THE NEED TO REDUCE THE NEGATIVE IMPACT OF HEAVY METALS IN PRESERVING ECOLOGY AND BIODIVERSITY

[a]Abdulboqiyeva Hilola Olimjon qizi
[a]Farg‘ona davlat universiteti “Zoologiya va umumiy biologiya”
kafedrasi 3-bosqich tayanch doktoranti

Abstract *The preservation of biodiversity is currently considered one of the most important issues. Biodiversity is of great importance not only for the plant world but also for the animal world. The flora and fauna of the environment are inextricably linked, and the complete extinction of one species can lead to the disappearance of another. A number of factors contribute negatively to their extinction. Among them, the degree of danger posed by heavy metals should be especially emphasized.*
Keywords*: heavy metals, plants, animals, bioremediation, physical methods, chemical methods.*

Biodiversity refers to all living organisms on the Earth, their genetic diversity, and the variety of species that significantly differ from each other. The conservation of biodiversity is one of the urgent problems today, which has reached the level of state policy. The strategy for the "Conservation of Biodiversity in the Republic of Uzbekistan" for the period of 2019-2028 has been developed. Within the framework of this strategy, several national and local programs and plans related to biodiversity conservation have been implemented. Around 40 international scientific projects on this issue have been approved. In this regard, processes such as slowing down desertification, working with resource-efficient technologies, eco-tourism, and international trade in flora and fauna have been carried out.

Heavy metals are environmental pollutants that are hazardous to plants and animals. Pollution of ecosystems by heavy metals can lead to a number of negative changes. Over time, species diversity decreases in areas contaminated with heavy metals. Their life activity may cease entirely, or species migration may occur. Once heavy metals enter the environment, they accumulate in the soil. Initially, they affect the root part of plants, then move to the above-ground parts. Following this, they spread to other organs and tissues of the plant organism[2]. One of the most important functions of the plant root system is the absorption of mineral elements from the soil and ensuring their sufficient amount for all vital processes. The growth, development, and productivity of plants depend significantly on the condition of the ion transport systems of root cells. Heavy metals enter the organism through various routes, including drinking water, air, food, or sometimes through the skin[3]. The heavy metals that enter the organism accumulate and store within it. The bioaccumulation of toxic metals leads to various toxic effects in different tissues and organs of the organism. Metal toxicity can be acute or chronic. Heavy metals disrupt cellular processes, including growth, reproduction, regeneration, and apoptosis (cell death). Toxic metals can also lead to epigenetic changes, altering genetic processes within the cell. Some toxic metals, such as Cr, Cd, and As, disrupt genetic stability. These metals lead to

oxidative stress and DNA damage. As a result, cell metamorphosis occurs, which may lead to changes in species composition or complete extinction. Below is a detailed discussion of some sources of heavy metal pollution.

Mercury is very rare in the Earth's crust (0.1 x 10^-4%). Despite its rarity, it is easy to extract because it is accumulated in sulfide residues, such as cinnabar (HgS)[5]. In this form, mercury is relatively harmless, but atmospheric processes, volcanic activity, and human activity lead to a total of 50 million tons of mercury in the world’s oceans. Due to erosion, natural mercury deposits flow into the ocean at a rate of 5000 tons per year. Currently, mercury production exceeds 10,000 tons annually, most of which is used in chlorine production. Mercury enters the air from the burning of fossil fuels. Mercury and its compounds are hazardous to life. Methyl mercury is particularly dangerous for animals and humans because it quickly crosses from the blood to brain tissues. Clinical signs of methyl mercury poisoning include insomnia, loss of spatial orientation, and loss of vision. Mercury poisoning symptoms do not appear immediately. Reducing mercury pollution can be achieved by banning the production and use of certain products. Undoubtedly, mercury pollution remains an ongoing issue. However, the risk of mercury poisoning can be reduced by imposing strict controls on industrial waste containing mercury and food products.

Lead: Organic compounds of lead are more toxic than inorganic compounds. The primary source of lead entering the human body is food, and the air that we breathe also plays an important role. In children, lead dust and paint are also ingested. About 30-35% of inhaled dust is retained in the lungs, and the majority of it is absorbed into the bloodstream[1]. Absorption in the gastrointestinal tract is typically 5-10%, but in children, it reaches 50%. A deficiency in calcium and vitamin D enhances lead absorption. Severe lead poisoning is rare, but symptoms include excessive salivation, vomiting, abdominal pain, acute kidney failure, and brain damage. In severe cases, death can occur within a few days. Early symptoms of lead poisoning include increased irritability, depression, and nervousness. In cases of poisoning by organic lead compounds, an increase in blood lead levels is detected.

Due to global lead pollution, it has become a constituent of all food and nutrients everywhere. Plant foods usually contain more lead than animal-based foods.

Cadmium, zinc, and copper are the most important metals studied in pollution because they are widely distributed and toxic. Cadmium and zinc (as well as lead and mercury) are mainly found in sulfide sediments. These elements easily enter the oceans as a result of atmospheric processes[4]. In soils, they account for about 4.5 x 10^-4%. Plants contain varying amounts of these elements. Zinc is found in relatively high amounts in the ashes of plants, and it plays an important role in plant nutrition. About 1 million kg of cadmium enters the atmosphere annually. This amount accounts for approximately 45% of the total pollution of this element. About 52% of pollution comes from the burning or processing of cadmium-containing products. Cadmium readily engages in chemical reactions, which allows it to easily enter the atmosphere. The sources of zinc pollution in the atmosphere are similar to those of cadmium.

Heavy metals are being addressed in ecology through various methods to prevent environmental damage. One of these methods is the greening of roadsides using plants. Heavy metals are present in the organic substances emitted by cars in considerable amounts. Plants that strongly absorb heavy metals include conifers. Juniper, pine, and oak are considered indicators of pollution levels in a given area. These plants contain negatively charged organic substances that have a significant effect on the ionization of the air. These ions are essential for the human body and perform a protective function.

REFERENCES

1. Resolution of the Cabinet of Ministers of the Republic of Uzbekistan, June 11, 2019, No. 484.

2. B. Umarov. The Role of Plants in Capturing Dust from the Air. *Science and Innovation*. Volume 1, Issue 5, page 107.

3. Burenkov E.K., Ginzburg L.N., Gribanova N.K., et al. "Comprehensive Ecological-Geochemical Assessment of Technogenic Pollution of the Natural Environment." - Moscow: "Prima-Press," 1997, 72 pages.

4. Natural Resource Use. Textbook. A. Arustamov. Publishing House "Dashkov & Co." Moscow – 2000.

5. Timofeva S. N., Kadikov I. R. "The Effect of Zinc on Weight Gain, Biochemical Parameters, and the Content of Metals in Organs of Rats Exposed to Cadmium Chloride." *Westnik of Mari State University*. 2020, 6(1):59-66.