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QUALITY OF SUGAR BEET SEED DEPENDING ON ITS STIMULATION

It is established that the intensity of calibrated seed germination of diploid and triploid hybrids by stimulation is significantly increased, especially in the early stages. After stimulated calibrated seed pelleting, both biological forms of sugar beet, germination energy and similarity of it was the same as before pelleting, but significantly higher than on the control. The most significant influence on seed germination has factor "stimulation" among of other factors.

Keywords: *sugar beet, seed, stimulation, intensity of germination.*

Introduction. The quality of sugar beet seed is caused by the complex of genetic factors [1], environmental and agrotechnical conditions of its cultivation and methods of post-harvest and presowing preparation with modern technologies using [2;3]. In the process of presowing preparation of sugar beet seed is passing a complicated technological chain: cleaning from impurities that are not related to seed and small fruits that are in accordance with the requirements of the standard are wastes of the main culture, calibration on the technology and sowing fractions, polishing, sorting by the aerodynamic properties and specific mass, pelleting and encrusting [4]. All these technological operations are focused on quality of prepared seed improving [5]. Along with the above technological operations for seed obtaining with the maximum-possible similarity are using its stimulation. There are different methods of stimulation: mechanical way – by mechanical noise reducing – pericarp of seed, which is achieved by seed polishing, chemical – different growth regulators using, changes in temperature from the humble (5-10 °C) and to the higher (20-30 °C) in the process of germination or by initiating of the passage of the initial phases of germination with its suspension following. The latter is one of the most perspective methods of intensity of seed germination increase. The purpose of our research was the factors determine that influence on the processes of rapid embryo germination and efficiency of this method use in the process of presowing seed preparation.

Materials and methods. Laboratory researches are conducted in the Institute of bioenergy crops and sugar beet NAAS, laboratory and factory – on TOV Ahrohrad "B" (Vinnitsa seed plant) in 2012-2013. For stimulation were using 12 parties of calibrated seed prepared for pelleting, which is partially lost similarity and energy of germination in the process of storing: Ukrainian ChS 72 and Vesto diploid hybrids and Dobroslava, Alexandria triploids. Stimulation of seed is carried by the method that developed by the Institute of bioenergy crops and sugar beet. After stimulation seed are pelleting. In the control variant were seeded not stimulated seed. In this article the content of the method is not disclosed as materials are preparing for patenting and only the results of its manufacturing inspection is provide.

On each variant was determined the number of germinated seeds on the 2nd, 3rd, 4th (energy of germination) and 10th (similarity) days of germination. Seed were germinated in accordance with DSTU 2293-93 (GOST 22617-94) [6].

Results and discussion. Developed Institute method of seed stimulation of the germination using which provides the embryo awakening in the early stages of its subsequent suspension is provided a significant increase of the intensity of seed germination of different biological forms of sugar beet in laboratory conditions (Fig. 1).

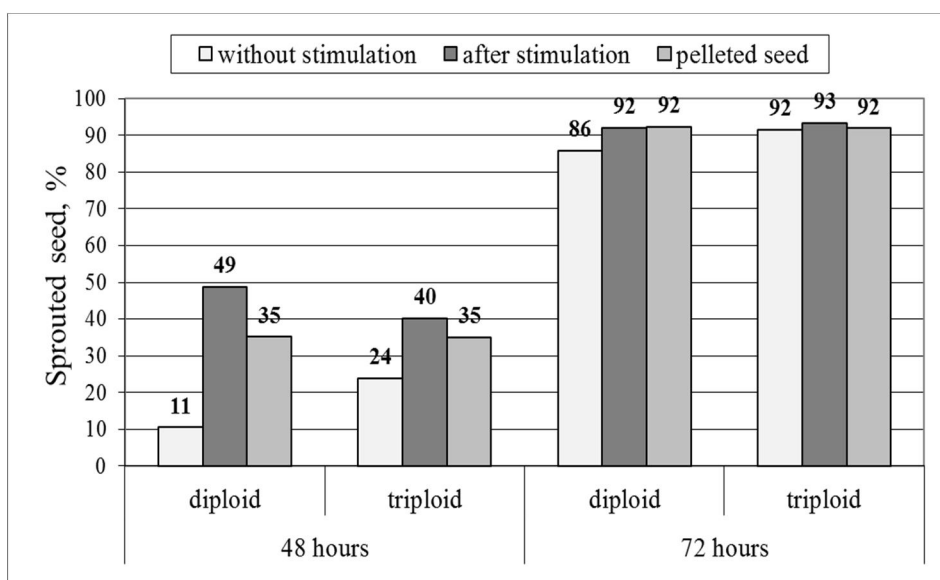


Fig.1. The intensity of seed germination of different biological forms depending on its stimulation (average of 12 parties of seed)

Thus, an average of diploid hybrids if without stimulation through of 48 hours after seeding were sprouted 11% of calibrated seed then after stimulation - 49% or on 38% more than on the control. Similar results were obtained in triploid hybrids. After stimulated seed pelleting the intensity of germination was also significantly higher as diploid and triploid sugar beet. Even through of 72 hours after seeding the intensity of germination of calibrated and pelleted seed of diploid hybrids after stimulation was higher than on the control. And in triploid hybrids through of 72 hours after seeding the difference of the number of germinated seed almost was not or it is equaled to control.

Stimulation of calibrated seed is significantly increase its influence on the energy of germination of both biological forms of sugar beet it is established (Table).

Table

Intensity of seed germination depending on its stimulation (average of 12 parties of seed)

Variant	Biological form of sugar beet			
	diploid		triploid	
	energy of germination, %	similarity, %	energy of germination, %	similarity, %
Calibrated seed non stimulated	90	92	90	92
Calibrated seed after stimulation	94	94	94	95
Pelleted seed after stimulation	95	95	94	94
SSD ₀₅ gen.	2,5	1,8	2,5	1,8
SSD ₀₅ hybrid factor	1,7	1,2	1,7	1,2
SSD ₀₅ stimulation factor	1,7	1,2	1,7	1,2
P, %	0,9	0,6	0,9	0,6

Thus, if the energy of germination of calibrated seed of diploid and triploid hybrids before stimulation was 90% then after stimulation, it increased on 4% (SSD₀₅ stimulation factor = 1.2%) and amounted of 94%. Seed germination is significantly increased after stimulation of both biological forms of sugar beet. Significant differences of energy of germination and similarity of seed, depending on parties of seed that is studied as diploid and triploid hybrids is not established. After

pelleting of stimulated calibrated seed the energy of germination and similarity of both biological forms of beet was the same as before pelleting, but significantly higher compared with control. Thus, energy of germination and similarity of pelleted seed of diploid hybrids were similar and amounted of 95%, that respectively – on 5 and 3% higher than on the control and these indicators of triploid hybrids of pelleted seed were equal and amounted of 94%, which is on 4 and 2% more than in the control - respectively.

The factors determining that is influence on the laboratory seed germination is revealed that the "stimulation seed" factor was the most significant and amounted of 61% (Fig. 2).

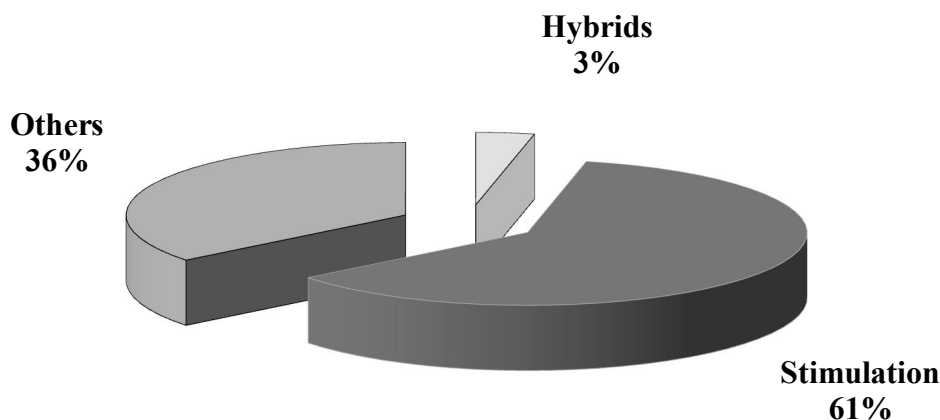


Fig.2. The share of factors influence on seed germination (average of 12 parties of seed)

Influence of biological forms of beet was insignificant and constituted only 3%, and the influence of other factors (presence of fulfilled but dead fetuses, etc.) was significant and amounted of 36%.

Conclusions

1. Established that the stimulation of calibrated seeds of various biological forms is provide a significant increase of its intensity germination on early stage. After 48 hours after sowing the number of seed of diploid and triploid hybrids, which sprouted is increased on 38% and 16% – respectively, compared with the control, where the seed are not stimulated.

2. Stimulation of calibrated seed is significantly influenced on the increase of its energy of germination and similarity of both biological forms of sugar beet. Energy of germination and similarity of diploid and triploid hybrids are increased on 4 and 3%, compared with the control. Along with other factors "stimulation of seed" factor is most significantly influence on seed similarity.

3. After pelleting of stimulated calibrated seed energy of germination and similarity of both biological forms of beet were the same as before pelleting, but significantly higher compared with control.

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Анотація

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Якість насіння цукрових буряків залежно від його стимулювання

Встановлено, що інтенсивність проростання каліброваного насіння диплоїдних і триплоїдних гібридів за стимулювання істотно підвищувалась, особливо на початкових етапах. Після дражування стимульованого каліброваного насіння, обох біологічних форм цукрових буряків, енергія проростання і схожість його була такою ж як і до дражування, але істотно вищою ніж на контролі. Найсуттєвіше на схожість насіння поряд з іншими чинниками впливав фактор „стимулювання”.

Ключові слова: цукрові буряки, насіння, стимулювання, інтенсивність проростання

Аннотация

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Качество семян сахарной свеклы в зависимости от их стимулирования

Установлено, что интенсивность прорастания калиброванных семян диплоидных и триплоидных гибридов за стимулирования существенно повышалась, особенно на начальных этапах. После дражирования стимулированных калиброванных семян, обеих биологических форм сахарной свеклы, энергия прорастания и всхожесть их была такой же, как и до дражирования, но существенно выше, чем на контроле. Существенно на всхожесть семян наряду с другими факторами влиял фактор „ стимулирования ”.

Ключевые слова: сахарная свекла, семена, стимулирование, интенсивность прорастания