AGROBIOLOGICAL PROPERTIES OF BENTONITE IN AGRICULTURE

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In agriculture, it has been studied that the use of non-traditional agro-ores as additional nutrients gives good results in maintaining and increasing soil fertility. It is known that the reduction of organic substances in the soil, especially humus, sharply reduces the effectiveness of synthetic fertilizers used to obtain high yields from crops. In mitigating the shortage of mineral and local fertilizers, non-traditional agro-ores glauconite, phosphorite and bentonite slurries are rich in many micro- and macro-elements.

Bentonite clay, which is considered one of the non-traditional agro-ores, can be used as fertilizers in agriculture due to the level of provision of macro- and micro-elements in the soil in optimal proportions. Microelements have a high agrochemical and physiological importance, they improve metabolism, help the physiological and biochemical processes to pass optimally, have a positive effect on the process of chlorophyll synthesis and increase the speed of photosynthesis. Under their influence, plants become more resistant to fungal and bacterial diseases, one of the unfavourable environmental conditions is the lack of moisture, temperature increase or decrease [1].

It has been proven that sowing seeds encapsulated with non-conventional agro-ore bentonite slurry accelerate the germination of cotton seedlings by 1-2 days, increases the weight by 10-12% and increases the yield by 2.2-2.7 5 t/ha.

Many scientists in our country and abroad have carried out scientific research on the use of non-traditional agro-ores in agriculture. In particular, agro-ores have been found to have a wide influence on physiological and biochemical processes in plants.

Agro-ores of bentonite and glauconite improve the mechanical composition of the soil, as a catalyst in the physiological processes of plants, in photosynthesis, metabolism, and disease resistance [2-4].

The effectiveness of bentonite in agriculture has been extensively studied in different soil climates. It was determined that when bentonite slurry is added to the soil at different rates and periods, the water-physical properties of the soil are improved, seasonal water consumption is saved, cotton wilt and root rot diseases are reduced by 25-40%, and cotton yield is increased by 14.2-20.6%. [5-11].

It is worth noting that scientific works have been carried out on the effect of various non-traditional agro-ores and composts prepared based on them on the productivity of cotton and cotton-complex crops. In the Bukhara oasis of Uzbekistan, the dynamics and physiological processes of cotton germination, as well as the effect on productivity, of encapsulating seeds

of various cotton varieties with bentonite mud solution in grassland-alluvial soils and extreme climatic conditions are determined.

Bentonites, glauconites, palygorskite, zeolites, vermiculites, carbonate-phosphate rocks, mineral muds, mining industrial wastes, etc., among the non-traditional mineral raw materials, serve as a source of microelements and improve the water-physical properties of the soil [12-17].

Today, scientists of the Institute of Geology and Geophysics have carried out significant scientific work on the above-mentioned unconventional agro-ore deposits, including bentonite clay deposits. Information about the effectiveness of the use of bentonite clay in agriculture is widely covered in the republic. Foreign materials related to reserves, physicochemical and technological properties and areas of use of clay deposits scattered on the territory of the Republic have been collected. Therefore, in the implementation of this project, the participation of geologists is very important, along with experts in the field of agriculture, in determining the prospectivity of deposits, separating productive layers and determining their quality [15-19].

In the conditions of our republic, growing a stable, high-quality crop from cotton is the backbone of our economy, and the main part of the foreign exchange earnings is provided by the export of cotton fibres. Also, the development of many branches of agriculture and industry is directly related to the cotton sector. From this point of view, it is important to increase the production of raw cotton, reduce consumption costs by 30%, increase productivity by 20%, to develop and modernize agrotechnical measures for growing high yields in accordance with modern conditions, despite the disadvantages of natural climatic conditions.

It is known that physiologically active substances have a specific effect on the photosynthesis process, enzyme activity, amino acid, nucleic acid and protein biosynthesis, phytohormone exchange process in cotton metabolism, increase the germination capacity and fertility of seeds, increase tolerance to drought, salt and diseases, and have a positive effect on the rapid growth of the plant, accelerates the ripening of crops and increases productivity and product quality [20-24]. During the processes of cotton ontogeny and under the influence of various agrotechnical measures, crop elements are rapidly formed in plants. But under the influence of extreme conditions, failure to follow the scientifically based ratio of mineral fertilizers application or low rate, due to lack of water or excessive moisture and poor quality of agrotechnical measures, due to the influence of diseases and harmful insects, the loss of crop elements is observed, as a result of which the yield of crops decreases and the quality of products decreases. If 1-2 more bolls are preserved or gathered in one bush of cotton, the productivity increases by 3-4 t/s or allows for the growth of several 100 thousand tons of additional cotton crop in our Republic [25-28].

Therefore, to reduce the spillage of crop elements that appear during the development periods of cotton under the influence of external factors, and to increase productivity and product

quality, it is important to study the effect of local raw bentonite powder on cotton and develop optimal application technology in the conditions of our republic.

As a result of the solution to this problem, cheap, ecologically clean new agricultural products will be developed locally, and new jobs will be created in the enterprise that produces it, which will be a solution to problems such as localization of industrial production, modernization of enterprises and opening of new jobs promoted by the leader of our country.

In the section of Paleogene deposits in the southwestern foothills of the South Nurota Range, clay deposits are widespread, accounting for about 80 per cent of all rocks. A. Thanks to the scientific research conducted by Mirzaev, a deposit of high-quality bentonite and carbonate palygorskite clays were found and explored in the section of these deposits. Today, more than 7.1 million tons of reserves of this mine have been approved by the State Reserves Commission (SRC) and put into operation.

Bentonite clays of industrial importance belong to the Nura suite of the Eocene, and the carbonate palygorskite clays belong to the sugral suite, they lie in accordance with the quartz sands of the Kazaktov suite and in turn are overlain by the bentonite clays of the Kultaban suite. The maximum total thickness of bentonite and carbonate palygorskite clays is about 20 m. The material composition and physicochemical properties of bentonite and carbonate palygorskite clays were studied using modern laboratory research methods [29-31]. In the mineral content of bentonite clay, montmorillonite reaches 80 per cent. The amount of secondary mineral hydromica is 10-25 per cent. Quartz, cristobalite, iron hydroxides, calcite, palygorskite, galluasite, aunite, jarosite, etc. are found as additions.

In the electron-microscopic pictures of preparations made from bentonite clay suspension, montmorillonite is composed of cloudy particles of irregular isometric shape with unclear edges. The size of such crystals ranges from 0.1 to 1.0 μm, with an average of 0.3-0.5 μm. Deformed crystals of montmorillonite are visible in the replica taken from the surface of the sample.

Carbonate palygorskite clays and alkaline bentonites have been very effective in the purification of cottonseed oil and in the clarification of wine-vodka products. In this case, it is not necessary to process them with chemical reagents as usual, but simple thermal activation is sufficient. Thus, it has been proven that alkaline bentonites can be used as a structure-forming additive in the production of varnish and paint products, and in the production of bentonite laundry soap, detergents and cleaning agents in household chemistry. After special treatment of bentonite clays, a preparation with strong antiseptic and adsorbing properties was obtained from them. Clinical studies show that this drug is very effective in the treatment of surgical and burn wounds.

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