

IMPACT OF SOIL POLLUTION ON HUMAN HEALTH. SOIL POLLUTANTS WITH HOUSEHOLD AND INDUSTRIAL WASTE

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Summary: Soil is one of the strong environmental factors on which human health depends. It is the soil that plays the leading role in the cycle of substances in nature. Being in constant contact with other environmental flows, such as the atmosphere, hydrosphere, flora, soil, it is a necessary link in the path of substances entering the human body.

Key words: soil cover, lithogenic and soil health factors, biogeochemical endemics, prion, soil health

Materials and methods: Watercress seedlings grown on soil samples treated with household pollutants in a wide range of concentrations. Hypothesis. The hypothesis was that the introduction of safe, in the public consciousness, household pollutants (carbonated drink, shampoo, petroleum product) into the soil delays the development of plants and changes their morphological properties. It was also assumed that the least harmful effect should be that of carbonated drink, then shampoo and then petroleum product. The most harmful effect, according to the initial hypothesis, should be that of copper sulfate.

Introduction: Each of us knows that the environment in which we are forced to live affects our health. We are interested in the quality of the water we drink and the air we breathe. But do we know how the condition of the soil affects our health?

Soil, like drinking water and atmospheric air, has a significant impact on human health. First of all, because soil is the main means of agricultural production, and the condition of the soil affects both plant and livestock products. It is important for people to receive a sufficient amount of nutrients necessary for the construction and normal functioning of the body. We must not forget that along with food products, a person can receive both useful and harmful substances that negatively affect his development and life. Deficiency or excess of microelements in the soil also leads to

their deficiency in plants, animals and humans. Diseases associated with deficiency or excess of microelements are called endemic. For example, low iodine levels in the soil can cause thyroid diseases. Low fluorine content in soil and drinking water leads to dental caries.

Soil pollution is defined as the presence of toxic chemicals (pollutants or contaminants) in soil, in high enough concentrations to pose a risk to human health and/or the ecosystem. In the case of contaminants which occur naturally in soil, even when their levels are not high enough to pose a risk, soil pollution is still said to occur if the levels of the contaminants in soil exceed the levels that should naturally be present.

Today, about 3.2 billion people around the world suffer from the consequences of land pollution, with more than 500 thousand previous deaths recorded annually. A significant portion is observed in vulnerable groups: children, elderly people and those who live for a long time in contaminated areas. Thus, during the Industrial Revolution, about 135 billion tons of soil were lost from agricultural land.

Among the natural factors influencing the occurrence of human diseases, climatic, biological, lithogenic and soil factors are distinguished. The natural factor can be the cause of the spread of fatal diseases, the causative agents of which are not only animals and insects - carriers of pathogenic microorganisms. Rocks with an increased radioactive background, toxic groundwater, pollutants also affect humans. The natural factor is an insignificant part of about 20% of all factors influencing human health, and in the modern world their share is significantly increasing, which is associated with general pollution of the environment. At the same time, the soil accounts for the bulk of pollutants accumulating in the upper root-inhabited horizons



Soil is not an inert repository of pollutants. Their redistribution occurs in the profile, and toxicity changes. The entire catalytic system of the soil participates in these processes: microorganisms, immobilized enzymes, organic matter, aluminosilicates, metal oxides and hydroxides. However, much remains unclear in these processes. On the one hand, clay minerals accelerate the decomposition of pesticides, the formation of humus-like substances, which increases fertility and improves the structural functions of the soil. In other cases, such as with prions, clay minerals (montmorillonite, kaolinite) can enhance the activity of infectious particles, which leads to deterioration of the sanitary functions of the soil. It is quite obvious that we still know very little about the behavior of infectious particles, pathogenic microorganisms and the products of their vital activity in the soil

Causes of soil pollution

The root cause of soil pollution is often one of the following:

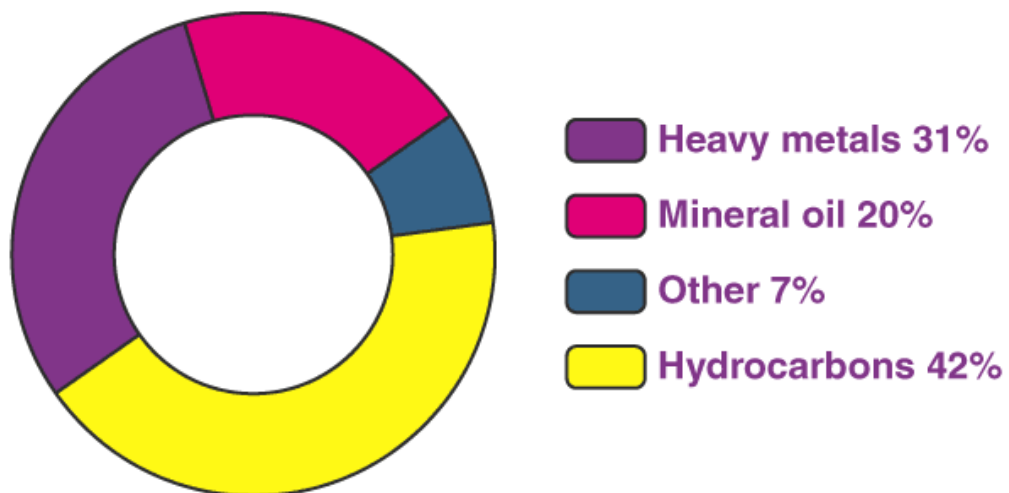
- Agriculture (excessive/improper use of pesticides)
- Excessive industrial activity
- Poor management or inefficient disposal of waste

The challenges faced in soil remediation (decontamination of soil) are closely related to the extent of soil pollution. The greater the contamination, the greater the requirement for resources for remediation.

The causes of soil pollution are usually divided into natural and anthropogenic.

Natural causes: Natural contamination is quite rare and can occur through the activity of soil microbes, through the transport of pollutants through precipitation, or due to floods and other natural disasters. In some arid areas, compounds containing perchlorates, substances harmful to plants and living beings, accumulate in the soil. Perchlorates can also form in soil containing chlorine and certain metals during thunderstorms. These cases account for a small percentage of the total volume of land contamination.

Some of the most hazardous soil pollutants are xenobiotics – substances that are not naturally found in nature and are synthesized by human beings. The term ‘xenobiotic’ has Greek roots – ‘Xenos’ (foreigner), and ‘Bios’ (life). Several xenobiotics are known to be carcinogens. An illustration detailing major soil pollutants is provided below.



The different types of pollutants that are found in contaminated soil are listed in this subsection.

Anthropogenic causes: Consequences of soil pollution Toxic pollutants degrade soil over the long term, which means they can reduce crop yields and make food unfit for consumption. For example, land contaminated with inorganic aluminum can be toxic to plants. It also often increases the salinity of the soil, and crops can no longer be grown on it. Soils become contaminated as a result of spills of hazardous substances. For example, gasoline and diesel fuel entering the ground leads to hydrocarbon pollution. Also, large areas suffer as a result of wars and military operations. Industrial zones and local facilities make a negative contribution. For example, demolition of old buildings can lead to asbestos contamination of the soil. Lead-based paints are used in construction, which can lead to dangerous concentrations of this heavy metal in the ground. Foundry operations often result in the dispersion of metal contaminants into nearby areas. Almost all cases of soil pollution are anthropogenic in nature. A variety of human activities can lead to the contamination of soil. Some such processes are listed below.

- The demolition of old buildings can involve the contamination of nearby soil with asbestos.
- Usage of lead-based paint during construction activities can also pollute the soil with hazardous concentrations of lead.
- Spillage of petrol and diesel during transportation can contaminate soils with the hydrocarbons found in petroleum.
- Activities associated with metal casting factories (foundries) often cause the dispersion of metallic contaminants into the nearby soils.

- Underground mining activities can cause the contamination of land with heavy metals.
- Improper disposal of highly toxic industrial/chemical waste can severely pollute the soil. For example, the storage of toxic wastes in landfills can result in the seepage of the waste into the soil. This waste can go on to pollute groundwater as well.
- Chemical pesticides contain several hazardous substances. Excessive and inefficient use of chemical pesticides can result in severe soil pollution.
- Sewage produced in urbanized areas can also contaminate soil (if not disposed of correctly). These wastes may also contain several carcinogenic substances.

Purpose of the study: Objective of the study was to find out to what extent such household substances affect the human health. Whether they have any effect at all. For comparison, we chose an obvious pollutant - copper sulfate, which we use to treat plants to protect them from insect pests. Watercress was used as a bioindicator, since it has a high sensitivity to pollutants, is characterized by rapid seed germination, and the shoots and roots of this plant undergo noticeable changes under the influence of pollutants (growth retardation, change in the size, color and shape of the shoots). Having studied the effect of household pollutants on plants, we can assume that they also affect human health.

Conclusion: Industrial zones and local facilities make a negative contribution. For example, demolition of old buildings can lead to asbestos contamination of the soil. Lead-based paints are used in construction, which can lead to dangerous concentrations of this heavy metal in the ground. Foundry operations often result in the dispersion of metal contaminants into nearby areas. Against the background of such disappointing forecasts, experts propose to control soil pollution, including creating networks for monitoring the quality of land and the environment. Scientists and environmentalists are calling for an end to the use of toxic substances in industry if safer alternatives are available. It is also important to introduce and expand recycling and proper disposal of waste, this will help reduce damage to soils from landfills

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