NOVATEUR PUBLICATIONS
JournalNX- A Multidisciplinary Peer Reviewed Journal
ISSN No: 2581 - 4230
VOLUME 8, ISSUE 4, Apr. -2022

RELATIONSHIP BETWEEN T. OFFICINALE AND T. KOK-SAGHYZ TYPES WITH EDAFIC FACTORS IN DIFFERENT SOIL SAMPLES

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ANNOTATION:

This article describes the toxic effects of heavy metals in the soil, which are considered the most dangerous among environmental pollutants, for living organisms. To determine the amount of chemicals in the soil Taraxacum kok-saghyz Rodin and Taraxacum officinale Wigg plants from the Botanical Garden, around the nitrogen plant in Chirchik, the ring road of Yunusabad district of Tashkent and the Chirchik river in Gazalkent 0-30 cm samples were taken and quantitative aspects of toxic elements were analyzed in an inductively coupled plasma mass spectrometer of the amount of heavy chemicals in the soil. According to the results of the analysis, soil samples were contaminated with heavy metals such as Pb, Cd, Ni, Cr, Zn, Co, Cu, Ag. Planting and germination rates of T. officinale and T. kok-saghyz species were described in the same soil samples.

Keywords: heavy metals, Taraxacum officinale Wigg and Taraxacum kok-saghyz Rodin plant, heavy metals, seeds, germination index.

INTRODUCTION:

Heavy metals play a major role in the metabolism of nature, but their excess leads to the deterioration of the quality of soil, raw materials used in agriculture and pharmaceuticals, resulting in direct poisoning of all living organisms, disruption of ecosystem stability and the emergence of carcinogens in the human body. Therefore, in the pharmacopoeias of developed countries such as the USA, England, Germany, France, their strict norms are set.

In addition, heavy metals are absorbed very slowly and in small amounts in the soil, they are stored for a long time. For example, zinc is stored in soil for 70 to 510 years, cadmium for 13 to 1,100 years, copper for 310 to 1,500 years and lead for 740 to 5,900 years. [1]

In the literature, the reproductive features of the growth of T. officinale in areas contaminated with various harmful toxins from the ferrous and non-ferrous metallurgy and chemical industries have been studied. Seasonal dynamics of plants in different affected areas were studied. It has been studied that the viability and seed yield of T. officinale are much higher in such areas, but not at the same level every year [2].

T. officinale allows the detection of mutagenic changes that may occur under the influence of heavy metals and recycled products that pollute the environment. The seeds of T. officinale can be used to determine the mutagenic effects of toxins emitted from industrial plants on the environment. Because this species is perennial, it is exposed to contaminants for a long time [3,4,5].

After analyzing the toxic elements in the soils from natural conditions [7] and then determining the chemical elements in the soils from different areas where the above-mentioned plants were grown, T. officinale and T. kok-saghyz were planted in the same soil samples, the exit process was studied.

OBJECT AND METHODS OF RESEARCH:

Taraxacum kok-saghyz Rodin and Taraxacum officinale Wigg plants from the Botanical Garden, Chirchik Nitrogen Plant, Tashkent Yunusabad District Ring Road and Gazalkent Chirchik River Analysis. Samples were taken from depths of 0-30 cm. Determination of the amount of elements in various soil samples using the method of inductively coupled plasma mass spectrometry (Perkin Elmer) was carried out at the Institute of Bioorganic Chemistry of the Academy of Sciences of the Republic of Uzbekistan. Seed germination of plants in different soil samples was performed under laboratory conditions by M.K.Firsova Using the method of [6], the research was conducted in the laboratory of the Department of "Ecology and Botany", Tashkent State Agrarian University.

The results obtained and their analysis:

Using inductively coupled plasma mass spectrometry (Perkin Elmer), soil samples were taken from different regions to determine and analyze the amount of chemical elements in different soil samples during plant growth. When preparing soil samples for analysis, a precisely weighed sample of 0.1000 g (100 mg) is quantified in Teflon-treated autoclaves. Place 6 ml of purified and concentrated nitric acid (HNO_3) and 2 ml of purified hydrogen peroxide (H_2O_2). The autoclave mouth was closed and a microwave grinder Berghof (Speed Wave Xpert or similar type of oven) was placed. In this case, the mass inside the device is given to disintegration according to a certain method. The temperature and pressure inside the autoclaves specified in this method are automatically controlled by the device itself. Process information is displayed on a liquid crystal display. In this case, decomposition is carried out in wet conditions for 35-45 min under conditions where the minimum temperature inside the autoclaves is T (50^0C) and the maximum temperature is T (230^0C), R [bar] max 40 [bar].

The autoclaves are cooled to room temperature and the liquid mixture inside is transferred to a volumetric flask (linear) with a volume of 50 or 100 ml. The autoclaves are rinsed 2-3 times and then filled with bidistilled water up to the tube line. The solution is thoroughly mixed, poured into a test tube for autosamples and placed on autosamples.

Quantitative analysis of macro- and micronutrients in the samples is performed on an inductively coupled plasma mass spectrometer (or similar analogue) of the mineralization solution Perkin Elmer's ISP-MS (Nexion 2000). During the detection process, the mass and dilution values of the sample are entered, and the instrument itself recalculates the results obtained and calculates the accuracy level (RSD) values. Upon receipt of the data, the actual quantitative content of the substance in the test sample is automatically calculated and converted to mg / kg or µg / g with an rsd error limit in %.

According to the results obtained, soil samples taken from different places were found to be contaminated with heavy metals such as Pb, Cd, Ni, Cr, Zn, Co, Cu, Ag. It is known that heavy metals include chemical elements with a density of 5 g / cm^3. The statistical data presented in the tables were calculated in µg / g with an error limit based on the Perkin Elmer method (Table -1).

The amount of very dangerous elements of heavy metals in the soil (μg / g):

(calculated in μg / g with error limit)

Table 1

Type 1 very dangerous elements (μg /g)	The city of Chirchik is surrounded by a nitrogen plant	Botanical Garden	Yunusabad ring road	The city of Gazalkent is around the Chirchik River
Cd	131.84 ±0,83	0.815±0,02	0.142±0,01	70.343±0,09
As	800.75±0,91	72.74±0,17	5.56±0,09	284.92±0,29
Pb	1091.75±0,99	73.60±0,18	12.60±0,11	6814.56±0,99
Se	246.48±0,67	2.49±0,19	0.59±0,06	424.33±0,47
Zn	3805.02±0,48	246.85±0,76	31.19±0,07	3109.14±0,98
Ni	212.59±0,51	139.49±0,59	13.69±0,05	914.76±0,47

The amount of highly hazardous elements listed in Table 1 is REM Cd^{111} - 1 μg / g, Cd^{111}-131.84 μg / g 131 times, REM As^{75}-10 μg / g, As^{75}-800.75 μg / g 80 times, REM Zn^{66}-23 μg / g, Zn^{66}-3805.02 μg / g 165 times in the soil around the Uzbekkimmash plant in Chirchik, REM Pb^{208}-30 mkg / g, Pb^{208}-1091.75 μg / g 36 times, REM Se^{82} -2.2 μg / g, Se^{82} -246.48 μg / g 112 times, REM Ni^{60}-4 μg / g, Ni^{60}-212.59 μg / g 53 times in large quantities. The city of Gazalkent was identified in soil samples around the Chirchik River, while other areas were found to have higher levels of heavy metals in the soil.

After the detection of heavy metals in the above soil samples, two types of plants were added to the soil samples at 18° C in 8 glasses from the Botanical Garden, around the Uzbekkimmash plant in Chirchik, the ring road of Yunusabad district of Tashkent and the Chirchik river in Gazalkent. 15 seeds were sown on February 5, 2021 and 10.02.21. The seeds sown on the day sprouted (Table 2, Fig. 2).

Table 2 Seed germination in laboratory conditions of T. officinale and T. kok-saghyz plants in different soil samples

№	Soil samples	T.officinale (% account)	T.kok-saghyz (% account)
1	Tashkent Botanical Garden	100	73
2	The city of Chirchik is around the Uzbekkimmash plant	86	46
3	The city of Gazalkent is around the Chirchik River	73	80
4	Yunusabad ring road	33	40

According to the table above, T.officinale sprouted 100% in the soil of the Tashkent Botanical Garden, while T.kok-saghyz sprouted 73%. Introduced T.kok-saghyz germinates 73% in local soil is also a good result. In the soil sample taken from the Uzbekkimmash plant in Chirchik, the seed yield in T.officinale was 86% and the fertility of T.kok-saghyz seed was 46%. T. kok-saghyz seeds in soil samples taken around the Chirchik River in Gazalkent T.kok-saghyz accounted for 80% and T.officinale 73% in the soil around the Yunusabad ring road T.officinale seeds accounted for 33%, T.kok-saghyz and seed germination was 40%. The results showed that T.officinale species had higher seed germination than T.kok-saghyz species.

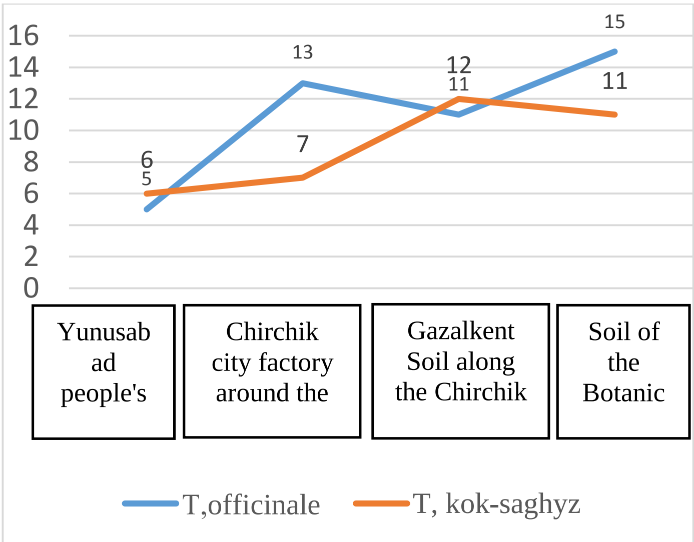

Figure 2. Diagram of seed germination in laboratory conditions of T.officinale and T.kok-saghyz plants in different soil samples

In the diagram shown in Figure 2, the germination of plant seeds when T.officinale and T.kok-saghyz are planted in soil samples taken from different places is located in the vicinity of the Chirchik River in Gazalkent. We can see that the germination of seeds of T.officinale planted in soil samples taken from the Tashkent Botanical Garden and the

Uzbekimmash plant in Chirchik is higher than that of T.kok-saghyz. It was observed that the germination of seeds of plant species planted in the soil of Yunusabad ring road is low.

CONCLUSION:

At the end of the study, T. officinale and T. kok-saghyz from the Tashkent Botanical Garden, around the Uzbekkimmash plant in Chirchik, were used to determine the amount of chemicals in the soil. In order to analyze the soil composition of plants grown from the ring road of Yunusabad district of Tashkent and Chirchik river in Gazalkent, samples of heavy metals Cd-131 times, As-80 times, Zn-165 times, Pb-36 times, Se-112 times, Ni- 53 times more than REM.The soil fertility of the Tashkent Botanical Garden and the Chirchik River in Gazalkent was high when the seeds of plant species were planted and germinated in soil samples from different regions.

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