm). Results indicated that Ni, Cr, Cd and Pb concentrations in the root part ranged from 2.05 to 54.48, 13.67 to 86.35, 0.89 to 5.21 and 3.84 to 22 mg/kg, respectively and in shoot parts ranged from 9.3 to 63.05, 29.99 to 97.4, 1.8 to 6.42 and 12.38 to 29.93 mg/kg, respectively, in marigold under different treatments of heavy metals spiked wastewater irrigation. Heavy metal translocation factors (TF) ranged from 0.22 to 0.87, 0.47 to 0.88, 0.38 to 0.82 and 0.32 to 0.75 for Ni, Cr, Cd and Pb, respectively and bioaccumulation factors (BF) for heavy metals (Ni, Cr, Cd and Pb) were varied from 63.8 to 114.47, 39.76 to 72.18, 34.21 to 64.57 and 6.3 to 12.61, respectively, in marigold under different treatments of heavy metals spiked wastewater irrigation. However, long-term application of heavy metals rich wastewater in marigold needs to be monitored at different soil and climatic conditions.

**Key Words :** Accumulation, Heavy metals, Irrigation, Marigold, Translocation, Wastewater

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