

Powder complex bacterial preparation for crop and efficiency of its use in agroecosystems

I.K. Kurdish¹, A. O. Roi¹, I. O. Skorokhod¹, A. Yu. Chobotarov¹, I. O. Herasimenko¹,
V. V. Plotnikov², V.G. Hilchuk², O. V. Korniihuk²

1. Zabolotny Institute of Microbiology and Virology of the NAS of Ukraine, 154, Acad. Zabolotny str., Kyiv, MSP, D03680, Ukraine, Kurdish@serv.imv.kiev.ua ;
2. Institute of forage and agriculture of Podillya of the NAASU, Vinnytsya, Ukraine

Soil microorganisms are one of the main factors of its fertility. At the same time they can cause adverse effects on plant growth and development and cause their diseases. Therefore, an important goal of plant-growing is correction of microbial processes in agroecosystems through the use of effective bacterial preparations [1]. This will reduce the use of chemicals in agriculture and have high quality of plant products.

Based on highly efficient interaction of selected strains *Azotobacter vinelandii* IMV B-7076 [2] and *Bacillus subtilis* IMV B-7023 [3] with particles of expanded vermiculite it was created the complex bacterial preparation for crop production. The interaction of these strains with vermiculite nanoparticles significantly increases their dehydrogenase activity, and also the activity of antioxidant enzymes.

It has been optimized the process of making powder complex of the bacterial preparation for crop. The technology allows to get in every of its gram more than 10^9 of cells of these bacteria strains. The preparation is stable during storage, improves nitrogen and phosphorus plants nutrition, stimulates their growth by biologically active substances and protects plants from lesion by phytopathogenic micromicetes and bacteria.

It has been determined that in rhizosphere soil of cereals, whose seeds were treated with the complex bacterial preparation, significant changes have been observed in the rhizosphere of microbial coenosis, in which the total number of bacteria, the content of oligotrophic bacteria, phosphate-mobilizing bacteria and some other physiological-trophic groups of microorganisms was increasing..

Growing of winter wheat «Tsarivna», whose seed was processed with the powdered complex bacterial preparation, was accompanied by an increase in grain yield up to 0.57-0.62 t/ha, the content of crude protein and fiber in it, up to 0.6-1.0 % and 1.1 -1.3%, respectively. Thus, lesion plant root rot and septoria leaf spot of wheat was significantly decreasing. Seeds treatment of spring barley varieties «Nabat» with the powdered complex bacterial preparation increased the yield of grain up to 0.35-0.43 t/ha; in grain the content of crude protein up to 0.4-0.6 %, reduced lesion plant leaves of dark brown spot.

Thus, it has been established the technology of creation of the powder complex bacterial preparation for crop, which is stable during storage and convenient for use in agroecosystems cereals. It has been shown the positive impact of application of the powder complex bacterial preparation with crop seeds of winter wheat and spring barley. The preparation has significantly increased the yield and improved the quality of grain.

1. Kurdish I.K. Introduction of microorganisms in agroecosystems. –Kyiv. Naukova dumka,2010. –p.253. (in Ukraine).

2. Patent of Ukraine №72856. Strain of bacteria *Azotobacter vinelandii* for bacterial fertilizer obtaining for plant-growing / I.K.Kurdish, Z.T.Bega.- Published in 2006,bulletin №8 (in Ukraine).

3. Patent of Ukraine №54923A. Strain of bacteria *Bacillus subtilis* for bacterial fertilizer obtaining for plant-growing / I.K.Kurdish, A.O.Roi.- Published in 2003,bulletin №3 (in Ukraine).