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MODERN REALITIES AND CHALLENGES OF ELECTROMAGNETIC ENERGY IN PLANT

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The problems of the problem and the reality of the methods of influence on the activation of the electromagnetic energy plants.

Electromagnetic energy, energy source, the dose of treatment, the germination, the seed pre-sowing, germination, biological object, crop.

The problem of increasing crop yields remain open. Modern Farming equipment technology today have exhausted themselves and can not solve this problem. In this regard, finding new ways, and especially in the first place, using Electrotechnology, which is currently quite perfect and according to the latest research assistance worth solving this problem. The purpose of research - based on analysis of the electromagnetic energy efficient and identify ways of practical implementation of the activation process of plants.

Materials and methods research. Recent studies scholars Ukraine, Russia, USA, Germany, Japan, Malaysia and others. [1, 3, 5, 6, 7] show the high efficiency of electromagnetic energy in agricultural production and, above all, by high ergonomic, economic and functionality of Electrotechnology. This primarily concerns the pre-treatment of seeds, cultivation and storage of crop production. Activation of electromagnetic energy to various biological objects makes the possibility of increasing crop to 1.2 - 1.3 times, reducing the need to use is not always environmentally friendly fertilizers that are currently used to maintain soil fertility [2].

Studies. Based on the huge volume of accumulated data can be stated that electrical technologies that use various types of carriers of electromagnetic energy (electric field, the field of corona discharge, electromagnetic radiation, magnetic

fields, radiation and acoustic energy, etc.). Determine not only reasonable but also virtually very similar results.

Thus, the yield of plants when using different energy sources increased by 10 - 24% similarity to 9 - 14% with a significant increase in green fodder. When electromagnetic effects on biological objects, an increase, such as the mass of tubers (potatoes beets), shoots and pods of peas, increased protein content (spring wheat) and some nutrients, such as vitamin C (potatoes, sugar beets).

However, increasing the quantity and quality of the final product, in our opinion, should be targeted based on the interaction of energy with biological objects, taking into account the inherent nature of different power plant resources necessary vigor. The truth of this is confirmed by the results of numerous studies that the processing of seeds of various plants (tomatoes, cucumbers, peas, rice, soy, etc.). Different doses of energy rise as a stimulant and depressant effects. For example, scientists in Japan (Tokyo, Institute of Biophysics Plant) and domestic scientists seed treatment lettuce, tomatoes, peas doses 0.5 ... 3.0 W/cm2 was observed to enhance their ability to germinate, while increasing to 4.5 W/cm2, conversely, inhibit, and in some cases (lettuce, cucumbers), even their death.

Inadequate results were observed for seed treatment of barley, corn, wheat. For example, at a dose of treatment (vehicle - electric field corona) 100 ... 200 J · hod/m2 germination effect was not observed at a dose of 1100 ... 1300 J · h / m2 effect almost reached maximum values, while increasing its newly observed effect of inhibition [3].

Similar results were obtained in the case of pre-treatment of seeds of spring wheat in the electric field of corona discharge at different tensions. When tension E = 0.5 ... 1.5 kV / cm the effect of germination hardly observed at E = 2 ... 5 kV / cm germination reached maximum values of 12 - 15% at E ≥ 5 ... 6 kV / cm the effect is not observed . Moreover, with such intensity values observed corona discharge, increased ionization effects that adversely affect the physiological state of biological objects [4].

Numerous studies show ambiguous effects of tension to various biological objects. Thus, the maximum germination of sugar beet is observed at E = 3.0 ... 3.5 kV / cm, barley at E = 2.5 ... 1.0 kV / cm, wheat at E = 4.0 ... 5.0 kV / cm seed in coniferous E = 0.5 ... 2.5 kV / cm, onions, lettuce, tomatoes at E = 2.0 ... 2.5 kV / cm. Differences in treatment parameters (dose treatment exposure) observed in the application of microwave technology, electromagnetic treatment and more.

According to the research of scholars USA (Iowa) seed treatment of winter crops, sunflower, corn stipulated in the magnetic field increased yields by 12 ... 20% at a dose of energy 1 ... 5 J · s / kg and induction 1 ... 1.5 Tesla. Similar results were obtained in the Institute of Energy and Automation NUBiP Ukraine (increased wheat yields by 17 ... 21%), but the energy dose of 0.2 ... 0.5 5 J · s / kg and induction of 30 mT. Increased yields of vegetable crops (tomato seeds, carrots, cabbage, peppers) 12 ... 25% observed in the application of microwave technology, but again at different frequencies (from 2450 MHz to 37 ... 39 GHz) and different terms of power density (0.05 ... 1.0 kW / kg).

Examples of various energy sources, demonstrating the high efficiency, significantly different parameters and modes of processing, transformation and principles of biological objects taking power, the influence of the effect of increasing or inhibiting plant growth and the rate of technological actions depending on different plant species.

Existing differences, inadequate working out the modalities of energy supply, the lack of consensus about the "workability" of their electricity consumption, a wide range of variation coefficient of performance and so on. significantly complicate the realization of such promising Electrotechnology, development of design decisions when creating the equipment.

In our view, the fate of negativity increases and the desire of some researchers to solve existing problems by digging ushyr problems, not "inside" that impedes implementation of these bezumovylo Electrotechnology in plant, limits inherent in the physical nature of electromagnetic energy in the crop, do not give an

unambiguous answers to several questions, such as the usefulness of a particular energy source, ways of transforming it into an object and so on.

Conclusions

1. The introduction of highly efficient plants in Electrotechnology-tion by electromagnetic effects on the activation processes of plant development can actually help increase crop yields, the problem needs of the country's vegetable products.

2. Despite the positive results achieved, the problem can be achieved through deeper elaboration on the effects of electromagnetic energy on zhyttyediyalni processes in biological objects, setting depending on the dose and the energy carrier of energy from energy resource limits of biological objects inherent nature, its genotype, identifying effectiveness of the method (energy, efficiency, adaptability), depending on the purpose of processing and structural and technological features electro-equipment of its parameters.

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Рассмотрены вопросы состояния проблемы и реальность реализации методов воздействия электромагнитной энергии на активацию растений.

Электромагнитная энергия, энергетический ресурс, доза обработки, энергия прорастания, семя, предпосевная обработка, всхожесть, биообъект, растениеводство.