The influence of preparation obtained by the electropulse ablation method on the soil microbiota in soybean crops

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A powerful factor in increasing the productivity of crop production, the potential of which is extremely underutilized, is the intensification of the development of agronomically useful groups of microorganisms. These groups of microorganisms increase the fertility of the soil due to their participation in the transformation of complex compounds of carbon, nitrogen, phosphorus, potassium and trace elements, converting them into available for plants forms. That is why it is extremely important for the agricultural producer to know the state of the soil microbiota in order to timely correct it and prevent crop productivity losses (Coban et al, 2022, De Corato et al, 2020).

The purpose of the research was to determine the composition of ecological and trophic groups of soil microbiota in soybean crops after seed treatment with a drug whose components were obtained by the method of electropulse ablation (Kravchenko et al, 2021). To compare the effect of the preparation, the other part of the soybean seeds was treated with the chemical pesticide Maxim XL (active substance - Fludioxonil + Metalaxyl-M). As a control, seeds without etching were used.

As a result, it was established that the amount of ammonifiers in the variant with preparation was 1046 thousand CFU/g of soil, while in the variant without etching - 396.7 thousand CFU/g of soil, in the variant with chemical pesticide - 188.1 thousand CFU/g of soil. This may indicate a high content of organic matter in the soil, since under such conditions the ammonifying microbiota is the most numerous and taxonomically diverse.

In the experimental sample, pedotrophic microorganisms were 2 times more than in the control and about three times more than in the variant with a chemical pesticide. Under optimal conditions in the soil, pedotrophs are the most widespread group of soil microorganisms, which adequately reflects the general development of microbiota in the soil and play a significant role in the formation of soil fertility.

The number of phosphate-mobilizing microorganisms in the experimental version exceeded 2.8 times the number of corresponding microorganisms in the control and variant with Maxim-XL. The high number of this group of microorganisms makes it possible to reduce the application rate of phosphorus mineral fertilizers.
Thus, the obtained results indicate a significant increase in the number and composition of various ecological and trophic groups of microorganisms with the use of drugs obtained by electro-impulse ablation methods.