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

Iryna Gumeniuk[1], Lyudmyla Symochko[1,2,*], Ivan Mostoviak[3], Olena Demyanyuk[1], Olena Sherstoboeva[1], Vera Boroday[4], Vitaliy Symochko[2]

[1]Institute of Agroecology and Environmental Management of National Academy of Agrarian Sciences of Ukraine, Metrolohichna str., 12, Kyiv, Ukraine;*
[2]Uzhhorod National University, 32 Voloshyna Str., 88000, Uzhhorod, Ukraine;*
[3]Uman National University of Horticulture, 1, Instytutska Str., Uman, 20305, Ukraine;
[4]National University of Life and Environmental Sciences of Ukraine, 03041, 19 Henerala Rodimtseva Str., Kyiv, Ukraine;

[*]Corresponding Author Lyudmyla Symochko: e-mail address: lyudmilassem@gmail.com;

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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 μmol C_2H_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.

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DETERMINING CRITERIA IN TECHNOLOGY VALUATION THROUGH THE ANALYTIC HIERARCHY PROCESS: A CASE STUDY IN VIETNAM

Tran Van Nam[1*], Trinh Minh Tam[2], Do Son Tung[2], Tao Minh Hung[4]

[1]National Economics University, 207 Giai Phong Road, Hai Ba Trung District, Hanoi 100000, Vietnam;*
[2]Vietnam Centre for Science and Technology Evaluation, Ministry of Science and Technology of Vietnam 39 Tran Hung Dao, Hoan Kiem District, Hanoi 100000, Vietnam;
[3]Rouse Legal Vietnam Ltd.-Hanoi Branch, 7th Floor, VIT Building, 519 Kim Ma Street, Ba Dinh District, Hanoi 100000, Vietnam;

[*]Corresponding Author Tran Van Nam, e-mail: namtv@neu.edu.vn;

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ABSTRACT

Technology valuation is a bottleneck in the process of commercialization and technology transfer. When applying valuation methods, there are many assumptions set out in the calculation. This article presents very first serious effort to analyse the Analytic Hierarchy Process (AHP) and its initiation in Vietnam. The AHP is a weight calculation method applied to evaluate the importance of each factor affecting technology valuation. However, the AHP has been applied to valuation work in only a few countries in recent years. In Vietnam so far, there has been no research on the AHP in technology valuation; the results of this study are expected to be a breakthrough for the application of the AHP in technology valuation. In this study, the research team uses Saaty's AHP to analyze and identify criteria affecting technology valuation in the current conditions of Vietnam.

Keywords: Technology Valuation, Analytic Hierarchy Process (AHP), Vietnam.

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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

Volodymyr Orekhivskyi[1], Anna Kryvenko[1], Nataliia Kovalenko[1*], Svitlana Burykina[2], Maxim Parlikokoshko[2], Antonina Drobitko[3]

[1]Institute of Plant Physiology and Genetics of the National Academy of Sciences of Ukraine, Ukraine;*
[2]State Enterprise "Research Farm named after M. I. Kutuzov" of the Odessa State Agricultural Research Station of the Institute of Water Problems and Land Reclamation of the National Academy of Agrarian Sciences, Ukraine;
[3]Mykolaiv National Agrarian University of the Ministry of Education and Science of Ukraine, Ukraine;

[*]Corresponding Author Nataliia Kovalenko, e-mail: BoikoNP@ukr.net;

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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_{30} at sowing and N_{30} 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.

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