## *Annotation*

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***Agrochemical effectiveness of modern soybean fertilizer systems***

*Current agricultural conditions require reduced energy consumption and spared economic resources used in technologies of crop cultivation. One of the ways to achieve this is to use atmospheric nitrogen on a wider scale by expanding soybean crops. Growing of this crop will give a good yield only if microbiological preparations are applied. The research objective was to determine the effect of Azorhiz microbiological preparation on soybean capacity, the formation of its symbiotic mechanism and agrochemical indicators of dark grey podzolized soil. Apart from legume bacteria, Azorhiz preparation contains associative nitrogen-gathering and phosphorus-mobilizing bacteria, as well as biologically active substances such as B vitamins, gibberellins and auxins. The effectiveness of microbiological preparation was determined by means of the field (small experimental plots), laboratory-based (agrochemical analysis of soils, determining the amount of nodules) and statistical (statistical analysis of experimental data) methods.*

*According to the field studies it was found that the application of the microbiological preparation in the soybean fertilizer system is an effective measure to enhance its capacity and improve soil agrochemical indicators. The highest increase in yielding capacity of 1.99 t/ ha (48%) was obtained under the Azorhiz application together with mineral fertilizers ($N_{10}P_{30}K_{30}$) and seed treatment with microelements (Mo, B). With the microbiological preparation applied together with $N_{30}P_{60}K_{60}$ the soybean yield was by 1.19 t/ ha (29%) compared with the check variant. The increased protein content in grain was by 2.4–3.1% depending on the ground in comparison with the variant without fertilizers.*

*Soil treatment with Azorhiz stimulated the formation of nodules on soybean roots and their number in the stage of crop maturity was 29.5-38.5 nodules per plant as compared with 8.1 nodules per plant on the plots without fertilizers. The most intensive formation of nodules was observed under Azorhiz application while seeds were treated with microelements and $N_{15}P_{30}K_{30}$ application. The intensified nitrogen fixation process caused by the microbiological preparation contributed to the increase of mineral nitrogen content in soil throughout the soybean growing season. During crop flowering and ripening a high nitrogen content in soil was also recorded under the microbiological preparation application together with seed treatment with microelements and $N_{15}P_{30}K_{30}$ application, 33.3 and 42.7 mg/ kg of nitrogen ammonium compounds respectively, and 22.9 and 18.9 mg/ kg of nitrate compounds. The use of the microbiological preparation in the soybean fertilizer system improved other agrochemical indicators of dark gray podzolized soils, including the content of mobile phosphorus and potassium compounds.*

*Thus, it is advisable to use Azorhiz complex microbiological preparation in order to increase soybean yield capacity, make wider use of biological nitrogen in agricultural production and improve soil nutrient status.*

***Key words:*** *soybean, microbiological preparation, symbiotic nitrogen fixation, legume bacteria, yield capacity, mineral nitrogen.*