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INFLUENCE PRESOWING SEEDS IN MAGNETIC FIELD ON YIELD OF VEGETABLES

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Today found that the influence of various physical factors (electric field, magnetic field, microwave, laser, etc.) in preliminary treatment of seeds can increase yields of vegetables and quality products.

When choosing the method of the fundamental role played by its economic efficiency and environmental cleanliness [2]. The research by several authors show that the most stable positive effect on vegetable seeds reached the influence of a constant magnetic field [5].

The use of this technology necessitates the establishment of a mechanism of influence of magnetic field on seeds and determine the optimal mode of treatment options and appropriate equipment.

The purpose of research - to establish the impact of pre-treatment in a magnetic field chive on her yield.

Materials and methods of research. Experimental studies of the magnetic field on the yield were conducted with chive varieties "Lugansk". Bulbs moved on the conveyor through a magnetic field generated by permanent magnets (Figure 1).

Magnetic induction governing the change of distance between the magnets in the range 0 - 0.5 T and measured teslameters 43205/1. The velocity of the conveyor changed in the range 0 - 0.8 m / s for the frequency converter.

Fig.1. Device for magnetic treatment chive

Experimental studies were conducted using experimental design theory [1]. The factors taken magnetic induction (*X1)* and speed bulbs (*X2*), and the output value was the yield of onion.

On the basis of one-factor experiments mentioned by the upper, lower and main levels of factors that accounted for magnetic induction respectively 0,015; 0,65 and 0,115 T, to the speed of the bow - 0.4; 0.6 and 0.8 m / s.

In studies used a composite orthogonal centrally plan [1]. Experiments performed in threefold repetition. Each row of the matrix defined planning dispersion and uniformity of criteria checked by Cochran.

The regression equation found in the form:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + b_{11} X_1^2 + b_{22} X_2^2 + b_{12} X_1 X_2 . \qquad (1)$$

The coefficients in the regression equation and their significance was determined by a known method, and the adequacy of the resulting regression equation was estimated by Fisher criterion [1].

Results. Processing bulbs in a magnetic field affects the physical and chemical processes that occur in them.

Studies have shown that under the influence of magnetic field on the bulb increases the rate of chemical reactions that leads to the stimulation of plants:

$$\omega_{м} = \omega \exp \mu (K^2 B^2 + 2KBv_n) N_a / 2RT, \qquad (2)$$

where ω - speed chemical reactions without the influence of the magnetic field mol / l · s; μ - particles mass, kg; B - magnetic induction, T; v - velocity of particles, m / s; K - coefficient that depends on the concentration and type of ions and the number peremahnichuvan m / s · T; N_a - Avogadro's number, molecules / mol; R - universal gas constant, J / mol · K; T - temperature, K.

This increases the solubility of salts and acids found in plant cell [6]. The growth rate of chemical reactions and solubility of salts and acids leads to changes in pH and biopotential seeds [7].

The magnetic field helps accelerate the diffusion of molecules through the cell membrane, including oxygen [8]. This causes the increase of yield of vegetables and reduce the incidence of plants.

Under the influence of the magnetic field increases ion transport through the cell membrane, increasing the concentration of minerals in the cell [4].

All these processes contribute to increased plant growth and development, and increase the yield of onion.

Experimental dependence of the yield of onion magnetic induction at a speed of bulbs in a magnetic field of 0.4 m / s are shown in Fig. 2. Changing magnetic induction from 0 to 0,065 T onion yield increases and with further increase of magnetic induction begins to decrease.

The results of the multivariate experiment obtained regression equation in physical terms is (Figure 3):

$$У = 30{,}97 + 393{,}78B - 25{,}833v + 166{,}67Bv - 2756B^2. \qquad (4)$$

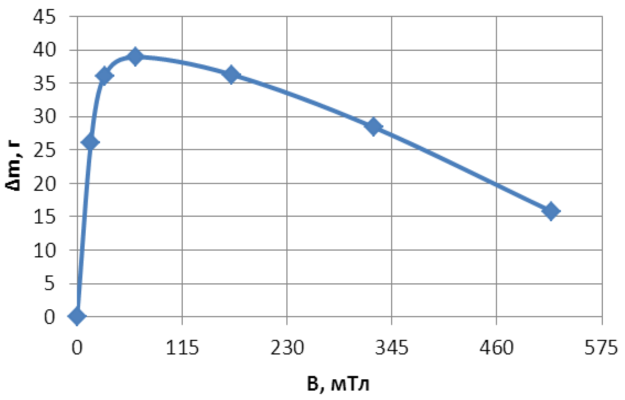

Fig. 2. Dependence of the yield of onion magnetic induction

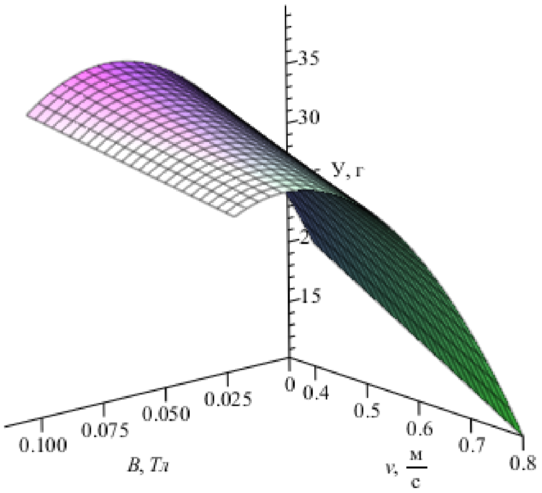

Figure 3. Change onion yield in the processing of a magnetic field

Established that the yield of onion has a maximum value at 0,065 T magnetic induction. Reducing the speed of the bulbs in a magnetic field up to 0.4 m / s increases the yield of onion.

Conclusion

It was established that the change in the yield of onions magnetic treatment depends on the square of the magnetic induction and velocity of the bulbs in a magnetic field. Optimal treatment takes place at 0,065 T of magnetic induction and velocity of 0.4 m / s**.**