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Advantages of Covering Seed with Bentonite Mud

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Annotation. In the scientific article, the effect of covering the seeds of local cotton varieties Gossipium barbadense with bentonite slurry on the seed germination was studied in the growing barren soils of the Surkhandarya region of the Republic of Uzbekistan.
When coating cotton seeds with bentonite clay solution, when 50 kg of seeds are coated with 15 kg of melted bentonite mud, the dynamics of seed germination and the effect on cotton growth and yield are described. Differences in growth and development of treated seeds of domestic and imported thin-fiber cotton varieties compared to untreated variants were determined during the season. Also, the effects of planted cotton varieties on the yield and quality of the crop were determined, and the differences between the control and the varieties were studied. It has been studied that bentonite clay is an agro-ore rich in natural micronutrients, and due to its good adsorbent properties, it can increase the tolerance of seeds to various stress and extreme conditions encountered in the soil during the germination period, and also increase the resistance to the negative effects of diseases and pests. In the scientific article, information on the new, cheap and effective technology of planting seeds with a bentonite clay solution of natural non-traditional agro-ore is presented based on research.

Keywords. Agrorude, soil, grassland, barren, degradation, bentonite, cotton, variety, seed, shell, common, seed, thin fiber, layer, G.barbadense, Termiz-202, Iolatan-14, Surkhan-103, ST-1651, humus , catalyst, photosynthesis, extreme, cation, anion, fertility, temperature, gammosis, root rot, trace element, stress, seedling, montmorillonite, option, phase, pod, yield.

Today, 8 billion people living on the surface of the earth are separated from 6.5 million hectares of fertile soil every year as a result of degradation of 1.5 billion hectares of fertile soils for irrigated farming in the world. Therefore, the problems of providing the population of the earth with agricultural products, including food products, have arisen, which requires the intensive use of existing irrigated lands. The rapid growth of the population and the reduction of arable land to a certain extent creates the need for the development and scientific justification of measures to increase soil fertility and improve the weight and quality of the harvest obtained from agricultural crops.

In the agrarian sector of the Republic of Uzbekistan, in order to obtain a high and quality harvest from agricultural crops, the science-based crop rotation system is not followed in the following years, a sharp decrease in mineral fertilizers applied to the soil, and a shortage of local fertilizers are causing a number of serious losses in maintaining soil fertility. For this reason, the use of relatively inexpensive and abundant natural raw materials, including local glauconite flour, phosphorite, bentonite mud, and many mineral raw materials from industrial wastes, as non-traditional additional nutrients in agriculture can be beneficial.

If we turn to concrete facts, 843.2 thousand hectares of irrigated lands in our country have been degraded and their productivity has decreased sharply. According to the state of productivity, the level of humus supply of the irrigated soils of our Republic decreased by 0.15% in the 0-30 cm layer of the soil in the next 30 years, i.e. by 5.57 tons per hectare, especially the total amount of nitrogen in the soil decreased by 0.010%, i.e. by 380 kg per hectare, gray soils in plowed and under-plowed layers, the amount of humus is proportionally 1.02-0.88%, and in the soils of the desert region, the amount of humus has decreased by 0.89-0.63% in the plowed layer, and it is observed that this amount decreases from year to year.

In the decree of the President of the Republic of Uzbekistan dated June 17, 2019 "On measures for the effective use of land and water resources in agriculture" No. PF-5742, it was specially emphasized on the implementation of practical and innovative research on the improvement of agrotechnology of the use of

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complex fertilizers and non-traditional mineral raw materials in agriculture. . It is known from the world experience in agriculture that bentonite and bentonite-like natural rocks, glauconite and others are multi-purpose raw materials due to their physico-chemical properties of the composition of agro-ores, especially the richness of microelements, absorbability.

As a rich source of macro and microelements in plant nutrition, cation and anion exchange as an adsorbent increases absorption, improves soil water retention, cleans soil and plants from toxic chemical elements, heavy metals and radiation (P.B. @ Agromage. com 2010), reduces the amount of harmful salts in soil as a meliorant (S.M. Boltaev 2018), sand and (A.S. Sokolov, A.O. Orazmuratov) stated in their scientific works that sand improves the mechanical structure of the soil, acts as a catalyst in the physiological process of plants, in the exchange of substances in the process of photosynthesis, respiration, and in increasing the resistance of plants and seed materials to diseases. . By A.Djamalov, D.Alimardanov, when non-traditional agro-minerals, especially bentonite clay and glauconite sand are used in cotton at different rates and periods, the occurrence of wilt disease is reduced by 20-25%, as well as black root rot and gammosis diseases are reduced by 20%, and the cotton yield is 5.1 ts/ it was determined as a result of the scientific researches that caused it to increase.

In countries with developed agriculture, seeds are treated with various substances in order to increase their resistance to diseases and pests. As a result of this action, the resistance level of crop seeds increases in some way, but these substances do not satisfy the need of microelements of seeds or increase their fertility.

Taking into account the specific physical and chemical properties of bentonite and bentonite-like rocks and the richness of microelements, a part of the research work was carried out in the conditions of barren soils of Surkhandarya region to study the effect of seed coating in order to protect the seeds of agricultural crops from various pests, to increase their resistance to stress factors and their fertility. went

The factor of the swelling properties of bentonite clays having a good effect on the water-physical and physico-chemical properties of the soil is the presence of magnesium montmorillonite mineral in their composition of 20-60% or more.

Therefore, the amount of exchangeable cations and anions in 100 grams of soil is equal to 23-150 mg/eq. is a gram. In addition, bentonites are considered as an additional source of nutrients for plants, they contain 0.3-4.7% carbon, 0.4-3.0% potassium and 0.3-1.0% phosphorus.

In addition, it contains copper, zinc, boron, cobalt, molybdenum, manganese, sulfur and more than ten microelements. Bentonite slurries from the soil layer where plant roots are spread prevent mobile nutrients and humus from being washed away by water and increase carbon, nitrogen, phosphorus and potassium reserves in the soil. This satisfies the need for nutrients and microelements of the seed planted in the soil, especially during the germination period, and ensures the emergence of a healthy seedling.

Bentonite mud has been found to have a wide range of effects on physiological and biochemical processes. In particular, it increases the seed germination capacity by 10-12%, increases the amount of chlorophyll by 2.5-3.0 times and increases the productivity of photosynthesis.

It is also important to protect the planted seeds from various negative effects in the soil. After sowing seeds and other seeds at a certain depth, they effectively protect against rapid drying of the seed layer under the influence of sudden changes in air temperature and chronic winds, and against harmful fungi and bacteria in the soil, as well as the effects of pests that damage the seeds during the germination period.

Research object and methods. As an object of research, shelling solution prepared on the basis of bentonite mud and fine-fiber cotton varieties Termiz-202, Iolatan-14, Surkhan-103 and ST-1651, loamy soils. In the conditions of barren soils of Surkhandarya region with extreme climatic conditions, the effectiveness of seed sowing with Khovdak bentonite mud was studied in field experiments. In this case, seeds of fine-fiber cotton of Gossipium barbadense species Termiz-202, Iolatan-14, Surkhon-103 and ST-1651 were sown with 15 kg of well-dissolved bentonite mud per hectare per 50 kg of spent seed. All observations and measurements in the field experiment were carried out based on the manuals "Methods of Agrophysical Research", SoyuzNIXI (1973) and "Methods of Conducting Field Experiments", UzPITI (2007).

In 2018, thin fiber cotton varieties were planted on April 6, 20.04., 1.05., 5.05. Differences between the germination rate and quantity (number) of the seeds sown in the shelled and conventional method were determined. (table 1). It is worth noting that this year, the drop in air temperature in the first and second ten days of April, the drop in the temperature in the 10 cm layer of the soil caused difficulties in quick and horizontal germination of the pinned seeds.

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In the experiment, the dynamics of germination of seeds covered with bentonite slurry in the soil gi was found to be superior to the control even in unfavorable natural conditions. 5.05 in cotton varieties. It was observed that the germination of shelled seeds on date was 8.7-9.6% higher than that of normally planted seeds in all variants. The results of observation show that even in unfavorable soil and climatic conditions, sowing seeds with bentonite slurry has a positive effect on the dynamics of seed germination, and it creates opportunities to get enough seedlings from cotton and produce a full hectare (Table 1).

Table 1. Dynamics of germination of cotton varieties, %. (planting date, 04/06/2018)

Goza varieties	Two methods	Seedling thickness, thousand shoots/ha	Observation periods, days			Monitoring difference, %
			20.04	01.05	05.05	05.05
Termiz-202	Covered	130-140	55	90	95	9.5
Termiz-202	Simple	130-140	53	85	86	
Iolotan-14	Covered	130-140	60	85	91	8.7
Iolotan-14	Covered	110-120	70	90	94	9.6
Iolotan-14	Simple	130-140	50	80	85	
Iolotan-14	Simple	110-120	55	88	91	
Surkhan-103	Covered	130-140	63	88	95	9.5
Surkhan-103	Covered	110-120	65	90	96	9.3
Surkhan-103	Simple	130-140	60	82	91	
Surkhan-103	Simple	110-120	61	85	92	
CT-1651	Covered	130-140	56	89	97	8.8
CT-1651	Covered	110-120	55	90	95	9.5
CT-1651	Simple	130-140	53	85	86	
CT-1651	Simple	110-120	54	84	91	

Despite the fact that the seeds coated with bentonite clay were planted at the same time during the season according to the growth and development of the plant, it was observed that there was a significant difference in the growth and development of cotton compared to the variants planted in the normal way. During the growing season, the level of black root rot and gammosis, which is more common in cottons with thin fibers, was very low. It was found that the rate of aphid and thrips damage of cotton seedlings in the young period was very low in seedlings germinated from encapsulated seeds compared to the control option. According to the results of the observations conducted in August of the season, the height of the head stem of cotton varieties was 93.7 cm in the shelled variant of Iolotan-14 variety, and it differed by 8.6 cm from the variant planted in the normal way, and the number of formed bolls was 3.8 more, and the yield increased by 1.9-2.3 ts/ . Also, in other varieties, it was found that the cotton growth and yield was 2.0-2.6 ts/ha higher in shelled variants than in conventionally planted variants. (table 2).

Table 2. Bentonite coated seed and normal seed
seed growth and development, 2018.

Var. No	Goza varieties	Two methods	Seedling thickness, thousand shoots/ha	August 1			September 1		
				height, cm	harvest, seeds	harvest element, piece	kosak, dona	one bag of weight, gr	productivity, c/ha
1	Termiz-202	Covered	114	104.2	18.4	28.9	22.8	2.1	33.5
	Termiz-202	Simple	131	97.6	15.9	25.7	20.4	1.9	32.7

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	Iolotan-14	Covered	127	91.3	13.1	23.8	20.3	1.6	31.6
2	Iolotan-14	Covered	115	93.7	14.5	27.8	23.4	1.5	32.6
3	Iolotan-14	Simple	127	85.1	11.8	20.3	18.1	1.5	29.7
4	Iolotan-14	Simple	115	86.7	12.2	23.7	19.6	1.5	28.9
5	Surkhan-103	Covered	129	99.3	14.2	25.1	20.7	1.8	33.7
6	Surkhan-103	Covered	114	94.8	15.2	26.5	22.4	1.7	33.0
7	Surkhan-103	Simple	129	91.9	14.1	21.8	19.3	1.7	31.8
8	Surkhan-103	Simple	114	90.9	14.6	24.7	22.3	1.7	30.9
9	CT-1651	Covered	131	99.7	16.7	27.3	21.5	1.7	35.0
10	CT-1651	Covered	114	102.2	17.4	28.9	22.6	1.7	32.5
11	CT-1651	Simple	131	94.6	14.9	25.6	20.8	1.6	32.9
12	CT-1651	Simple	114	97.6	16.0	25.9	20.3	1.6	30.8

Conclusions based on the analysis of the research results:

- it was found that sowing seeds of various cotton varieties with bentonite mud, which is a natural source of micronutrients and ecologically pure, gives positive results for the healthy germination of seeds, healthy development and harvesting of cotton as its cheapest resource and abundant raw material.

- is of great importance in effectively protecting the seed from various negative effects on the soil, including sudden changes in air temperature and the rapid drying of the layer where the seeds fell under the influence of chronic winds, harmful fungi and bacteria in the soil, and the effects of pests that harm the seed during germination.

-bentonite mud has a positive effect on the physiological and biochemical processes during seed germination, increases the germination capacity of seeds by 10-12%, increases the amount of chlorophyll in seedlings by 2.5-3.0 times, and improves photosynthesis productivity.

- in the variant where the seeds are sown with shells, the resistance of cotton seedlings to black root rot during the growing season, especially gammosis, which is more common in thin-fiber cotton, and to the effects of sucking pests such as aphids and thrips in the phase of true leaf release of young seedlings increases.

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