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BIOGEOTECHNOLOGICAL SIGNIFICANCE OF THE CENTRAL KYZYLKUM DESERT'S FLORA

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Annotatsiya: Markaziy Qizilqum nodir va rangli metallar rudalariga boy bo'lgan sanoat ahamiyatiga ega hudud hisoblanadi. Bu yerda uchraydigan o'simliklarning biogeotexnologik xususiyatini o'rganish sanoatlashgan hududlarni bioremediatsiya qilishda muhim ahamiyatga ega.

Kalit so'zlar: Sanoatlashgan hudud, fitoekstraktsiya, bioremediatsiya, og'ir metallar, introdutsent o'simliklar, fitoremediatsiya, ksenobiotiklar, giperakkumulyatsiya.

Аннотация: Центральный Кызылкум является областью промышленного значения, богатой цветными и редкоземельными металлами. Изучение биогеотехнологических характеристик растений данного региона важно для биоремедиации промышленных зон.

Ключевые слова: Промышленная зона, фитоэкстракция, биоремедиация, тяжелые металлы,растения-интродуценты, ксенобиотики, гипераккумуляция.

Abstract: The Central Kyzylkum desert is an industrial area which is rich in rare and non-ferrous metals. The study of biogeotechnological characteristics of plants in the region is vital for the bioremediation of industrial zones.

Keywords: industrial zone, fitoextraction, bioremediation, heavy metals, introducent plants, xenobiotic, hyperaccumulation.

Introduction. For the time being, the top priority problem the world community facing is environmental sustainability and biodiversity conservation as the future and development of mankind depends on it. Today, there is an

environmental danger for all humankind everywhere. With the development of mankind, the anthropogenic impact on nature is increasing, and this, in turn, leads to an aggravation of environmental problems.

One of the global environmental problems on earth is soil pollution. Anthropogenic effects daily damage the soil with various organic and inorganic wastes. Heavy inorganic compounds contain heavy metals that are extremely dangerous for the environment. [1].

Excessive extraction of heavy metals into the ecosystem as a result of anthropogenic impact leads to the destruction of the vital functions of many living organisms. Heavy metals include metallic and metalloid fibers with atoms above 50% [2]. Such heavy metals are most common in the soils of mining regions.

Thailand has a great experience and a long history in the mining industry, in particular in Thailand there are large reserves of gold, silver, potassium, coal, dolomite, gypsum, intended for quarry mining.

In the information provided by the scientists Nakbanpote, W., Prasad, M.N.V. and others highlighted topical issues of the sustainable use of land contaminated with metals, phytobiome and mycobiome approaches to the recovery of mine waste and scientific approaches to long-term monitoring of mine waste [3].

Literature review. The main sources of heavy metals in the environment are man-made and anthropogenic activities. Phytoremediation is the process of using plants to clean a polluted environment. Provided that the phytoremediation process is applied, economically significant plants with a short life cycle are a motivating factor for local residents. In this context, many ornamental plants were evaluated for their use and potential according to phytoremediation.

Many scientists, among them Nakbanpote, W., Prasad, M.N.V. and others covered in their work the phytoremediation potential of land and aquatic ornamental plants. Thus, some ornamental plants can add a new measurement scale

in the field of phytoremediation and phyto management of polluted aquatic and terrestrial environments [4].

Recently, much of the work has focused on fitness in the potential of biochar. Biochar is used as a soil restoration tool that can increase seed germination, crop and soil productivity, above-ground biomass, and vegetation cover in tailing mine mines, rock dumps and polluted industrial wastes. This whole process is carried out by increasing the nutrients of the soil and water holding capacity, improving the acidity of the soil and the function of stimulating microbial diversity [5].

A greenhouse study was conducted using a perennial chaff to determine its potential for restoring soil vegetation on the territory of the former ferrous metallurgy plant (in Naples, in southern Italy). These territories were contaminated with Cu, Pb and Zn at levels that exceeded the permissible regulatory limits of Italy. For the experiment, surface samples of soil from the territory (from 0 to 40 cm) were used, where mineral resources were located (RM1 and RM2). Samples of unpolluted cultivated soil (C) and the mixture in a 1: 3 ratio with contaminated soil samples (RM1 + C and RM2 + C) were taken from the nearby area [6].

The central zone of the Kyzylkum mainly consists of the deserts and steppes located in the deserted and lowland areas. This region has its diverse flora and fauna. The central Kyzylkum zone also plays a special role in the strategic importance of our country as it is very rich in rare, non-ferrous metals and other minerals. Works such as the refining of gold, uranium and other ores, as well as the extraction of phosphate rock in factories can have a negative impact on the environment. At present, the use of the phytoremidiation technology on the empty lands and the study of their biogeotechnological properties are considered scientifically and practically important. A number of research works were conducted on the utilization of harmful substances by microorganisms that are released into the environment by industrial enterprises [7].

However, no microorganisms can contain heavy metals dangerous for life such as mercury, cadmium, copper, mercury, selenium, lead, radioactive uranium isotopes, undergo the process of decay of uranium radionuclides, decontamination and removal from the soil in the form of green plants and concentrate in the tissues. Phytoremediation studies using local and introducent plants are insufficient. This problem is waiting for its scientific and practical solution in modern biology and biotechnology.

A number of biotechnological methods have been investigated for the effects of chemical and metallurgical production on the environment and their degradation in the environment. However, the study of the biodiversity of local and introducent plants, as well as the complex purification of xenobiotics is deficient.

When removing heavy soil with the help of plants, depending on the degree of contamination, density and concentration, soil is selected for the usage as a phytoculture. The degree of plant resistance to heavy metals in the soil varies widely, and different types of plants represent different cumulative characteristics of the same element.

In the refiningprocess of various types of heavy metals, the phytoextraction method using plants of high density is most effectivein international experiments.

More than 400 species of cultivated and wild species are used in 22 households to clean up soil contaminated with heavy metals. Among them peer-to-peer familiesare formed as a large group. At present, studies are being conducted with the new species to use in phytoremediation [8].

For example, Matteucci astruthiopteris (L.) absorbs cadmium from the soil and accumulates in the leaves. The experiments have shown that heavy metal ions accumulated in the leaves do not affect the photosynthesis of plants [9].

The cyanid and rodanids' waste water cleanage possibilities were revealed and biotechnological method was worked out. Anatomical structure was comperatively studied and the quantity of macro and macroelements in high aquatic plants biomass, grown on cyanid and rodanid waste waters were determined [10].

Research methodology. The research has been carried out since March – April, 2018 in the Central Kyzylkum region to study the biogeotechnological characteristics of plants and their monitoring. During the experiment, more than 20 species of plants and their territory served as objects of study. To determine heavy metals in plants, the biomass accumulated mainly at the flowering stage, which had high physiological activity.

In $40^{0}31$ northern latitude and $65^{0}00$ long lanterns in the Central Kyzylkum region species such as Kochia prostrate (L) Sehod, Ferela assa – foetida L. and Acanthophyllum albidumwere found to be dominant species of that area.

Also, the results of research on plant and soil samples of this region have been summarized as follows:

Analysis and results. Laboratory analysis of the study was carried out using X-ray examination in the Central Scientific Research Laboratory of Navoi Mining Metallurgical Combinate. In the analysis of samples, the quantitative parameters of heavy metals such as Cu, Zn, Mn, Ni, Pb, Au, Mo, Cr and Re were investigated.

Soil samples which were the object of the study were analyzed by heavy metals and it was found out that the soil contained Cu-0,02%, Zn-0,02%, Mn-0,06% and the elements such as Ni, Pb, Au, Mo, Cr and Reshowed lower levels than the sensitivity of the research method.

The following results were obtained when analyzing the composition of biomass of some of the plants in this soil environment with heavy metals (Table 1).

Table 1.

Results of preliminary analysis of heavy metals during the research (April, 2018)

Experiment samples	Cu %	Zn %	Mn %	Ni %	Pb %	Au %	Mo %	Cr %	Re %
Soil	0.02	0.02	0.06	-	-	-	-	-	-
Ferula assa-foetida L. (family of soybeans)	0.03	0.04	0.02	-	-	-	-	-	-
Kochia prostrate (L) Sehod.	0.03	0.03	0.04	-	-	-	-	0.003	-

(mariy family)									
Acanthopyllum albidum (carnation family)	0.02	0.03	-	-	-	-	-	-	-

From the table it can be seen that, the fulcrum of the ferrum analysis shows that the biomass of the plant L. (soybean) is higher than Cu-0.03%, and Zn-0.04% is higher than Cu-1.5, and Zn is 2 times higher than in the soil, and vice versa, Mn - 0.04% was found to be 3 times less than that of the soil. The elements Ni, Pb, Au, Mo, Cr and Re showed lower biomass sensitivity in the analysis method.

It was identified that the biomass of Kochia prostrate (L) Sehod plant (the family of marijuva) is Cu-0.03%, Zn-0.03% - 1.5 times higher than in the soil, and vice versa, Mn-0.04 % - 1.5 times less than in the soil. The elements Ni, Pb, Au, Mova Re showed lower sensitivity to biomass than with the method of analysis.

Despite the fact that the content of Cr in the soil is less sensitive than with the analytical method, the plant contains 0.003%. Thus, even with a small amount of crude oil, this plant contains a large amount of copper, which is much higher than in the soil.

In the biomass of the plant Acanthopyllumalbidum, the amount of metal Cu-0.02% was 1.5 times higher than in the soil Zn-0.03%. The elements such as Mn, Ni,Pb, Au, Mo, Cr and Re showed lower level of sensitivity relative to the biomass method.

Conclusion. Based on the results of the analysis, we can come to the following conclusions:

First, plants participate in the biogenic migration of many elements and absorb them in large quantities from the soil;

Secondly, not all plants can exactly absorb an element in the same quantity;

Thirdly, because of their development and accumulation of heavy metals in plants, their number may be higher than in the soil.

A preliminary analysis of plants in the Central Kyzylkum region showed that Ferula assa-foetida L., belonging to the family of soybeans, absorbed metals such

as Cu and Zn, and Kochia prostrate (L)Sehod plants, belonging to the family of mariy, absorbed Zn and Cr metals more than other elements. This is a vivid example of the fact that the content of these elements in the soil is more than other elements.

Today the development of science and technology has led to the rapid development of this industry. The ecology of polluted technogenic lands and the solution of their problems using biotechnological methods is one of the urgent scientific and practical problems.

The use of hyper acculating properties of plants in this area will allowto develop the mining industryinnovatively, as well as separate rare metals from biomass and help solve certain environmental problems of the industry.

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