

CHANGE OF BARLEY BIOPOTENTIAL BY PRE-SOWING TREATMENT IN A MAGNETIC FIELD

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Electro-technological methods of pre-treatment of cereal seeds make it possible to increase their productivity, reduce the incidence of plants and improve product quality.

A common shortcoming of existing methods of electromagnetic stimulation is the lack of instrumental determination of dose treatment. Its optimum value is determined by the results - the results, which are heavily dependent on the agro-climatic factors, soil fertility, etc. applied cultivation technology.

Therefore, in determining the optimum magnetic treatment regimes important issue is the indication of the effect that requires scientific substantiation and resolution.

Studies have shown that to determine the effect of magnetic treatment would be best to use potentiometric method of measuring the redox potential (biopotential).

The purpose of research - to establish the influence of magnetic field on biopotential barley seeds.

Materials and methods of research. Experimental studies were conducted with barley varieties "Solntsedar." Seeds shifted on the conveyor through a magnetic field generated by permanent magnets.

Magnetic induction regulate the change of distance between the magnets within 0-0,5 T and measured teslameters 43205/1. The velocity of the seeds through the magnetic field is changed by the frequency converter.

Processed in a magnetic field of barley seeds germinated and measured values of redox potential (ORP) of germs.

To measure the ORP was developed measuring electrode, which is a platinum plate with the sharp tip of a knife. Platinum electrode is introduced into the germ sprouted seeds. As an auxiliary electrode used standard silver-chloride electrode. With ionometer И-160М determined difference ORP sprouts raw and treated in a magnetic field seeds.

The influence of velocity at magnetic seed treatment on change biopotential of cucumber sprouts were performed using the method of experiment planning. By taking a change of biopotentials review cucumber sprouts at magnetic treatment. By taking factors mentioned magnetic induction ($X1$) and velocity solution ($X2$).

Limits changes of magnetic induction was determined on the basis of one-factor experiments. The value of the upper, lower and main levels for magnetic induction were 0,015; 0,65 and 0,115 T, to the speed of the seeds - 0,4; 0.6 and 0.8 m / s.

In studies used a composite orthogonal centrally plan.

The coefficients of the regression equation and their significance was determined by a known method, and the adequacy of the resulting regression equation was estimated by Fisher's criterion.

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

Under the influence of magnetic field on seed increases the rate of chemical and biochemical reactions that occur in the cell.

Changing the redox potential (ORP) seeds determined by the equation:

$$\Delta OBI = -\frac{2,3^2 \mu N_a K}{zF} \left(\frac{KB^2}{2} + v_n B \right). \quad (1)$$

biopotentials:

$$\Delta BI = -\frac{2,3^2 \mu N_a K}{zF} \left(\frac{KB^2}{2} + v_n B \right). \quad (2)$$

or

$$\Delta B\Pi = A_1 B^2 + A_2 Bv, \quad (3)$$

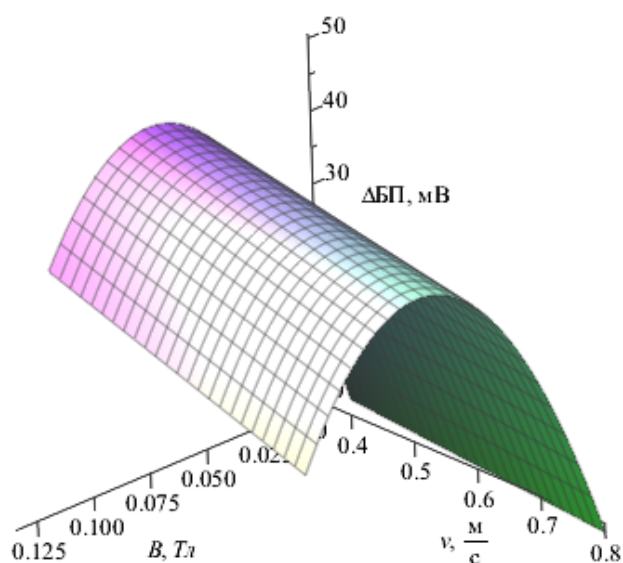
where A_1 and A_2 - coefficients.

Factors that go into the equation (3) can not be determined analytically. They are determined on the basis of experimental data.

Experimental study biopotential changes sprouts of barley seed treatment in a magnetic field have shown that when the magnetic induction from 0 to 0,065 T biopotential value increases, and when it starts to decrease further increase. For large values of magnetic induction biopotential barley sprouts practically unchanged, but the 20 mV higher than the value of the seeds, raw in a magnetic field.

The regression equation which connects the barley sprouts biopotential parameters of the magnetic field in physical terms has the form (figure):

$$\Delta B\Pi = 75.831 + 533.667B - 9.875v - 91.667Bv - 3511B^2.$$



Change biopotential sprouts of barley seed treatment in a magnetic field

Studies have shown that the biopotential change of plants can determine the effectiveness of pre-treatment of crop seeds and determine the most effective treatment regimes.

Conclutions

Change biopotentials at magnetic grain processing depends on the square of the magnetic induction and velocity of seeds in a magnetic field. The most effective mode of

treatment of barley takes place at 0,065 T of magnetic induction and speed of seed 0,4 m/s.