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Influence of Biological Preparations on Melioration of Saline Soils: Case Study from Uzbekistan

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Abstract

Lowland and desert areas of Uzbekistan are prone to soil salinisation, which has a seasonal character and increases from spring to autumn. This phenomenon affects soil fertility and land productivity. This paper presents a study on an application of locally produced biological and biochemical preparations with the purpose to assess their effectiveness and environmental safety as a mean for the melioration of saline soils of Uzbekistan. Experiments were carried out with different preparations developed by Uzbek scientific institutions. Two biological preparations (Rizkom-1 and Trichodermin) applied through watering of cotton seeds before sowing should activate microbiological processes in saline soils. The Rizkom-1 is developed by the Institute of Microbiology of the Science Academy of Uzbekistan based on algae called chlorella, whereas Trichodermin, with the active ingredient trichoderma – a naturally occurring mycopathogenic fungus – is produced by the Uzbek Research Institute of Plant Protection. Further, we tested locally produced biochemical preparation “Biosolvent” developed by the Institute of Bioorganic Chemistry of the Science Academy of Uzbekistan and its effect on leaching of salt from the soil. In all the experiments we checked moisture, salinity and chemical composition of the soil before and after treatment. The results show that preparations maintain a higher moisture content in the soil which can lead to water savings during irrigation. This concerns in particular the application of Rizkom-1. Additionally, leaching with the upfront spraying of the soil with 11 % solution of the preparation “Biosolvent” and subsequent supply of 2000 m³ ha⁻¹ of water, toxic ions (chlorine, sulfates and sodium) are more washed out as the control. At the same time, there was no negative influence of “Biosolvent” in the form of increased leaching of nutrients NPK from the soil.

Keywords: Biological preparations, chemical composition of soils, leaching, melioration, saline soils, spraying of soil, watering of cotton seeds