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INVESTIGATE SOIL CONTAMINATION WITH HEAVY METALS WHILE COMMUNITY HEALTH

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Annotation

It is an anthropogenic factor that causes high levels of urban pollution around the world. This mainly leads to soil contamination with heavy metals. Heavy metals enter the soil in vehicles, industrial plants, thermal power plants, and military training grounds. The danger of contamination of soils with toxic substances is that the toxins that enter the soil are stored for many years and affect the processes of the soil, such as agrochemical, agrophysical, biological, microbiological properties, nutrients, and eventually enter our body through the food chain. With this in mind, when we studied the wastes of private machine-building enterprises from an ecological and hygienic point of view, the hazard classes of environmental pollution were studied. The waste was found to contain lead, tin, copper, iron oxides, polyethylene and petroleum products.

Keywords: heavy metals, environment, soil ecosystem, hazardous class factors, industrial waste, human health.

Introduction

Human health is largely determined by the environment in which he lives. Soil plays an important role in this. Human health depends in many ways on the structure and composition of the soil. This is due to the fact that the quality of food depends on the soil, i.e. the state of the plant and animal world that humans consume. The main causes of soil pollution; industrial waste can remain on the soil surface for a long time and render it unusable.

Soil contaminated with harmful chemicals has a negative impact not only on human health, but on the entire organic world.

Since the beginning of the 21st century, global chemical industry production has doubled to 2.3 billion tons per year, a figure that is projected to increase by another 85% by 2030. The amount of waste will also increase, with the world currently generating 2 billion tons of waste per year, and it is projected that by 2050 this figure will increase to 3.4 billion tons due to population growth and urbanization.

The Action Strategy of the Republic of Uzbekistan for 2017-2021 states that "sustainable development of agricultural production, further strengthening the country's food security, further improving the reclamation of irrigated lands, expanding the production of environmentally friendly products, significantly increasing the export potential of the agricultural sector" defined as tasks. Therefore, it is important to carry out research on the detection of toxic emissions and environmental cleanup.

Decree of the President of the Republic of Uzbekistan No. 4947 of February 7, 2017 "On the Strategy of Actions for the Further Development of the Republic of Uzbekistan", Cabinet of Ministers of the Republic of Uzbekistan No. 142 of May 27, 2013 Resolution No. 375 of February 13, 2018 "On the procedure for the formation and use of funds of the Fund for Ecology, Environmental Protection and Waste Management" and the implementation of the "Urban Development Code of the Republic of Uzbekistan" Urban planning activities of legal entities and individuals Article 11 "On the protection of the environment, protection of the environment, compliance with the requirements of environmental safety, fire and sanitary rules, norms and hygiene standards", as well as Uzbekistan n In accordance with the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 343 of June 3, 2021 "Monitoring of water resources, atmospheric air and soil pollution sources", urban planning is carried out on the basis of a number of normative and methodological documents. However, these details in modern legislation are not enough to protect the environment, and a scientifically based, stratified system of quality standards has been developed for a complex object such as soil, which aims to improve their environmental assessment and reclamation status.

Chemical pollution of the environment, especially soil cover, is caused by a variety of factors, and over the years, radioactive elements (U, Ra, Os, Th, etc.) and heavy metals (Cd, Pb) have been recognized as highly toxic. , Sr, Ni, As, etc.), some gases and pesticides enter the soil cover and exert their influence through the “soil → plant → animal → human” life chain.

Assessment of soil quality is important to describe the ecological and hygienic condition of the area a, because it is the primary link in the food chain, a secondary source of air and water pollution, and an integral indicator of the environmental wellbeing of the environment. However, the qualitative analysis of soils is complicated by the peculiarities of soil formation in the urban environment.

The purpose of the study: Ecological and hygienic study of wastes of private machine-building enterprises in Samarkand region

Research Objectives: Our research aims to:

• Study of soil and climatic conditions of the study area;
• Identification of hazardous classes of pollutant sources in the study area;
• Develop measures to remove heavy metals from the study area.

Research methods: Samples were taken from the soil at a depth of 0-5 and 5-20 cm at 25 points, of which 5 mixed samples were selected. Samples dried in room air were carried out in the Sanitary and Hygienic Laboratory of the Samarkand Regional Department of Sanitary Epidemiology and Public Health. Further research revealed the following:

• Potentiometric pH determination;
• Spectrophotometric method of organic matter and ammonium nitrogen content;
• General forms of Cu, Pb have been identified.

To minimize errors, several samples were taken at different locations of the research object. Sampling for soil contamination is regulated by UzDST 17.4.4.02-2017. Two layers of soil were sampled. One - at a depth of 0–5 cm, the other - 5–20 cm. The obtained sample was made by the envelope method (in the corners and in the center - 5 points). The total sample weight was 1 kg. Selected samples are numbered indicating the serial number, sampling location, relief, soil type; the intended purpose of the area, the type of contamination, and the date of selection were recorded. Soil sampling and soil quality control are carried out in accordance with SanQM 2.1.7.1287-03 "Sanitary-epidemiological requirements for soil quality".

To determine the amount of copper in the soil, the method of extraction-photometric determination of copper with lead diethyldithiocarbate was used. The photometric method of copper in soil is based on the formation of a colored Cu2 + complex soluble in organic solvents with lead diethyldithiocarbamate. Extraction-photometric determination of lead with dithizone was used to determine the presence of lead in the soil.

Results: 1-5 hazardous wastes are generated in the machine-building industry, which have a negative impact on the environment. To determine the most dangerous of these, a detailed analysis of the unauthorized waste at the waste recycling site is required. (Table 1).

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List of wastes of the machine-building industry (2019-2021 Samarkand city private machine-building enterprise)

Waste name	Waste of Dangerous class	Component name	Of components content ,%
lead (that is) including chang and / or lead shavings) _ unsorted waste	II	Lead	100.00
used accumulator lead , without electrolytes	III	Lead Polyethylene	70.00 30.00
industry mineral moy waste	III	Oil products Mineral section Water	95.51 0.87 3.62
unsorted lead remnants	III	Lead Tin	90.00 10.00
Not sorted and uncontaminated copper fragments and waste	III	Mis Polymers	95.44 4.56
Not sorted and unpolluted rux pieces and waste	III	Rux Mechanic compounds	97.00 3.00
fat content 15 % or from him more than which was greasy mill scale	III	Iron oxides Oil products Water	55.00 40.00 5.00
mineral engine oils waste	III	Oil products Water	98.00 1.10
oil or oil products with polluted soil (oil or oil products content 15% or from him many)	III	Sand Oil products Water	60.00 30.00 10.00
waste oil products mixture	III	Oil products Mineral section Water	98.22 0.55 1.23
mis discharges	III	Copper disputes Iron Mineral oils , water	98.30 0.20 1.50
oil and oil products container and pipes cleaning mud	III	Mineral oil (oil products) Water Sand	50.00 30.00 20.00
chrome and his alloys pieces and waste , unpolluted without	III	Chrome Nickel Carbon oxide Iron	20.00 25.00 2.00 53.00
unsorted contains chrome holding waste ,	III	Chrome	100.00
unpolluted nickel disputes	IV	Nickel Mineral oils , water	97.00 3.00

Based on this table, diagrams were constructed: on the example of the SamAuto plant in terms of hazard classes (Figure 1), as well as component composition, we consider the most toxic waste types listed in Table 2 below.

Table 2. Waste of a private machine-building enterprise in Samarkand (2019-2021)

	Waste name	**Waste Dangerous Class**
1	Transformer oils waste	**II**
2	Use feature lost halogens own into received hydraulic oils waste	**II**
3	Not sorted lead remnants	**III**
4	Mis a piece shaped waste	**III**
5	Ruxdan waste products	**III**
6	Contains aluminum which was unsorted waste (this) including aluminum dust)	**IV**
7	Oil or oil products with contaminated (oil or oil products content 15% or from him many)	**III**
8	Paint during to the ground lacquer spill	**IV**
9	15% va from him more than oil products own into received black metals cutting way with again performance in the process	**III**

As we can see in Table 2, the most hazardous substances in the waste generated at a machine-building plant are: petroleum products and heavy metals. Contamination with heavy metals (OM) is one of the most serious cases in terms of chemical contamination. Heavy metals contain more than forty chemical elements of Mendeleev. Elements of this category form part of enzymes that are actively involved in many biological processes. The category of “heavy metals” largely corresponds to the definition of “microelements”. Therefore, lead, zinc, cadmium, mercury, molybdenum, chromium, manganese, nickel, tin, cobalt, titanium, copper, vanadium are heavy metals. Heavy metals accumulate in the upper horizons of the soil and are gradually removed from the soil during washing, assimilation by plants, and erosion. Half-life or removal of fifty percent of the initial concentration is long: for zinc - from 70 to 510 years, for cadmium - from 13 to 110 years, for copper - from 310 to 1500 years and for lead - from 740 to 5900 years. . In the humus parts of the soil, the primary change of the compounds entering it occurs. Heavy metals have the ability to perform a variety of chemical, physicochemical, and biological reactions. Almost all of them have variable valences and are involved in oxidation-reduction processes.

Heavy metals and their compounds, as well as other chemical compounds, have the ability to move and redistribute, that is, move, in an environment where they are present. Migration of heavy metal compounds occurs significantly in the form of organomineral components. The ratio of organic compounds combined with metals is indicated by the products of microbiological activity. Soil microorganisms can form mercury-resistant populations, which convert mercury metal into toxic substances for macro-organisms. Some aquatic plants, fungi and bacteria have the ability to accumulate mercury in cells. Mercury, lead and cadmium are included in the list of the most important pollutants in the environment by the UN.

Conclusion. The retention time of pollutants in the soil is much longer than in other parts of the biosphere, which leads to changes in the composition and quality of the soil, as well as the dynamic system, and ultimately to the imbalance of environmental processes. From the results of the study it can be concluded that the thickness of the surface deposits in the studied waste areas was 0.1-1.5 mm. A detailed analysis of the waste generated by the machine-building industry, taking into account the main source of the Samavto private machine-building enterprise, made it possible to propose a list of the main components. These are: petroleum products (14%) and heavy metals (lead 15%, copper 14%, zinc 14%, nickel 3%), as well as the main risk class of components - the third class.

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