BIOSYNTHESIS OF PHYTOHORMONES BY STRAIN OF *MESORHIZOBIUM CICERI* ND-64

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In the cultivation of legumes, microbial preparations based on beneficial soil microorganisms are becoming increasingly important. Due to the mechanisms of biological fixation of molecular nitrogen and its conversion into a form accessible to plants, nodule bacteria are able to meet significantly the needs of crops in this element. This helps to increase plant productivity and soil fertility. Cultivating chickpeas in different soil and climatic zones, especially in new areas, involves the inclusion of such an agricultural measure as pre-sowing bacterization of seeds by active and highly efficient strains of *Mesorhizobium ciceri* in the technology of cultivation. This will contribute to the implementation of the symbiotic potential of plants, increase their resistance to adverse soil and climatic conditions and increase yields.

The objective of our work was to study the ability to produce phytohormones substances with new effective strain of chickpea nodule bacteria *M. ciceri* ND-64. The ability of chickpea rhizobia to produce biologically active substances was studied using biotests according to methodological recommendations and methods for determining phytohormones, growth inhibitors, defoliants, and herbicides. The analysis of the quantitative content of extracellular phytohormones synthesized by *M. ciceri* microorganisms was carried out using the method of high performance liquid chromatography.

A new strain of *M. ciceri* ND-64 was selected, which is able to form an effective symbiosis with such chickpea varieties of Ukrainian selection. It was shown that the use of inoculation of seeds of these varieties using bacterial suspension of *M. ciceri* ND-64 contributed to an increase in the number (by 5–89%), weight of nodules (by 10–190%) and their nitrogenase activity (by 26–290%) compared with positive control (inoculation *M. ciceri* H-12), as well as structural parameters of chickpea yield: number of beans (by 5–34%), seeds from the plant (by 7–27%), weight of seeds from the plant (by 8–26%) and yield (by 4–19%) compared to the positive control in the zones of the Steppe and Polissia of Ukraine.

The ability of nodule bacteria *M. ciceri* ND-64 of intensive synthesis of phytohormones and the formation of highly effective symbiosis with chickpea plants of different varieties provided a complementary interaction of rhizobia with plants and a significant increase in crop yield.

It was found that *M. ciceri* ND-64 with high nitrogen-fixing activity is characterized by the ability to synthesize phytohormone-like substances: auxins, cytokinins and gibberellins. For example, when wheat coleoptiles were treated with a suspension of *M. ciceri* ND-64, the highest increase in their length was registered at a dilution of 1:1000 (20%), the highest increase in cucumber cotyledons weight at the same dilution – by 50%, and gain in the length of corn mesocotyles was 23% at a concentration of 1:500. High-performance liquid chromatography in the culture fluid of *M.ciceri* ND-64 revealed a high content of auxin substance with a total concentration of 29.6 μg/g absolutely dry biomass.

M. ciceri ND-64 are capable of active synthesis of substances of phytohormonal nature, which contributes to the effective interaction between rhizobia and chickpea plants.