

THE ASSESSMENT OF HEAVY METALS CONTENT IN THE SOIL AND PLANT COVER OF CHERNIVTSI REGION

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The study of heavy metals in landscape complexes is an essential prerequisite for the development of geographical bases of environmental management. Irrational environmental management leads to a significant increase of heavy metals both in soils and in biomass. The soil and surface water have been significantly transformed; the groundwater level has been changed.

Key words: landscape complex, ecological state, degree of transformation, landscape, biomass, heavy metals.

Introduction. Environmental issues, associated with environmental pollution and health effects, stimulate people to search ways for their solution and to assess the environmental state of territories. Landscape-geochemical approach allows studying the behavior of pollutants, depending on the characteristics of the landscape-geochemical environment.

Environmental issues, arising in connection with the operation of the transport system in Ukraine, are the result of operation of not only individual transport means, but other sectors of the national economy. It is, above all, the structure and existing constructions of transport means, covering and the quality of exploitation of ways, etc [Valchuk O.M., 2002].

Chernivtsi region – is a region of significant pollution of natural environments. Organohalogen compounds, heavy metals and others belong to the main anthropogenic pollutants that cause changes in the state of atmosphere, soil, biomass and health of population. These pollutants come into the atmosphere as well as into the soil and vegetation from stationary and mobile sources of pollution.

Among mobile sources of pollution motor transport has the largest amount of discharge. Transport causes a number of problems that can be conditionally combined into several groups (by the basic ways of interaction with the environment): 1) transport – a heavy consumer of fuel; 2) transport – a source of environmental pollution; 3) transport – one of the sources of noise; 4) transport takes agriculturally used areas for ways and stationary facilities; 5) transport is the cause of injury and death of people and animals.

Initial preconditions. Theoretical and methodological basis of the research is the study of anthropogenic landscapes, developed by domestic and foreign scientists – A.H. Isachenko, P.G. Shishchenko, F.M. Mil'kov, L.I. Voropay, V.M. Gutsulyak, G.I. Shvebs, V.M. Pashchenko, M.D. Grodzinsky, I.P. Kovalchuk, G.I. Denysyk, and others.

Ecological and geochemical studies of landscapes of Chernivtsi region began in the 80's of the twentieth

century. At first they concerned lowland landscapes, and later – piedmont and mountain landscapes.

The problem of vegetation contamination of road geosystems has been investigated by V.M. Hutsulyak, V.P. Tarasenko, O.I. Vasylenko and others.

Presentation of the research results. Studying the environmental condition of landscape complexes, it should be taken into account that it is composed of various components. Therefore, you first need to assess the ecological state of the aquatic environment, air, soil, flora and fauna and to assess the human impact on the environment.

Soil is an essential component of the biosphere and has a number of important ecological functions: fertility, energy, gas and atmospheric, hydrological and others. It serves as a liaison of all components of the biosphere and has a function of a biogeochemical barrier. Soils should be used as an objective information block when assessing the geochemical state of all biogeocoenose, because of their feature to reflect and sensor. Hence the ecological and health role of soils and soil covering. Wholesale forms are presented as a potential reserve of mobile soil elements that are actively involved in the biological cycle [Blokhin E. V., 1997, 2000].

The processes of ploughing, leaching and biological capacity of vegetation and granthiota play a decisive role in the distribution of mobile forms of elements by the soil profile. Zinc and lead are background forming mobile elements in all landscape areas.

Local anomalism is also found on certain forms of elementary geochemical landscapes: nickel, zinc, lead accumulate in eluvial landscapes; zinc, copper, nickel – in transeluvial; zinc, nickel, lead, and copper – in subaqual [Gutsulyak V.M., 1995].

The accumulation of heavy metals in the plantash of the road geosystems varies. Zinc is characterized by the highest absorption rate and the highest concentration. Zinc accumulation ranges from 7.8 to 91.5 mg/kg of dry weight. Copper is the second by the degree of accumulation in plants of road geosystems, its accumulation is from 4.21 to 17.15

mg/kg of dry weight. Accumulation of lead and cadmium is almost the same and is respectively: lead – 0.97-04.78 mg/kg of dry weight, cadmium – 0.12-0.42 mg/kg of dry weight. The spreading of heavy metals in the ash of plants varies with the distance from the road [Khodan H.D., 2011].

Zinc and copper intensively accumulate in vegetation of highways of Chernivtsi region. Accumulation of zinc ranges from 43.4 mg/kg to 92.5 mg/kg within a five-meter zone and from 25.4 mg/kg to 62.8 mg/kg within a hundred-meter zone. Lead and copper are characterized by a high degree of accumulation. Their accumulation ranges accordingly from 4.21 mg/kg to 14.5 mg/kg within a five-meter zone and from 5.72 mg/kg to 13.5 mg/kg within a hundred-meter zone. Cadmium is characterized by much lower concentration, its accumulation in vegetation ranges from 0.12 mg/kg to 0.32 mg/kg [Khodan H.D., 2011].

Conclusions. So, as a result of anthropogenic factors in the environment, harmful chemicals (including toxic, allergenic and carcinogenic) migrate primarily from vehicles, industrial and agricultural facilities, public utility. They migrate by the scheme: atmosphere – soil – water (surface and groundwater). Pollution of all the mentioned environments in a complex has a harmful effect on the town residents, due to which the impact of individual components significantly increases. Therefore, it is necessary to study further environmental quality (based on the landscape), technogenic pollution, especially by transport means, and to conduct a permanent environmental monitoring.

Currently there is no state policy in Ukraine on legal, normative and economic regulation of the impact of heavy metals on the environment and health of population, the reduction of lead discharging and its compounds into the environment, the outright ban of leaded petrol.

Ходан Г. Вмісту важких металів у рослинному та ґрунтовому покриві Чернівецької області. Дослідження вмісту важких металів в ландшафтних комплексах є необхідною передумовою розвитку географічних основ раціонального природокористування. Нераціональне природокористування призводить до значного збільшення важких металів як у ґрунтах так і в біомасі. Значно трансформований ґрунтовий покрив та поверхневі води, змінився рівень ґрунтових вод.

Ключові слова: ландшафтний комплекс, екологічний стан, ландшафт, біомаса, важкі метали.

Ходан Г. Содержания тяжелых металлов в растительном и почвенном покрове Черновицкой области. Исследование содержания тяжелых металлов в ландшафтных комплексах является необходимым условием развития географических основ рационального природопользования. Нерациональное природопользование приводит к значительному увеличению тяжелых металлов как в почвах так и в биомассе. Значительно трансформирован почвенный покров и поверхностные воды, изменился уровень грунтовых вод.

Ключевые слова: ландшафтный комплекс, экологическое состояние, ландшафт, биомасса, тяжелые металлы.

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