INTERNATIONAL JOURNAL OF RECENTLY SCIENTIFIC RESEARCHER'S THEORY

ANALYSIS OF CONTAMINATION OF SOME REGIONS WITH HEAVY METALS IN WATER BODIES AND SOIL

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Annotation: The article describes the influence of heavy metals in water and soil on the reduction of yields in the cultivation and production of agricultural products and methods of combating it.

Keywords: heavy metals, pollution, humus-containing horizons, metabolism, mineral, concentration, prevention, accumulation, agrochemistry, regularity.

Аннотация: В статье описано влияние тяжелых металлов в воде и почве на снижение урожайности при выращивании и производстве сельскохозяйственной продукции и методы борьбы с ним.

Ключевые слова: тяжелые металлы, загрязнение, гумусосодержащие горизонты, метаболизм, минерал, концентрация, профилактика, накопление, агрохимия, регулярность**.**

Introduction. Today, one of the most pressing issues is the prevention of pollution of the environment, including water resources and heavy metal deposits. It is important to study heavy metal pollution. Heavy metals in environmental objects (air, water, soil) can accumulate in the body of plants and animals and pass from one organism to another through "feed chains." In many cases, the amount of heavy metals contained in sediments is several times higher than their amount in water. pits are a secondary polluting source of the reservoir, as it has the property of collecting pollutants. Therefore, it is important to investigate pollution of water bodies with heavy metals [2].

Soil pollution by heavy metals and metalloids is a worldwide problem due to the accumulation of these compounds in the environment, endangering human, plant and animal health. Heavy metals and metalloids are usually present in nature, but the increase in industrialization has led to concentrations exceeding the

allowable levels. They are biodegradable and toxic even at very low concentrations [1].

To obtain reliable information on the main sources of pollution of water bodies and soils, it is necessary to track the amount of pollutants both in surface water and in sediments. Obviously, the aqueous medium, depending on the water that is the driving component, in the cells creates the properties of pollutants and passes through them into the soil. This results in a relatively high concentration of contaminants in the water [1].

Currently, one of the most pressing problems of water pollution is its pollution with heavy metals and their transition to soil composition. This is due to the fact that pollution of this species can cause very large negative consequences. These negative consequences indicate harmful effects on the living environment and the human body in water [4]. Emissions of industrial enterprises into the atmosphere and wastewater lead to the ingress of heavy metals into the soil, open water bodies, groundwater, pits, plants and animals.

Pits of heavy metals entering water bodies are adsorbed into the contents of head particles and then drown in the form of deposits. Heavy metals in the aquatic ecosystem eventually accumulate in sediments and biota. In the first place in terms of the frequency of accumulation of heavy metals are fractional particles and holes in water, and then plankton, benthos and fish. Heavy metals on fish can enter the human body and poison them. [3].

The entry of part of heavy metals into water bodies through wastewater, that is, through irrigation of crops, leads to the appearance of toxic substances, pesticides and other heavy metals in the water. It is also necessary to conduct a toxicological analysis for the content of heavy metals, petroleum products and pesticides in water [7]. Pesticides should be completely deduced in fish-hatching water bodies, oil and oil products in the emulated state not more than 0.05 mg/l, manganese - 10 mg/m3, honey - 1 mg/m3, chromium - 20-70 mg/m3, cadmium - 5 mg/m3, nickel - 10 mg/m3, lead - 100 mg/m3, cobalt

Humanity is faced with the problem of anticipating the immediate and distant consequences of its intervention in natural processes, achieving the greatest positive effect of using biosphere resources, introducing rational1 technology, repeatedly using and returning to biochemical cycles of nature and economy by-products and wastes of industry, mining, urban economy, agriculture. The most dangerous form of soil degradation is pollution with heavy metals or other chemical elements, the technogenic flow of which into the environment has a

negative impact on soil and plants, leads to an increase in environmental consequences and poses a threat to human health.

Research materials and methods. Soils are buffered and therefore relatively resistant to anthropogenic effects, however, it is soil pollution and their multifaceted degradation that will significantly affect in the future, since the restoration of soil fertility is a long and complex process, therefore, one of the urgent problems is the problem of the dynamics of toxic compounds, the study of the laws of their sorption, migration and accumulation in the soil. Human health, diseases, hidden mutations largely depend on the presence, concentration, ratio and interaction of such compounds with soils, soil organisms and plants. Almost any of the chemical elements, depending on the concentration in the external environment, or rather, on the received dose and ratio with other elements and compounds, can have both a positive and negative effect on the metabolism in living organisms [8]. To date, there is only fragmentary and disparate information on intensity

Therefore, in addition to addressing the issues of protecting the biosphere and, in particular, the soil cover from heavy metal pollution, optimization of the nutrition of crops with biogenic macro- and microelements is of great interest, taking into account the strengthening of the activities of physiological barriers that prevent toxic substances from entering plants, especially those of their organs that go to human food and animal feed; identifying ways to reduce the translocation of heavy metals into plants; search for reliable methods for diagnosing the level of pollution of soils with heavy metals and predicting the use of such soils for agricultural land [9]. - изучить динамику поступления биогенных элементов и тяжелых металлов в растениях на почвах, загрязненных кадмием, свинцом и цинком в зависимости от биологических особенностей культур;

- find out the selectivity of absorption of elements by plants when increasing the concentration of Co, Ni, Mo, Cu and Sb in the soil and the role of various organs in the formation of the mechanism of resistance of plants to heavy metals;
- investigate antagonistic-synergistic interactions of micro-and macronutrients during their translocation into plants on soils contaminated with heavy metals;
- study the effect of liming of various organic and mineral fertilizers on the quantitative and qualitative composition of plants under conditions of technogenic load on the soil;
- provide a balance-sheet assessment of the condition and forecast of soil pollution with heavy metals during long-term use of organic and mineral fertilizers.

When soil is contaminated with heavy metals, liming significantly reduces their content in plants, however, by regulating the pH of the soil, it is not possible to obtain products that are safe according to sanitary and hygienic standards. Therefore, the main purpose of liming remains generally accepted - to create an environment that is optimal for plant growth.

The toxicity of metals affects not only aquatic organisms, but also soil flora, plants, animals and humans. Oxidative stress leads to damage to cell morphology and inhibits cytoplasmic enzymes [10]. Usually these metals exist in nature individually or in a group with other elements, but anthropogenic activity increases their concentrations in the environment [11]. Since the toxicity of metals is soluble in water, they are mostly soluble in solutions. This makes them difficult to remove by physical and chemical separation processes in the soil [8]. The solubility of toxicity of metals is determined by their chemical morphology in the environment. Thus, in order to improve the efficiency of microbial fuel cell (MFC) reduction, appropriate methods are needed to convert the toxicity of metals into easily transferable forms (such as acid soluble fractions). Some studies have used adjunctive reagents such as low molecular weight organic

Heavy metals (Hg, Pb, Cd, As, Zn, Cu, etc.) are mainly used in industry and agriculture. Small amounts of these metals are deadly.

Results. Most of the studied crops on artificially contaminated soil accumulated a significant amount of heavy metals in the productive part without visible signs of metabolic disturbance, reduced yield, product quality, therefore, the indicator of heavy metals entering plants should be decisive for establishing the degree of pollution and normalizing the content of heavy metals in the soil.

The distribution of heavy metals between the reproductive and vegetative organs of crops under the same soil and weather conditions depended on their biological characteristics.

Increasing the concentration of cadmium in the soil increased the relative content of copper, lead, zinc in plants; zinc - lead, nickel and copper; lead - copper. The content of cadmium in plants decreased with an increase in the concentration of zinc in the soil.

According to the ability to penetrate into the reproductive organs of plants, elements such as zinc, copper, cadmium are distinguished, and the series of intensity of biological absorption of them for different plants are different. Flax seeds in comparison with chicory root crops and potato tubers are able to accumulate these elements. The accumulation capacity for cadmium is

characterized by straws and roots of flax, potato tops and chicory. The decrease in the biological absorption coefficients of zinc, lead and cadmium when they contaminate the soil indicates the protective ability of the plant organism against the penetration of heavy metals into it.

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