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OBTAINING AND USE OF ORGANIC AND MINERAL FERTILIZERS

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Traditional organic fertilizers have only local significance in the manufacture of industrial organic and mineral fertilizers, and cannot be used as a source of organic matter. In this regard, large reserves and low cost of organic substances, that are wastes of many industries, including lignite, can accelerate the industrial production of new types of complex organic-mineral fertilizers (OMF).

Researches of OMF manufacturing processes on the basis of lignite were conducted during 2007-2012 in the laboratory of Agricultural Chemistry and Quality of Plant Products named after O. I. Dushechkin of NULES of Ukraine. Field researches with the received fertilizer were conducted in stationary experiment of the department in a separated subdivision of NULES of Ukraine "Agronomy Research Station" on meadow-humus carbonate soil during 2010-2012. Laboratory and field studies were carried out in accordance with conventional techniques in agronomy.

As a result of laboratory tests it was found that producing OMF from lignite composting is carried out for 2-3 months at a temperature of 18-22°C and substrate humidity of 20% in such a ratio of components: lignite (58-68%); biohumus (10-20%); digested sludge (2%); microbial yeast, made of museum culture of *Bacillus megaterium*, *Pseudomonas sinuosa* (up to 1%); phosphorite meal derived from raw rock phosphates of Ukraine (15%) and ammonium carbonate (5%).

As a result of composting we obtain the OMF containing 43.5% of the total carbon (with 4.82% of humic acid carbon), at least 1.0-2.0% Ngen, 0.7-2.5% P_2O_5, 1.0-1.5% K_2O, 0.4% S and microelements: Cu (3 mg/kg), Zn (6 mg/kg), Mo (8-12 mg/kg); pH of the obtained substrate is 7.0-7.5; moisture – 15-20%. Not less than 70% of main nutrition elements (NPK) are in water-soluble state.

With the help of field research it was found that in terms of cultivation of spring wheat in meadow-humus carbonate soil, the most numerous were microorganisms of the nitrogen cycle - it increased the share of organotrophic, amylolytic and pedotrophic ones. It also increased the share of humate-decomposing microorganisms. This suggests that humic compounds of lignite in the soil will be subjected to further active microbial transformation, thereby creating the conditions for the optimal balance of microorganisms, and thus, enhance the processes of transformation of soil organic matter.

It was established that the use of OMF helped to increase yield of spring wheat and quality of the resulting product. The maximum grain yield can be achieved by applying 4.5 t/ha of OMF and is 3.92 t/ha, while 2.97 t/ha of the yield of control. In this variant, they were observed the highest quality indices: protein content was 14.5% with the highest content of bread-forming protein fractions – 14.7 of albumins and 13.3% of globulins; the content of “raw” gluten was 29.7%, FDI – 85 units and flour strength – 273 J.

Thus, the use of OMF helped to optimize microbiological soil regime, to increase productivity of spring wheat grain and to improve its quality.