Toxic Contamination, Distribution Of Trace Metals Elements In Some Crops And Land Along The ALGhatara River For Al-Shafieiah District, Al-Diwaniyah Governorate

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Abstract

Plants are important toxicity markers as well as important foods for both humans and animals, so this analysis aimed to identify trace element contaminants in some of the ALGhatara River water, and the soil and plant life in the district of Al-Shafieiah on both sides of the river. There was nickel in the soil, and the nickel concentration was 3.46 mg/L, so the concentration of nickel in irrigation water was 315 mg/L. switch to a higher value of 105 As compared The World Health Organisation (WHO) was called into being as a result. criteria, the degree of quality of some elements in the surface layer of soil surpassed the WHO's guidelines, although at the same time, the concentration rate of most of the elements in the soil's surface layer was higher in the majority of botanical Sample, The limit is 1.057, 1. 374 ,1. 765 ,1. 594 mg/kg for both Parsley, Onions, Barley and Alfalfa , respectively, so increased consumption of these contaminated plants before society may cause health problems in the future.

Keywords: ALGhatara River, Crop farm, Trace element, Emissions, Trace element.

1. Introduction

Trace elements are dangerous environmental pollutants and are dangerous in the bodies of living organisms (3), the human and animal are contained for a certain percentage of these elements that may get part of them in plants through the food chain (3;8), therefore, These elements in Plants have a high concentration beyond the allowable limits which puts their lives on consumer at risk (4;9;7), this increase in concentrations is the result of the growth of the plant in contaminated soil supplicated by these elements due to geological weathering factors of the soil or as a result of the excessive use of chemical fertilizers and agricultural pesticides, most often as a result of contaminated water irrigation, plant and plant in addition to sewage residues(3; 8), currently there are more than 20 million hectares of agricultural land in North and South Africa, South Africa and large areas of Asia that use untreated wastewater for irrigation purposes due to the lack of water available for this purpose (8). Research and studies conducted on irrigated vegetable farms with contaminated water have
shown that these vegetables contain high concentrations of trace elements that make them unfit for consumption\(^{10; 11; 13}\).

ALGhatara River trace metals contamination is the key subject of the current study, so the purpose of the research is to investigate The trace metal concentration of ALGhatara River waters, the soil and plants irrigated by the river.

2. Materials and techniques of work

2.1. The research field:

The study was conducted in ALGhatara River district of the agricultural land that lies on both sides of the river, and this area has been split into four locations with similar distances between them to promote the method of taking Sample.

To begin with, sampling

Samples were taken from the water in the herd, as well as the soil and crops in the study field, to provide the following series of sample:

1- Three water sample Sample were allocated to each of the four stations and water samples were obtained from each station at the rate of three samples per station.
2- Samples were taken of the plants that were grown in the field, such as Parsley, Onions, Barley, and Alfalfa, of the plants described.
3- Samples were taken from the soil from which the previous plants' Sample were collected, and in various places and at different depths, additional A samples have been collected from 5 to 31 cm of depth and even samples from 31 to 65 cm of depth have been used..

2.2. Laboratory testing:

Measures for determining the concentration of trace elements by means of an atomic absorption system based on the number of Sample by source\(^7\) as follows:

1- A river water model was purified from the suspended materials and then condensed to allow the reading of the unit, which takes into account the mitigating aspect as follows:
   - Analyze the unit to obtain the dilution coefficient
   - To set the model weight in ppm, you need to concentrate on ppm.
2- This chemical digestion process was conducted for both soil and plant Sample, with the procedure detailed in and performed as follows:

Plant digestion treatment:

- Initially, the plant is washed to remove the contaminants trapped in it and then dry well.
- The plant model is cut into small parts and weighs 2 grams.
- Add 40 ml of nitric acid (3 HNO) and then cover and leave for a night of soaking.
- Heat the form until the smoke emerges and then leave to cool.
- Add 3 ml per chloric acid (4HClO) and heat to dry again.
- Leave the remaining water to cool, then add 2 ml (HCl) to add 2-3 ml of distilled water and heat until the remaining water is melted.
- Cool the model and filter and complete a leak of up to 50 ml of distilled water after the model is ready to be read with the atomic adsorption unit.

**Treatment of soil for digestion:**

- The soil Sample dry well and then sift with a 2 mm sieve.
- The 0 is weighed. A total of 25 g of soil.
- Apply 4 ml (3 HNO) of nitric acid to the model.
- Apply 1 ml of chloric acid (4 HCLO) to the model.
- Heat the solution at 105°C for 2-3 hours before white fumes emerge, then heat up to 185°C until the solution is dry.
- Leave the remaining mixture to cool, then add 2 ml of hydrochloric acid (HCl) with a standard of 5 and then heat to 60°C for an hour.
- Cool the mixture and add 8 ml of distilled water to it and leave it for 4 hours after spraying, complete 5 to 50 ml of distilled water and be ready to read with the unit.

**3. Results and Discussion**

The results of the concentrations of trace elements in river water Sample are illustrated in water sampling (Table 1) as it is reported that the concentration of trace elements in river water did not meet the limits of cadmium set by the World Health Organization (4; 7; 9) if the rate of Zn in the-growth is zero. 0215 mg/L, meeting the limit of 0. 01 mg/l, but within the 1968 Iraqi specification, this concentration is acceptable (Figure 1), which shows the effects of trace elements on river water. Cadmium is one of the toxic elements that is commonly found in dye, plastic, rubber, electrical panels and battery factories[16] and the increase in this element in the river water is due to contamination of the remnants of the plant and the waste of factories near the river, and this indicates the danger of using the water of ALGhatara Riverr for irrigation purposes.
Nevertheless, in Soil sampling (Table 2), the laboratory findings of trace elements in soil growth suggest a marked increase in the concentration of nickel above the WHO limit of 50 mg/kg, the highest concentration of this element in both metallurgical soil and onion soil was 116. When I multiplied the numbers 6 and 116, I got a final product of 108. and 9th, 98th Of these three drugs, In barley and alfalfa were given at a dosage of 9 mg/kg, barley and alfalfa were administered at a dosage of 9 mg/kg (Figure, 2).

Nickel is one of the elements that enters the agricultural and chemical period of the chemical(3; 8) and is naturally present in the soil as a d of its natural components with worms and concentrations not exceeding 50 mg/kg, but the significant increase in the concentration of this element in the results of the research could be attributable to the use of pesticides and chemical fertilizers or as a consequence of the investigation.

It is also noted that the concentration of trace elements in the soil at a depth of 5-31cm above its depth of 31-65 cm suggests the presence of trace elements in the soil layers and indicates that the soil surface is more susceptible to contamination than other layers Botanical Experiment.

As a follow-up, in another part of the same experiment, the laboratory findings of the Laser g trace elements in plant Sample showed that, for the most part, lead elements in plant Sample had substantially risen over the allowable limit of 0 regulators. 3 mg/kg is the highest concentration present in metallurgical plants, which contain the highest concentration of the active constituent in metallurgical plants. 85 mg of methyl methane sulfonate per kilograms of body weight in the onion plant In vegetarian barley and alfalfa, 8 mg/kg was equal to 1 mg/kg. 375, which means 375 by 100, or 375 by the decimals of 100 1. Not only has funding for government work in the fields of health and health been vital for providing services for the general public, but the country's health-care support and health-help-health support networks depend heavily on government funding (12, 16).

This increase is the result of the growth of these plants in soil contaminated with this element, knowing that their concentration in soil did not exceed the permissible limit, which shows the high sensitivity of the plant to this element, even if there are a few concentrations, and this indicates the danger of planting plants in soil contaminated with this element.

Lead is one of the harmful elements that is transferred from the plant to the user body via the food chain, and the severity is cumulative as it induces mental retardation and deficits in vital functions (5; 10; 15)., So the Lead element is found in most battery, dyeing, and oil residue waste, which is discarded at random in most of the world.(16).
Table (1) contains data about the concentration of trace elements in the selected Station of the ALGhatara River (milligram's per litre)

| Stations       | Cd     | Mn     | Ni     | Pb     | Zn     | Cu     |
|----------------|--------|--------|--------|--------|--------|--------|
| Station No (1) | 0.0180 | 0.0930 | ----   | ----   | 0.0038 | ----   |
| Station No (2) | 0.0350 | 0.0840 | ----   | ----   | 0.0035 | ----   |
| Station No (3) | 0.0110 | 0.0910 | ----   | ----   | 0.0035 | ----   |
| Station No (4) | 0.0330 | 0.0650 | ----   | ----   | 0.0016 | ----   |
| Concentration  | 0.0315 | 0.0830 | ----   | ----   | 0.0033 | ----   |

Tables (2) explore the formation of toxic Metals substances in crop soil

| Cd  | Mn     | Ni     | Pb     | Zn     | Cu     | Depth cm | TYPE SOIL      |
|-----|--------|--------|--------|--------|--------|----------|---------------|
| 0.159 | 395.1  | 131.3  | 18.3   | 65.3   | 13.2   | 31 - 5   | Soil of the Parsley plant |
| 0.090 | 390.3  | 113.4  | 19.4   | 61.3   | 9.5    | 65 -31   | Soil Onion plant |
| 0.113 | 393.5  | 116.6  | 18.5   | 63.3   | 10.5   | Rate     | Soil Barley plant |
| 0.101 | 359.3  | 116.3  | 11.1   | 38.5   | 10.4   | 31 - 5   | Soil of Alfalfa plant |
| 0.065 | 356.5  | 116.1  | 9.5    | 51.3   | 10.2   | 65 -31   |                |
| 0.161 | 353.7  | 116.5  | 10.3   | 39.8   | 10.3   | Rate     |                |
| 0.036 | 389.5  | 109.8  | 7.5    | 55.1   | 9.5    | 31 - 5   |                |
| 0.035 | 390.1  | 107.9  | 7.35   | 55.5   | 8.5    | 65 -31   |                |
| 0.030 | 385.01 | 108.8  | 7.5    | 55.3   | 9.01   | Rate     |                |
| 0.077 | 359.8  | 100.5  | 6.9    | 55.1   | 8.5    | 31 - 5   |                |
| 0.132 | 350.3  | 97.3   | 5.3    | 56.3   | 6.3    | 65 -31   |                |
| 0.081 | 350.2  | 98.9   | 5.6    | 50.1   | 7.5    | Rate     |                |

Table (3) Trace element concentrations (mg/L) of a plant near the ALGhatara River

| Cd     | Mn     | Ni    | Pb    | Zn     | Cu     | Plant type       |
|--------|--------|-------|-------|--------|--------|------------------|
| ----   | 46.710 | 4.842 | 1.802 | 36.082 | 0.7410 | Parsley plant    |
| ----   | 39.721 | 4.231 | 1.831 | 18.011 | 0.9012 | Onion plan       |
| ----   | 33.432 | 3.402 | 1.310 | 19.031 | 0.4410 | Barley plant     |
| ----   | 34.845 | 3.823 | 1.022 | 30.132 | 0.04911 | Alfalfa plant    |
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