



## RESEARCH PAPER

# Impact assessment of heavy metals spiked wastewater irrigation on soil health 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 soil health in marigold (*Tagetes patula* L., cv. Pusa Arpita) under irrigation with metals spiked wastewater 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 soil health in terms of pH, organic carbon, phosphorous, potassium and micronutrients (Cu, Fe, Mn, Zn) was significantly not changed where as significantly higher salinity (EC: 0.45 dS/m), nitrogen content (164.17 kg/ha) as well as significantly higher concentration of Ni (0.76 mg/kg), Cr (1.66 mg/kg), Cd (0.18 mg/kg) and Pb (2.78 mg/kg) in irrigated soils were observed in the treatment T-7 where higher concentration of metals were spiked in wastewater. The present study may be concluded as the application of metals spiked wastewater irrigation may deteriorate the soil health by build-up of heavy metals under cultivation of marigold.

**Key Words :** Heavy metals, Irrigation, Marigold, Soil health, Wastewater

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## INTRODUCTION

Water is an essential resource for the general development and growth of human society and agriculture. The agricultural sector faces critical challenges globally due to depleting natural resources and reducing productivity of input use, while increasing

industrialization, urbanization, and growing population pressure strain shrinking resources like land and water (Gurjar *et al.*, 2018). By 2050, the global agricultural sector will need to double the amount of water used to supply the world with water management. Water supply per capita in India has decreased significantly from 1,700 m<sup>3</sup> in 2009 and is projected to decline further to 1,000 m<sup>3</sup>

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