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Using Wild Plant Species Grown in Wadi Al – Tib Region North East of Al – Ammara, Iraq, as Indicators of Heavy Metals Accumulation

Israa Amer Al-Gizzi* ***Suhad Al-Knaany*** ***Raghad Khalaf***

Department of Ecology, College of Science, University of Basrah, Basrah, Iraq.
*Corresponding author: israa.ayed@uobasrah.edu.iq
E-mail addresses: Suhad.taha@uobasrah.edu.iq , Raghad.khalaf@uobasrah.edu.iq

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Abstract:

The current study included, studying the ability of eight genera of plants belong to Brassicaceae family, *Brassica tournifortii*, *Cakile Arabica*, *Capsella bursa – pastoris*,*Carrichtera annua*, *Diplotaxis acris*, *Diplotaxis haru* , *Eruca sativa* and *Erucaria hispanica* to accumulate ten heavy metals Cadmium, Chromium , Copper, Mercury, Manganese ,Nickel ,Lead ,and Zinc . Plant leaves samples were collected from Al-Tib area during spring of 2021.The data demonstrated that, the highest conc. of Cd was 2.7 mg/kg in *Diplotaxis acris* leaves and lower value was 0.3 mg/kg in *Cakile Arabica* leaves. For Co, the highest conc.was 1.3 mg/kg in *Capsella bursa – pastoris* leaves, whereas the lower value was 0.5 mg/kg in *Cakile arabica* leaves. As for Cr element, the highest Conc. was 14.7 mg/kg in *Capsella bursa – pastoris* leaves, and the lower value was 2.7 mg/kg in *Diplotaxis acris* leaves. The highest conc. of Cu was 100.8 mg/kg in *Capsella bursa – pastoris* leaves, whereas the lower value was 8.8 mg/kg in *Cakile arabica* leaves. For Hg element the highest Conc. was 1496.2 mg/kg in *Brassica tournifortii* leaves, and the lower value was 3.1 mg/kg in *Erucaria hispanica* leaves. *Eruca sativa* record the highest Conc. value 95.2 mg/kg for Mn element, whereas the lower value was 28.8 mg/kg in *Diplotaxis acris* leaves. The highest conc. of Pb was 26.4 mg/kg in *Capsella bursa – pastoris* leaves, and the lower conc. was 1.5 mg/kg in *Cakile Arabica* leaves, Whereas the highest Conc. of Ni was 24.2 mg/kg in *Capsella bursa – pastoris* leaves and the lower conc. was 6.1 mg/kg in *Cakile Arabica* leaves. According to these results, *Brassica tournifortii* was more capable of accumulating heavy metals, while *Erucaria hispanica* was the least compared to the rest plants.

Keywords: Accumulation, Heavy metals, Plant leaves, Pollution, Wild plants.

Introduction:

Heavy metals discharged into the environment as a result of human activities can cause significant pollution[1]. With increase urbanization, increment, and mining activities, electroplating, energy and fuel output, power transmission, intensive farming, sludge dumping, and other factors, excessive metal contamination in the environment could become a global problem, with a variety of short- and long-term consequences for the environment[2, 3]. Heavy metals such as Aluminum (Al), Arsenic (As), Cadmium (Cd), Cobalt (Co), Chromium (Cr), Copper (Cu), Iron (Fe), Mercury (Hg), Manganese (Mn), Nickel (Ni), Lead (Pb), and Zinc (Zn), which are highly toxic to the environment and can be transferred and bio-accumulated along the food chain[4,5]. Any metal with a specific gravity of more than 5 (g/cm3)[2]. Fig. 1. depicts the pathway of heavy metal-induced toxicity in plants[4]. Plants are stationary in a terrestrial environment, and their roots are the primary contact sites for trace metal ions. Plant roots are the principal contact site for heavy metal ions, and plants absorb heavy metals predominantly through roots and also through leaf surfaces as a result of this interaction and the deposition of particles containing these metals [6].

Plants play an important role in ecosystems because they transmit elements from the abiotic to the biotic environment, they purify the air from various pollutants[7]. The use of plant leaves as bio-monitors of heavy metal pollution is extremely beneficial to the environment [8].