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Increasing the Biological Activity of Salinated Soils of Bukhara Region With the Help of Various Fertilizers

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Abstract: In the life of all living organisms in nature, green plants, their blue masses and products obtained from them are of great importance in the active exchange of substances and elements, especially carbon from the main elements and its cycle. The organic and inorganic substances in the soil, especially the wide spread, variety, and enzymatic activity of microorganisms, are very important and significant for the growth, development and fruitful production of plants

Key words: living organisms, nature, green plants, microorganisms

In the life of all living organisms in nature, green plants, their blue masses and products obtained from them are of great importance in the active exchange of substances and elements, especially carbon from the main elements and its cycle. The organic and inorganic substances in the soil, especially the wide spread, variety, and enzymatic activity of microorganisms, are very important and significant for the growth, development and fruitful production of plants.

Therefore, one of the most important and urgent tasks is to study and control the conditions, quality, soil composition of the cultivated fields of our country, chemical and biological, especially microbiological processes in them, to improve the structure of the soil, and to increase its productivity. Solving these issues includes issues such as maintaining the ecological balance in nature and protecting the environment.

It is known that in ensuring high productivity of irrigated lands, humus substances, microorganisms belonging to various taxonomic groups present and widespread in them, simple unicellular animals, algae, nitrogen, phosphorus, potassium, calcium, copper, chalk and similar elements are involved. Of course, the physico-chemical structure of the soil, its location in different geographical latitudes, the degree of absorption, meteorological conditions, seasons of the year, etc. are also of great importance. The fulfillment of all these conditions affects not only the efficiency of crop cultivation, but also the quantity and quality of the harvest, early ripening, and prevention of plant diseases.

In increasing soil fertility and crop productivity, green algae is extremely rich in biologically active substances (including: protein-40-60%; nitrogen substances-7-9%; carbonic water-30%; fat-7-15%; phosphoric acid-5.5 %; mineral salts -12%; vitamins (A, B2, B3, B7, B9, B12, C, K, PP, D, E), trace elements (chalk, copper, molybdenum), amino acids (lysine, methionine, tryptophan, arginine, histidine, leucine, isoleucine, phenylalanine, threonine, valine) increases the scope of their wide use. In particular, it allows the use of clean seeds (untreated) during sowing, as well as during the growing period of cotton. As a result, seeds will quickly germinate, develop, get additional yield from cotton and improve the quality of fiber, strengthen the properties of plant disease resistance.

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Studying and characterization of the soils of different regions of our region, creating factors for the health of different types of soils using biotechnological methods, studying the microbiological, biological and enzymatic properties of soils are the basis of the actual problems.

The soil of cultivated fields of Bukhara region is washed from salt 1-2 times a year. As a result, the water-soluble nutrients necessary for cotton are washed away from the fertile soil layer, or the productivity of the irrigated meadow alluvial soils is sharply reduced due to the transfer of groundwater to the subsoil layer. In the last 10-20 years, the process of salt leaching from the soil has led to a decrease in their conversion to humic acids. Currently, the technology of using green microalgae suspension in cotton cultivation is used in some districts of Khorezm and Kashkadarya regions. Based on the above, it is an urgent problem to study the effect of biomethods on the microbiological and enzymatic activities of irrigated meadow soils with different levels of salinity and on cotton productivity.

Experiment site and soil conditions. Cotton was planted in an area of 80 ha belonging to Sayfullo Baba Ziraboti Farm, Bukhara District, Bukhara Region. The soil of this land area is irrigated meadow soil, the mechanical composition is medium to light sand, and the groundwater is 3-5 meters deep. Enzyme activity, the total number of microorganisms, and other properties of the soil were analyzed in the field experiment.

Effect of biofertilizers on the biological activity of moderately and highly saline meadow alluvial soils. The soil of "Sayfullo bobo Ziraboti" farm, Galaasia district, Bukhara region is irrigated, moderately saline, and some places are strongly saline. The mechanical composition of the soil is medium and light sandy soil, suitable for cotton cultivation. Along with cotton, alfalfa, corn and wheat are grown in these agricultural fields. However, the main crop of agriculture is cotton. It is known that the types and activities of microorganisms in the soil are very diverse. In this regard, the development of biofertilizers and their practical application is the focus of attention of many researchers of our country and abroad.

Creation of optimal methods of rapid propagation of strains of green microalgae belonging to the species Chlorella vulgaris (Beyer) and Scenedesmus obliquus (Turp.) was studied comparatively against the background of mineral fertilizers by determining the dynamics of enzymatic and microbiological processes.

Alluvial soil samples of Bukhara region with varying degrees of salinity, strains of green microalgae belonging to the species Shlorella vulgaris (Beyer.) and Scenedesmus obliquus (Turp.), a biofertilizer created at the Institute of Microbiology of the Federal Republic of Uzbekistan, its agrochemical composition: humus - 12.4%, nitrogen - 2 ,1%, phosphorus - 0.2%, potassium - 2.5%, amino acids and microelements, copper, zinc, etc. In order to determine this situation, preliminary experiments were conducted in laboratory conditions on a highly saline soil sample of this farm. The salt content was as follows (in % of dry residue) - sulfates - 2.0-3.0; chlorides - 0.1-0.2 - a quantitative index of microorganisms living in highly saline meadow alluvial soil was determined. During 20 days, 1 g of soil contained 1,600,000 cells of microorganisms, including ammonifiers, 2,900,000 cells of oligonitrophils, 8,000 cells of fungi, and the presence of green microalgae cells was not observed.

When determining the amount of microorganisms, 10-15 million seeds of Bukhara 8 variety in 1 ml. Cells were thawed in a suspension of green microalgae from cottonseed and seeded into the highly saline soil described above. Then, within 8-9 days, the amount of ammonifiers in the soil is initially from 1600 thousand to 3100 thousand per sample; the number of oligonitrophils is from 2900 thousand to 4100 thousand; primary fungi - from 8 thousand to 12 thousand; It was found that green microalgae increased from 210,000 to 400,000. The number of ammonifiers is from 1,600,000 to 3,800,000 when the seed to be planted in the suspension of green microalgae and mineral fertilizer (NPK – 50%) is added to carry out experiments in three options; oligonitrophils - from 2900 thousand to 10200 thousand; fungi - from 8 thousand to 14 thousand; it was found that green microalgae increased from 200,000 to 950,000.

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Based on the experiments, it was found that the growth and development of microorganisms and the activity of soil enzymes are low due to the high amount of sulfate and chloride ions in highly saline soil. In order to study the effect of green microalgae on the growth, development and productivity of the Bukhara-8 cotton variety, as well as the composition and enzymatic activity of microorganisms, further experiments were carried out in moderately saline irrigated meadow soil. It was determined that the salt content of the average saline soil is as follows (in % based on dry residue): sulfate - 1.0-2.0; chloride-sulfate - 0.03-0.1. The growth of microorganisms and green microalgae (chlorella) in the irrigated soil was investigated for 20 days.

It was determined that 1 g of soil contains 3,800,000 cells of ammonifiers, 6,700,000 cells of oligonitrophils, 20,000 cells of fungi, and 5,000 cells of green microalgae. When green microalgae were added to the soil, it was observed that the number of cells of the above organisms increased by 1.6-1.9 times. For example, it was found that the amount of ammonifiers increased from 3800 to 5800 thousand, oligonitrophils - from 6700 to 8420 thousand, fungi - from 20 thousand to 175 thousand, and green microalgae - from 457 thousand to 589 thousand. Later, it was observed that the number of cells of the above organisms decreased.

When mineral fertilizers and green microalgae were given to the soil, it was observed that the growth and development of bacteria increased. During the remaining days of the experiment, the number of cells decreased. Studies have shown that during 6-8 days, the amount of ammonifiers increased to 7160 thousand, oligonitrophils increased to 15570 thousand, fungi increased from 20 thousand to 275 thousand, and green microalgae increased from 400 thousand to 573 thousand. In general, it was observed that the number of microorganisms and the growth and development of cotton were at a higher stage in medium salinity soil.

Conclusion. The irrigated soils of the agricultural area are mainly heavy and medium in mechanical composition. The reclamation condition of the soil is closely related to its underground water and its mineralization, but the underground water has little influence on the process of soil formation. Because of this, the agricultural soil cover has different degrees of salinity, and the depth of underground water varies.

Studies have shown that irrigated meadow alluvial soils are low in nutrients. The need for nutrients in the soil in these areas is felt more in relation to phosphorus fertilizers. It is provided with a low level of gross and mobile forms of phosphorus substances.Growth and development of ammonifiers, oligonitrophils, fungi, and green microalgae were determined under the influence of green microalgae suspension and biofertilizers in moderately and highly saline irrigated meadow alluvial soils of Bukhara region.

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