



## **The concentration and accumulation of essential elements and cadmium in sunflower, turnip and forage corn under wastewater irrigation**

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Our objective was to study the plant potential to concentrate and accumulate essential elements and cadmium from lands under wastewater irrigation. The study was performed in the fields of Varamin region located in Iran in 2005. The soil is a Shahr-e-Ray Series Typic Haplogypsis. The crops were sunflower, turnip and forage corn under wastewater irrigation. The experiment was a completely randomized block design with three replications. The sunflower, turnip and forage corn were sampled in 2005 and separated into roots, above ground materials and grains. The three crops were analyzed for nitrogen (N), phosphorus (P), potassium (K), nitrate (NO<sub>3</sub>), Iron (Fe), Manganese (Mn), Zinc (Zn), copper (Cu), cadmium (Cd). The results of experiment showed that the most concentration of nitrogen (N), phosphorus (P), Zinc (Zn), copper (Cu) and cadmium (Cd) were 11%, 1.8%, 212.7 ppm, 71.3 ppm and 1.48 ppm in sunflower respectively, and the most accumulation of nitrogen (N), phosphorus (P), Zinc (Zn) and copper (Cu) were in grain and cadmium in leaf. The most concentration of potassium (K) and nitrate (NO<sub>3</sub>) were 11.4% and 13.8 % in turnip respectively, and the most accumulation of potassium (K) and nitrate (NO<sub>3</sub>) were in leaf. Finally, the most concentration of Iron (Fe) and Manganese (Mn) were 1802 ppm and 248.6 ppm in forage corn respectively, and the most accumulation of Iron (Fe) and Manganese (Mn) were in root and leaf respectively. Based on the results of this experiment, in lands under wastewater irrigation with an excessive content of essential elements and cadmium sunflower can be used for uptaking excessive content of nitrogen (N), phosphorus (P), Zinc (Zn), copper (Cu) and cadmium (Cd), turnip for uptaking excessive content of potassium (K) and nitrate (NO<sub>3</sub>) and forage corn for uptaking excessive content of Iron (Fe) and Manganese (Mn) without any yield decrease.

**Keywords:** Municipal wastewater, Soil remediation, Sunflower, Forage Corn, Turnip

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