



SUNAGRO UKRAINE

BENEFICIAL MICROORGANISMS: THE FOUNDATION OF SUSTAINABLE AND ENVIRONMENTALLY SAFE AGRICULTURAL PRODUCTION

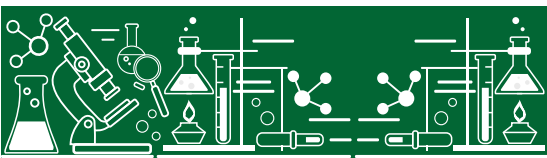
Over 70 years ago, chemical fertilizers and pesticides became a revolutionary breakthrough in agricultural production. However, the potential of chemical technologies is running out. Instead, we are facing new problems, such as the development of resistance in pathogens and pests to control agents, large-scale greenhouse gas emissions from the production and use of fertilizers, as well as a significant (up to 40%) reduction in their effectiveness in plant absorption. We stopped solving the problem of food security for humanity but actively generated a new, more dangerous problem – the environmental one, which not only deepens the crisis in food production but will also have a significant impact on the health of the planet's population.

In the mid-19th century, scientists proposed the idea that microorganisms are important participants in the plant life cycle. The most convincing argument for this theory (concept) was the discovery of the phenomenon of biological nitrogen fixation – the ability of bacteria to convert inert atmospheric nitrogen into biologically available nitrogen compounds for plants. At the same time, bacteria can fully realize their nitrogen-fixing potential only with the help of plants, which provide sources of photosynthetic carbohydrates that serve as “fuel” for the nitrogen fixation process. This provided proof that this interaction is mutually beneficial for both participants.

Further decades of research indicate the multi-dimensional interaction between plants and microorganisms, which is not limited to nitrogen nutrition alone. The availability of other nutrients, protection from diseases and pests, and plant resistance to drought, freezing, and salinity can be effectively controlled (regulated) by beneficial microbiota. New knowledge in plant biology and revolutionary advances in biotechnology have changed the status of agronomically useful microorganisms from auxiliary to central, and have served as a catalyst for the development and implementation of effective bioproducts, as well as the creation of highly productive organic and integrated farming systems.

We have just begun the path of biological farming, and it requires significant transformation in our approach to agriculture. However, every step taken confirms the success of our choice, ensuring higher plant productivity compared to conventional agricultural technologies. Moreover, the main advantage of such agricultural production is its safety for the environment. Biological/organic or even integrated farming systems help restore soils, returning their fertility, conserve biodiversity, and preserve natural resources.

The successful biological transition of agriculture could potentially trigger the second green revolution, but a true one, without harming the environment and society as a whole.



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