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THE ROLE OF BRADYRHIZOBIUM JAPONICUM EXOPOLYSACCHARIDES IN THE FORMATION OF AN EFFECTIVE SYMBIOTIC APPARATUS OF SOYBEAN

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ABSTRACT

There are a number of questions that have remained relevant for a long time when using inoculants based on nodule bacteria. It has been shown that exopolysaccharides (EPS) producing bacterial cells play one of the key roles during interaction and during signal transmission in legume-rhizobial symbiosis, namely, bacterial survival, virulence of rhizobia, shelf life on inoculated seeds and in soil, and efficiency created legume-rhizobial system. In particular, it was found that new strains of soybean nodule bacteria *Bradyrhizobium japonicum* LG 2 and LG 5 synthesize EPS at 3.2 and 2.8 g/l, with an optical density above 0.8 rel. units, the viscosity of the culture liquid – within 270-302 mPa • s. The high level of synthesis and the chemical composition of EPS of the studied strains ensured the preservation of the viability of bacterial cells on the surface of seeds and on a solid medium. Inoculation of soybean seeds with a culture liquid containing EPS of strains LG 2 and LG 5 ensured the formation of an effective legume-rhizobial system, which is confirmed by the formation of 18-21 nodules / plant of soybeans with a nitrogenase activity of at least 2.9 $\mu\text{mol C}_2\text{H}_4$ / plant per hour. A graph model has been developed, which proves the direct dependence of the effect of EPS on the number of nodules formed on the roots, the level of nitrogenase activity of the legume-rhizobial system and their indirect effect on the yield and protein content in soybean grain. Prospects isolated by strains LG 2 and LG 5 of *B. japonicum* for biotechnological production of liquid and gel biopreparations.

Keywords: exopolysaccharides, *Bradyrhizobium japonicum*, soybeans, inoculant, legume-rhizobial symbiosis, nitrogenase activity, nodules.