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IMPACT OF IRRIGATION OF REPEATED CROPS WITH LOW-MINERALIZED DRINK WATER ON SOIL SALINATION LEVEL

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Abstract
This article provides information on the effects of Nanosilicon and AMINOSID Universal Si biopreparations on the soil salt and nutrient content of millet and sunflower crops grown as repeated crops in conditions of alluvial, moderately saline soils in the Bukhara oasis, irrigated with low-mineralized ditch waters.

Keywords: Water level, well water, mineralization, biopreparation, Nanosilicon, AMINOSID Universal, dry residue, chlorine ion.

Introduction

Scientific research on irrigation of repeated crops with low-mineralized rainwater in areas vacated from winter wheat. Field experiments were conducted on the varieties of "Saratovskoe-853" and "Dilbar" sunflower in 2020-2022 on soils with a mechanical composition of medium loamy, meadow-alluvial, moderately saline, with a groundwater level of 2.0-2.5 meters deep and a mineralization of 2.5-3.0 g/l at the "Agrofayz Ziynati" farm in the Vobkent district of the Bukhara region. Field experiments were conducted with the "Saratovskoe-853" variety, with a soil moisture content of 70-75-65% relative to the average daily water content, and with the mineral fertilizer rate of N150, P105, K75 kg/ha, and with the "Dilbar" variety, with a soil moisture content of 70-70-65% relative to the average daily water content, and with the mineral fertilizer rate of N200, P140, K100 kg/ha, and with low-mineralized rainwater. During the observations, the amount of salts in the soil (dry residue, chlorine ions, sulfate ions, and bicarbonate ions) was determined at the beginning and end of the application period.

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The experiments conducted during 2020-2022 showed that at the beginning of the growing season, the amount of salts in the soil in the tillage layer (0-30 cm) was 0.011% Cl, 0.056% HCO_3, and 0.045% SO_4, while the dry residue was 0.290%. In the 0-100 cm layer of the soil, the amounts of Cl, HCO_3, SO_4, and dry residue salts were 0.012%, 0.045%, 0.046%, and 0.303%, respectively. This amount of salts in the soil is close to the category of saline soils in the accepted classification by salinity levels. It was found that at the end of the growing season of the repeated crops, all salts in the soil increased. In the repeated experiments, in variant 1, where the crop was directly irrigated with low-mineralized saline water, the amount of chlorine ions in the arable layer of the soil (0-30 cm) increased by 0.019% compared to the beginning of the treatment period, reaching 0.030%, while in the 0-100 cm layer it increased by 0.018% compared to the beginning of the treatment period, reaching 0.029%. When the amount of dry residue in the soil composition was analyzed, it increased by 0.162% compared to the beginning of the treatment period in the arable layer, reaching 0.452%, while in the 1-meter layer it increased by 0.111%, reaching 0.414%. In variant 2, irrigated with low-mineralized saline water and treated with Nanosilicon biopreparation, the amount of chlorine ions in the arable layer of soil (0-30 cm) increased by 0.015% compared to the beginning of the treatment period, and in the 0-100 cm layer it increased to 0.014%, reaching 0.026%. This indicates that the amount of chlorine ions in the arable (0-30) cm and one-meter (0-100 cm) layers of soil accumulated by 0.004 and 0.003% less than in the control variant. The amount of dry residue increased by 0.067 and 0.056%, respectively, compared to the beginning of the treatment period, equaling 0.385 and 0.358%. During the research, in variant 3, which was irrigated with low-mineralized saline water and treated with AMINOSID Universal Si, the amount of chlorine ions in the topsoil layer (0-30 cm) at the end of the treatment period was 0.028 and 0.026%, respectively, which was 0.002 and 0.003% less than in the control variant. If we analyze the amount of dry residue in the soil composition, it increased by 0.106 and 0.072%, respectively, compared to the initial result, at the end of the treatment period it was 0.396 and 0.375%.

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Also, in the 4th variant of the study, where sunflower was grown repeatedly, when irrigated with low-mineralized rainwater, the amount of salts in the soil composition at the end of the treatment period in the tillage layer (0-30 cm) was 0.031% Cl ion, 0.085% HCO_3, and 0.127% SO_4, while the dry residue content was 0.463%. In the 0-100 cm layer of the soil, the amounts of Cl, HCO_3, SO_4, and dry residue salts were 0.030%, 0.080%, 0.128%, and 0.423%, respectively. In the repeated sunflower cultivation, in variant 5, irrigated with low-mineralized sewage water and treated with Nanosilicon biopreparation, the amount of chlorine ions in the arable layer of the soil (0-30 cm) increased by 0.016% compared to the beginning of the treatment period, and in the 0-100 cm layer it increased to 0.014%, amounting to 0.027; 0.026%. This indicates that the amount of chlorine ions in the arable (0-30) cm and one-meter (0-100 cm) layers of the soil accumulated by 0.003% less than in the control variant. The amount of dry residue increased to 0.102 and 0.048%, respectively, compared to the beginning of the treatment period, amounting to 0.392 and 0.351%.

In the last variant of the study, when irrigated with low-mineralized saline water and treated with AMINOSID Universal Si, the amount of chlorine ions in the tillage (0-30 cm) and one-meter (0-100 cm) layers of the soil at the end of the treatment period was 0.029 and 0.027%, respectively, which was 0.001 and 0.002% less than in the control variant. If we analyze the amount of dry residue in the soil composition, it increased by 0.118 and 0.074%, respectively, compared to the initial result, at the end of the treatment period it was 0.408 and 0.377%.

Conclusion. In the conditions of alluvial, moderately saline, moderately humus soils of the Bukhara region, the repeated application of the "Saratovskoe - 853" variety at the rate of N150, P105, K75 kg / ha and maintaining the soil moisture before irrigation at 70-75-65% relative to the CHDNS, and the variants using Nanosilicon and AMINOSID Universal Si biopreparations, compared to the control, ensured a reduction in the amount of chlorine in the soil by 0.004% in the 0-30 cm layer and up to 0.003% in the 0-100 cm layer, a decrease in the amount of dry residue in the 0-30 cm, 0.385, 0.358% in the 0-100 cm layers, and a grain yield of 29.0-30.7 c / ha, which was 3.2-4.9 c / ha higher than the control. was

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determined. In the cultivation of sunflower as a repeated crop, at the rate of N200, P140, K100 kg/ha and maintaining the soil moisture before irrigation at 70-70-65% relative to the CHDNS, in variant 5, which used the Nanosilicon biopreparation, the amount of chlorine ions in the soil composition was reduced by 0.018% in the 0-30 cm layer and 0.016% in the 0-100 cm layer, respectively, compared to the control. In this variant, the amount of dry residue was 0.71%; 0.72% less than in the control variant, and was equal to 0.392; 0.351%. In variant 6, when the AMINOSID Universal Si biopreparation was used during irrigation with sewage water, the amount of chlorine ions in the soil was reduced by 0.002% in the 0-30 cm layer and 0.003% in the 0-100 cm layer compared to the control. The amount of dry residue in the soil decreased by 0.055-0.046% compared to the control, and was 0.408% in the arable layer and 0.377% in the 0-100 cm layer. This is explained by the accumulation of salts dissolved in water in the active soil layer as a result of irrigation with sewage water. The grain yield was increased by 2.0-3.9 c/ha compared to the control.

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