

CHEMICAL COMPOSITION OF THE CHERNOZEMELSKY DISTRICT SOILS, REPUBLIC OF KALMYKIA

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Abstract. *Background.* In recent decades, the soils of the arid territories of the Republic of Kalmykia have been exposed to ever-increasing anthropogenic impacts – both agricultural (grazing, plowing, irrigation) and industrial (oil production) ones – all have a negative impact on the state of the environment. The environmental situation currently prevailing in Kalmykia indicates that anthropogenic effects on biogeocenoses have recently increased so much that their most conservative component, the soil, has been affected. The work seeks to examine the change of chemical composition, as well as enzymatic activity of soils, of the Chernozemelsky district of the Republic of Kalmykia, with the influence of various anthropogenic factors on them. *Materials and methods.* The soils of the Chernozemelsky district of Kalmykia were chosen as the objects of the study. Laboratory and analytical research is executed with the use of standard methods in biology and soil science (chelatometry, potentiometry, analytical methods, methods of research of fermentation activity of soils, fluorimetry, spectrophotometry). *Results.* The study identifies chemical composition of soil samples from Kalmykian settlements, nature reserves, oil production areas. So, surface soil layers of rural settlements proved to be not salinized, though being poor in labile nitrogen, potassium, and organic carbon. Soils of nature reserves are characterized by average values of nitrogen, phosphorus and potassium. Still, the results obtained explicitly attest to the fact that soils of oil production areas do experience transformation of water and salt composition, with increased values of carbon and deteriorated nutrient balance. Oil and oil products repress catalase, the latter being far more active in soils of nature reserves. *Conclusions.* The soils of arid territories are sensitive to anthropogenic stress because unsustainable agricultural and industrial activities in these territories lead to soil degradation. The ingress of oil and petroleum products into the soil leads to a change in its chemical composition, so in the soils of oil-producing enterprises the content of cations (4–12 times) and anions (4–15 times) increases sharply, the content of organic carbon increases by 5.7 times compared to the soils of natural territories.

Keywords: soils, arid territories, Republic of Kalmykia, nature reserves, oil production areas, oil pollution.