ISSN NO: 2771-8840
Date of Publication: 30-03-2022

The Influence of the Bentonite Clay Coated Winter Wheat Seeds on Laboratory Germination

[1]Yodgorov N.G., [2]Amirkulov O.S., [3]Hasanov B.R., [4]Togaeva H.R.
Email: ynormumin@mail.ru, amirqulovo@mail.ru
[1]Yodgorov Normumin Gulomovich *agr.sci. d. (Ph), Senior researcher*
(Candidate of Agricultural Sciences, Senior Researcher).
[2]Amirkulov Otabek Saydullaevich *agr.sci. d. (Ph), Senior researcher*
(Candidate of Agricultural Sciences, Senior Researcher).
[3]Hasanov Bobur Rustam ogli *doctoral student*
[4]Togaeva Holida Rajabovna *doctoral student*
Southern Agricultural Research Institute, 180100, Karshi, Kashkadarya region, Uzbekistan

Annotation: In this article, the influence of the norm of coating seeds of winter wheat with bentonite clay, the energy of seed germination, fertility, the length of caleoptiles, the length and number of roots on the laboratory condition were determined and the results were analyzed at the Southern Research Institute "Plant Physiology and Biochemistry"

Key words: Bentonite clay, winter wheat, laboratory fertility, germination energy, number of roots, length, caleoptile length, seed coat.

Introduction The efficient use of water and other resources in agriculture, in particular the introduction on a regular basis of methods to increase productivity, providing various savings on irrigation and fertilizer, including soil fertility, moisture capacity and the use of natural agro-ores enriching with various elements necessary for plants, are economically and environmentally efficient.

Agro ores are natural compounds that can be used as fertilizers, ameliorants, biostimulants, feed additives in agricultural production.

Agro ores include zeolite, bentonite, diatomite, tripolite, terlitic, glauconite, palygorskite clays and others. In the USA, up to 800,000 tons of bentonite and zeolites, up to 400,000 tons of diatomite and shamrock, up to 600,000 tons of palygorskite, and in Russia up to 100,000 tons of zeolites, up to 50,000 tons of bentonite, diatomite, and up to 80 thousand tons of tapestries are used [1].

World experience in the use of non-traditional agro-ores shows that their use provides an increase in crop yields by 10-15 %, improving product quality; agro-ores cleans the soil of heavy metals, toxins and radioactive elements.

They are also used to counteract the negative impact of toxic salts, to replenish the missing part of the microelements in the soil, as feed additives for cattle, to improve the composition and quality of manure and silage. Bentonite clay is rich in minerals that naturally occurring mineral and many types are found in nature. Bentonite clay not only satisfies the soil's need for microelements, but also serves to improve its ameliorative state. Although bentonite clay retains moisture in the soil, it collects sand particles around it, increasing the viscosity of the sand.

Today, leading Western agrochemical companies produce ready mixes for seed coating, most of which is bentonite clay. Bentonite contains many minerals that have a positive effect on the plant, and also interact well with water and form a fairly strong coat on the surface of the seeds during coating. In addition, the coat contains protective and nutritious elements that contribute to the full development of the plant, increases the fertility of the fields and, as a result, increases the yield and its quality [2; 4].

In studies conducted by A.V. Kravets, V.A. Vinnikova, it was found that an aqueous extract of bentonite at a concentration of 0.5 % increases the germination of oat seeds by 10 %. An increase in seedling mass by 24 % and root mass by 33 % was also noted [3].

ISSN NO: 2771-8840
Date of Publication: 30-03-2022

Object and methods of the research So far, no experiments have been carried out in our country to study the germination of seeds as a result of seed treatment with bentonite clay.

Our experiments were carried out in the laboratory "Plant Physiology and Biochemistry" of the Southern Research Institute of Agriculture within the framework of the practical project **PZ 202102154** "Development of science-based agricultural technologies for saving irrigation water using bentonite clays in the cultivation of crops". Determination of seed germination in laboratory conditions in accordance with the requirements of the international standard GOST 12038-84, with seeds of winter wheat varieties "Shukrona" and "Sarbon" with bentonite 30; It was determined by processing at the rate of 40 and 50 % (by weight of seeds).

At the same time, 100 seeds in 4 replications helped to determine all the seeds in a thermostat in laboratory conditions. It has been established that winter wheat seeds germinate in a thermostat in 3 days, and at a temperature of 20 ^{o}C , they germinate in 7 days. In laboratory experiments, they studied the length of caleoptiles, the number of roots and the length of germinated seeds.

Research results According to the results of laboratory experiments, the effect of bentonite on the germination energy and seed germination of winter wheat varieties was significant. In this case, the seeds were treated with bentonite , it was established that the germination energy and seed germination under laboratory conditions increased in accordance with the amount of bentonite during the processing of shells by 30;40 and 50 %. The seed germination energy of Shukron winter wheat was 88 % in the untreated control variant, 90 % with 30 % seed coverage with bentonite clay, 93 % and 95 % with 40 % and 50 % seed coverage with bentonite clay compared with the control and there was an increase of 5 and 7 %. In the analysis of laboratory seed viability, in the untreated with bentonite clay variant seed viability made up 96% that the seeds were 30; 40 and 50 % indices; when coated with bentonite clay, the indices showed 98; 99 and 100 % or 2 compared to the control; were higher by 3 and 4 % (Table 1).

Table 1

The eeffect of coating winter wheat seeds with bentonite clay on laboratory fertility

№	Varieties	The norm of application of bentonite	Growth energy, %	Laboratory fertility, %	Caleoptile length,cm	Root length, cm	Number of roots, pcs
1	«Shukrona»	Control (seed uncoating)	88	96	3,8	4,0	3,2
2		Bentonite 30 %	90	98	4,5	4,2	3,9
3		Bentonite 40 %	93	99	4,9	4,4	4,2
4		Bentonite 50 %	95	100	5,1	4,5	4,5
5	«Sarbon»	Control (seed uncoating)	86	95	3,4	3,8	3,0
6		Bentonite 30 %	89	97	4,1	4,1	3,7
7		Bentonite 40 %	91	98	4,7	4,2	3,9
8		Bentonite 50 %	94	99	4,9	4,4	4,1

The same relationship was observed in the winter wheat variety Sarbon. For example, in the control variant, where the seeds were not treated with bentonite clay, the germination energy of the seeds was 86 %, while the seeds were 30; 89 when coated with 40 and 50 %, bentonite clay, it was determined to be 91 and

ISSN NO: 2771-8840
Date of Publication: 30-03-2022

94 % , it excelled 3; 5 and 8 % compared to control; the laboratory fertility was 95 % in the controlled variant with 30 seeds, when seeds coated with 40 and 50 % bentonite clay it was found to be 97; 98 and 99 % , it was 2; 3 and 4 % higher compared to the control, respectively.

While long caleoptiles of winter wheat seeds provide rapid seedling growth without damaging the soil surface in the field, the number and length of roots accelerate and improve the absorption of mineral elements that available in the soil by plants. This has a significant positive effect on the growth and development of germinated grasses. The length of the caleoptile formed in the seeds, as well as the number and length of the roots has been analyzed in the laboratory condition under the influence of covering the seeds with bentonite clay. At the same time, as a result of seed treatment with bentonite clay, it was found that the length of the cadeoptile, the number of roots and the length formed from germinated seeds increased in proportion to the norms of bentonite clay (30; 40 and 50 %). In other words, the average length of the caleoptile in the control variant of winter wheat Shukron was 3.8 cm, in the variety Sarbon it was 3.4 cm, and when the seeds were covered with 30 % bentonite clay, the length of the caleoptile was 4.5 and 4, 1 cm respectively, or 0.7 and 0.7 cm above control, it was 4.9 and 4.7 cm or 1.1 and 1.3 cm with 40 % bentonite clay, when treated with 50 % of bentonite clay the index showed 5,1and 4,9 cm, or the length was 1.3 and 1.5 cm, respectively. Also, when analyzing the length and number of roots of plants germinated under the laboratory conditions, on the control variant of the winter wheat variety “Shukron”, the length and number of roots were 4.0 cm and 3.2 pcs, and when the seeds covered with - 30; 40 and 50 % bentonite clay, the root length was 4.2, 4.4; 4.5 cm respectively, the number of roots was 3.9; 4.2; 4.5 pcs or it was 0,7; 1,0; 1,3pcs higher compared to control; On the control variant of the winter wheat variety “Sarbon”, in proportion to the above, the root length was 3.8 cm, the number of roots was 3.0 pcs, in the experiment, when seeds coated with 30; 40 and 50 % bentonite clay, the length indices were 4.1, 4.2; 4.4 cm, respectively; number of roots was 3.7; 3.9; 4.1 pcs or it exceeds 0.7, 0.9; 1.1 compared to control. In laboratory experiments, the highest rates of germination of winter wheat when seeds treated 50 % bentonite clay, seeds germination energy made up 95 %, length of caleoptiles formed was 5.1 cm, and the length of roots was 4.5 cm, and the number of roots was 4.5pcs, in the experiment, it was found that the lowest yield of seeds of winter wheat variety “Sarbon” showed 86 %, 95 %, 3.4 cm, 3.8 cm and 3.0 pcs when untreated control variant with bentonite clay, respectively.

Conclusion Under laboratory conditions, sowing seeds of winter wheat with bentonite clay coating had a positive effect on the ability of seeds to germinate. In the study, the seeds of winter wheat varieties “Shukron” and “Sarbon”, covered with 50% bentonite clay, root length was 4.5 and 4.4 cm, number of roots was 4.5 and 4.1, respectively, belong to class I according to the requirements of GOST.

References

1. Kravchenko I.P. Economic ores and non-traditional mineral raw materials (interactive course): Textbook / compiled by: Kravchenko I.P. - Saratov: Publishing House - FGBOUVPO «Saratov State Agrarian University»., p. 201.
2. Mikheev D. Investigation of the application of dry powder based on bentonite clay on the surface of sugar beet seeds during coating. EE "Belarusian State Agricultural Academy" Gorki, Belarus, 213407. 2018 . p. 181-185.
3. Kravets A.V., Vinnikova V.A. Influence of water extracts from clay minerals on the sowing quality of oat seeds // International Journal of Applied and Fundamental Research. – 2018. – № 1. P. 149-152 .
4. Ёдгоров, БМ Халиков. ВЗАИМОСВЯЗЬ УРОЖАЙНОСТИ МЯГКИХ СОРТОВ ОЗИМОЙ ПШЕНИЦЫ С КОЛИЧЕСТВОМ ПРОДУКТИВНЫХ СТЕБЛЕЙ, МАССЫ ЗЕРНА КОЛОСА И ЕГО ВЫХОДОМ НГ // - Актуальные проблемы современной науки, 2018