



Methodological Significance of Studying Chemical Pollution of the Environment by Microelements

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This article discusses the importance of studying the migration of trace elements in the air and plants. Regularities in the distribution of microelements in nature depending on their location in the periodic system of chemical elements are revealed.

Keywords:

methodology, chemical pollution, environment, trace elements, air, plants.

Introduction

The development of scientific and technological progress, if, on the one hand, facilitates and improves human life, on the other hand, worsens the living conditions not only of the person himself but of a living being in general. Assessing his activities, a person always strives to realize and understand the essence of the processes taking place around him and apply appropriate measures.

Today, the time has come for scientists to help not only children, pupils, and students, but all segments of the population in a deep understanding of the processes that occur in nature and pollute the environment.

This article is devoted to the methodological analysis of chemical pollution of the environment with microelements.

Materials and methods

The role of man in nature and in society is now so important that it has become necessary to

single out the anthroposphere - the sphere of human habitation and activity. The anthroposphere, although not a separate shell of the Earth, can be considered a part of the biosphere, changed as a result of human production activities.

The impact of man on the biosphere is complex and diverse, very often it leads to irreversible changes. While the changes in the Earth's surface caused by geological and biological processes are very slow, the changes brought about by human intensification have been accumulating extremely rapidly in recent years. All changes of anthropogenic nature disrupt the natural balance of each ecosystem, which was formed gradually over a long period of time. Therefore, such changes most often lead to the degradation of the natural human environment. As a result of the expansion of agricultural activities, some ecosystems have turned into artificial agro-ecosystems. Although the human impact on the biosphere

began as early as the Neolithic, the problem of the deterioration of ecosystems caused by their pollution,

Pollution of the environment, especially by chemicals, is one of the most powerful factors in the destruction of the components of the biosphere. Among all chemical contaminants, trace elements are considered as having special ecological, biological and health significance. In recent years, a large number of books have been published on microelements as components of pollution of the biosphere or individual ecosystems, and in all of them, special attention is paid to the relationship between the contents of inorganic microelements - pollutants in three media: air, soils and plants [10-14].

Human consumption of energy and mineral resources is the main cause of environmental pollution with microelements. An estimate of the global input of trace element pollutants into the environment can be based on data on world demand and consumption of minerals and energy. Scientists [10-12] believe that when the rate of extraction of an element exceeds the natural rate of its transfer in the geochemical cycle by 10 times or more, this element should be considered a potential pollutant. In this case, cadmium, silver, chromium, gold, mercury, manganese, lead, antimony, tin, tellurium, tungsten and zinc can be potentially the most hazardous for the biosphere metals-microelements. This list does not correspond exactly to the list of elements that are considered the most dangerous for the state of the environment - chromium, copper, mercury, Trace elements released from anthropogenic sources enter the environment and are involved in normal biogeochemical cycles. The study of the transport, residence time and fate of contaminants in each ecosystem is a special task of environmental protection. The behaviour of trace elements in any ecosystem is very complex, and therefore it is usually studied separately in air, water, soil and living organisms.

Air pollution occurs mainly from the burning of coal and other fossil fuels and the smelting of iron and non-ferrous metals. Currently, the concentration of trace elements in the

atmosphere is steadily and globally increasing. The contents of some trace elements, especially tellurium, bromine, cadmium, gold, lead and gold, can be more than 1000 times higher than their normal concentrations in the air. In general, elements that form volatile compounds or are part of fine particles during coal combustion and other industrial processes can be more easily released into the atmosphere. Substances coming from human activities are not the only component of global air pollution.

It is necessary to take into account such natural sources as eolian dust, volcanic eruptions, evaporation from the water surface, and some others.

Atmospheric precipitation of trace elements, mainly heavy metals, are involved in the pollution of all other components of the biosphere - water, soil and vegetation. Extensive research has been devoted to atmospheric fallout. [fourteen]. It has been found that the organisms most sensitive to atmospheric deposition from trace element contamination are mosses and lichens, but their sensitivity undoubtedly varies from species to species. Above-ground parts of plants are collectors of all atmospheric pollutants, and their chemical composition can be a good indicator for identifying polluted areas when compared with background values obtained for unpolluted vegetation.

You can list the main characteristics of inorganic pollutants-trace elements in the air:

1. Scattering over large areas and transport over long distances.
2. Bioaccumulation, most often affects the chemical composition of plants without the appearance of visible damage.
3. Impact on living tissues by disrupting metabolic processes and inhibiting light-absorbing living tissues.
4. Resistance to detoxification during metabolism results in the entry of elements into the food chain.

Plants play an important role both in the geochemical cycle of trace elements and in the entry of contaminants into food chains.

Plants can accumulate microelements, especially heavy metals, in tissues or on their

surfaces due to their great ability to adapt to changes in the chemical properties of the environment. Therefore, plants are an intermediate reservoir through which microelements pass from soils, and partly from water and air to humans and animals. Plants can act as a passive receptors for trace elements (by capturing dust or absorbing by roots), but they also have the ability to control the intake or removal of certain elements through appropriate physiological reactions. One of the major environmental concerns is related to the number of metals accumulated in edible parts of plants. Particular attention should be paid to the forms of occurrence of metals in plant tissues since this probably plays a decisive role in the transfer of metals to other organisms.

Each case of plant infection is individual and must be investigated in relation to the specific features of the environment. There is a growing awareness that the results of studies using modelling systems cannot be compared with observations from natural systems. For example, lettuce and onions grown outdoors absorb heavy metals much less than those grown in a greenhouse or micro-plot.

Conclusion

Trace elements of pollution that have penetrated into plant tissues play an active role in metabolic processes, but they can also be stored as inactive compounds in cells and on cell membranes. In any case, the chemical composition of plants can change without clearly visible damage.

An analysis of the literature on the migration of microelements gives a clear methodological idea that a correct understanding of the essence of the processes that occur in nature is necessary not only from the scientific and didactic side but also from the point of view of protecting the health of not only the person himself but in general a living being.

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