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## EFFICIENCY OF USING ORGANO-MINERAL BIOPREPARATIONS AS ELEMENTS OF BIOLOGIZATION IN CHICKPEA CULTIVATION TECHNOLOGIES IN THE ARID SOUTHERN STEPPE OF UKRAINE

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### ABSTRACT

The article establishes the effectiveness of three foliar feeding of chickpea plants with various organo-mineral biopreparations without the application of mineral fertilizers, as well as along with the application of N<sub>30</sub> at sowing and N<sub>30</sub> for fertilization. Such organo-mineral biopreparations are created on the basis of beneficial microorganisms and provide destruction of phytopathogens, as well as have a positive effect on the formation of legume-rhizobial symbiosis and productivity of chickpea, especially in climate change. It was found that fertilization of chickpea crops with Fulvo TE, Anti-stress, Polymicrostim, Extra and Root Most biopreparations on an unfertilized background provide 0,23-0,27 t/ha of yield increase. Against the background of mineral nitrogen application, when using Fulvo TE and Polymicrostim biopreparations, the maximum increase in chickpea grain yield was 0,34-0,30 t/ha, and when using Anti-stress biopreparation - 0,25 t/ha. The largest mass of 1000 grains of chickpea on an unfertilized background, which was 249,3 g, was obtained using Polymicrostim and Anti-stress biopreparations. In these variants, the protein content ranged from 25,17-25,53%, which is 0,84-1,20% more than the control variant. With the combined application of mineral nitrogen and the use of Anti-stress biopreparation, the protein content increased to 29,10%, and with the combined application of mineral nitrogen and the use of Seed Treatment and Root Most biopreparations, received the largest mass of 1000 grains of chickpeas, which was 258,3 g. Coefficient of utilization of chickpea plants introduced mineral nitrogen depended on weather conditions and the introduction of biopreparations. In particular, in 2019 with the use Amino and Anti-stress biopreparations it was 22,3-22,6% and increased with the use of Seed Treatment and Fulvo TE biopreparations to 46,8-50,4%. In 2020, when using the Amino biopreparation, the coefficient of utilization of chickpea plants introduced mineral nitrogen was 18,7%, which when using Polymicrostim and Fulvo TE biopreparations increased to 63,8-71,3%. On average, over the years of research, along with the application of mineral nitrogen, we can highlight the positive effects of Fulvo TE, Anti-stress and Polymicrostim biopreparations, which significantly improved plant growth and development, as well as the yield and grain quality of chickpea. These drugs are recommended for use in chickpea cultivation technologies as elements of biologization, especially in the arid Southern Steppe of Ukraine.

**Keywords:** organo-mineral biopreparations, elements of biologization, chickpeas, plant growth and development, yield, product quality, climate change.