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**MODERN SCIENTIFIC RESEARCH:
ACHIEVEMENTS, INNOVATIONS
AND DEVELOPMENT PROSPECTS**



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Editor

Komarytskyy M.L.

Ph.D. in Economics, Associate Professor

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AGRICULTURAL SCIENCES

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STABLE BIODESTUCTOR - AN EFFECTIVE MEANS OF CROP RESIDUE MANAGEMENT

Tretiakova Svitlana

Candidate of Agricultural Sciences, docent
Uman National University of Horticulture,
Uman city, Ukraine

Novikova Tetiana

Senior Lecturer Uman State Pedagogical
University, Uman city, Ukraine

Yurchenko Yuliia,

student

Uman National University of Horticulture,
Uman city, Ukraine

Abstract. The article considers the results of research on the effectiveness of the Bio destructor of stubble production) to regulate the decomposition of crop residues and the involvement in the cycle of their nutrients. The positive effect of Bio destructor treatment of crop residues on the speed of their destruction and biological activity of the soil is noted.

Key words: Bio destructor, stubble, plant debris, microorganisms.

Any global problem can develop without fatal consequences long enough, if external circumstances are favorable. For example, soil degradation has long been a global problem, as evidenced by the data of scientists and personal observations of farmers, but also the creation of an international soil partnership. At the same time, the problem of soil degradation and fertility, for all its severity and scale, until recently was pushed to the background by agricultural producers. Because they did

not see a significant deterioration in their production due to degradation.

However, the rather abrupt climate changes of recent years, which have complicated the usual technologies for growing crops, have shown that soil degradation is indeed a problem that needs to be addressing today.

Organic matter plays a decisive role in the reproduction of soil fertility. She is the coordinator of soil formation processes and an important source of nutrients for plants. The reserve of organic matter in the soil, in the absence of manure or other organic fertilizers, is a by-product of agricultural production (straw, tops, stems, etc.).

Increasing the fertility potential of the soil is achieving by returning the nutrients taken out with the harvest, as well as lost due to adverse natural and climatic factors. Among the agro-technical measures of soil replenishment with nutrients, the most important role is playing by organic fertilizers, which contain all the necessary nutrients for plants, including microelements, enrich the soil with humus, microflora and improve its physical and chemical properties. Soils that are enriching by organic methods have a favorable physical structure, better retain water. These improvements in soil quality characteristics directly affect yields, helping to maintain consistently high crop productivity even in dry years.

One of the types of organic fertilizers is by-products of crop production (straw of cereals and legumes, stalks of corn and sunflower, beetroot, etc.). Systematic use of crop residues as organic fertilizer enhances the vital activity of the microflora and the intensity of its respiration, improves the nutrient regime and physicochemical properties of the soil, and increases the humus content.

As M. K. Shykula, noted, the non-commodity part of the crop (straw, corn stalks, sunflower, sorghum, hyphae, rot and other post-harvest residues) is a huge reserve of organic fertilizers in conditions when manure is almost not applied due to the reduction of livestock fields. It is estimated that from 50 c / ha of dry matter of straw 5 t of organic matter enters the soil, with crop residues - 10 c, with roots weighing 25 c / ha - 4 c. When 1 ton of straw is applied, 800 kg of organic matter, 3.5–5.5 kg of nitrogen, 0.7–1.7 kg of phosphorus, 5.5–13.7 kg of potassium, 0.5–1.7 magnesium, 1.2–2.0 kg of sulfur, as well as copper, zinc, boron, molybdenum,

manganese, cobalt and other trace elements.

Preservation of plant remains, their plowing or burning in another way helps to enrich the composition of the soil with organic matter and intensify the activity of biota. Combustion of crop residues, which is now practicing by some farmers - is economically unprofitable and inefficient, because a significant amount of nutrients is lost and the entire useful microflora in the topsoil is destroying. Microorganisms that are not typical for soil-forming processes and effective interaction with plants take its place. In this case, microorganisms that do not «feed» crops with nutrients, but parasitize on the plant organism inhabit the roots of plants.

The organic residues serve as the material for the formation of humus. Microorganisms that are able to produce enzymes that destroy lignin, cellulose, fiber, proteins of plant residues, play the most active role in this. Restoration of natural ecosystems, preservation of their biological diversity, as well as protection of agroecosystems from degradation is solving using alternative farming models, which are basing mainly on the use of microbial preparations. It should be noted and the environmental role of biologicals. They do not harm the agro enosis, reduce the pesticide load, and reproduce soil fertility and crop rotation productivity.

Preservation, maintenance and increase of productive potential of soils can be carried out through technology of cultivation of grain crops with use of preparations of a biological origin, in particular the Bio destructor of stubble.

The purpose of this technology is to involve in the circulation of organic matter non-commodity part of the crop, to create optimal conditions for the development of beneficial microflora in agrocenoses, soil health and increase its fertility.

Stubble bio destructor is a complex of soil and endophytic microorganisms that allows to increase soil fertility and improve its physicochemical and biological parameters: particle size and chemical composition, organic content, reduce pathogens, increase the amount of beneficial microflora, accelerate decomposition.

Technology using the Bio destructor of stubble includes treatment with bio destructor of chopped straw and stubble after harvesting with a sprayer with simultaneous wrapping in the soil with a disk unit to a depth of 8-10 cm (Fig. 2).

Long-stemmed crops (corn, sunflower) are pre-shredded with shredders. The application rate is 1 l / ha for fine-stemmed cereals and 2-3 l / ha for corn. The outflow of working liquid is 300 l / ha. Under conditions of insufficient moisture in the soil, the period of destruction is somewhat prolonged.

Straw and plant residues plowed into the soil have a significant decomposition period. Usually during the winter, straw in the soil decomposes under favorable conditions by 40%. The use of stubble bio destructor allows increasing the degree of straw decomposition to 80% and more, to maintain the integrity of the natural system and to accelerate the maturation of the soil in the spring.

Phytopathogens - pathogens - get into the soil with plant remains and accumulate on them. In order to prevent and inhibit their development, it is recommended to use Stubble Bio destructor, which includes active bacteria-antagonists of fungal and bacterial pathogens, as well as fungicidal and bactericidal substances synthesized by them.

Treatment of crop residues with microbial preparations is especially important in the transition to energy-saving technologies of minimal and zero tillage (Mini-till and no-till). Application of stubble bio destructor does not have a negative effect on seeds, the destructor acts only on crop residues. Sowing in the fields where the stubble bio destructor was applied can be carried out without a waiting period.

An important indicator of the biological activity of the soil is the intensity of decomposition of organic matter that is in the soil and enters it with organic fertilizers, plant and animal residues and other substances. The main source of energy for soil biota is fiber. Therefore, it is necessary to maintain the activity of the beneficial microflora of the soil by treating it and plant residues with the use of biological products, an example of which is stubble bio destructor.

Stubble bio destructor, which was introduced in the studied biotechnology, significantly increased the activity of soil microorganisms compared to the option without bio destructor. This is confirmed by the results of the analysis of decomposition of corn residues. The use of stubble bio destructor affects the activity of soil microorganisms. In this case, the organic matter of crop residues is localized

in the upper layer of the soil and its natural structure is not disturbed, which creates comfortable conditions for the activity of microorganisms. Thus, the optimal conditions for the development of cellulose-destroying organisms are created against the background of biologization of crop technology. The biological activity of the soil under the influence of soil and endophytes microorganisms that are part of the stubble bio destructor is changing, which is a prerequisite for increasing the humus content and stabilization and enhanced fertility reproduction.

Conclusions:

1. Management of crop residues with the help of complex microbial preparations allows solving the problems of restoring microbial activity of soils, reproduction of fertility, reducing the number of plant diseases, reducing the use of mineral fertilizers and pesticides.

2. Systematic application of stubble bio destructor accelerates the cycle of nutrients contained in crop residues, increases the amount of nutrients in the soil in a form accessible to plants, increases the organic matter content, which leads to a significant improvement in agrophysical and agrochemical parameters of the soil and as a result, obtaining high yields.

3. Wrapping in the soil of stubble-treated crop residues leads to an increase in the biological activity of the main groups of microorganisms responsible for destruction and humus formation.

4. The use of stubble bio destructor causes pathogenic suppression and stimulates the development of beneficial soil microflora.

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