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IMPACT ANALYSIS OF BIOPHYSICAL INFORMATION-WAVE RADIATION ON REPRODUCTIVE ABILITY COLORADO POTATO BEETLE (LEPTINOTARSADECEMLINEATA)

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Now the sharp increase in agricultural production accompanied saturation food harmful chemicals. Production of organic foods, including potatoes, only possible with the full elimination of the use of pesticides, which are used for the destruction of the Colorado potato beetle and the possible transition from chemical method of pest control to electrophysical. And one of the promising directions of solving this problem is the use of information technology electromagnetic energy to destroy pests of potatoes.

Electromagnetic radiation and microwave ranges used in agriculture for disinfecting seeds and soil, destruction of pests and for the suppression of the reproductive capacity of the Colorado potato beetle.

The experimental results confirm the presence of biological effects from exposure to electromagnetic fields both heat and at low-power levels.

Based on practical data it is clear that the electromagnetic energy can alter metabolic and biosynthetic processes and under certain parameters (pulse repetition rate, porosity, power, exposure) pulsed electromagnetic field (EMF) can slow down and inhibit cell growth. Exposure of a millimeter RNA and DNA containing virus reduces their infectivity.

In experiments with microorganisms found that biological effects from exposure to EMF on microorganisms wore a resonant character.

At the same time the analysis of works of domestic and foreign scholars argues that only a few studies examined the impact of electromagnetic fields on biological objects to create electrotechnologies in agricultural production. From the above it follows feasibility studies in the indicated direction.

The purpose of research - study and analysis of biophysical information and the energy of electromagnetic radiation on the reproductive ability of the Colorado potato beetle.

Materials and methods of research. The use of electromagnetic radiation pesticides are extremely high efficiency. Experiments on the Colorado potato beetle were carried out in the lab with the impact of electromagnetic radiation energy frequency of 2.45 GHz. Laboratory studies have shown that to combat the beetle should use information-energy electromagnetic radiation with optimal biotropnymy parameters.

Experimental data on which fertility females Colorado beetle irradiation radiation frequency of 2.45 GHz for 4 minutes reduced by 27-36% (by number of pending eggs). Processing males radiation frequency of 2.45 GHz for 6-7 minutes causes complete sterility.

Results. One of the main mechanisms of inhibitory effect of electromagnetic radiation on organisms harmful biological membranes is the role of microorganisms in the reactions to this radiation. It is commonly assertion decisive role in the formation of membranes of biological response to external physical impact.

Many life processes occur on the membranes of cells. The membrane can regulate intracellular water as well as energy and biochemical processes in the cell by changing the diffusion of ions and other substrates. Exposure to it can alter cell functions, including ion transport through the membrane. Therefore, violation of membrane processes - the cause of a large number of diseases.

Electrical phenomena occurring in the membranes play an important role. The appearance of transmembrane potential difference caused by ionic conductivity membrane, which is an excellent insulator. Yes Insulating layer of lipid molecules capable of withstanding the electric field (EP) 105 V/cm. The electrical potential of the membrane is extremely important. According to the modern theory of transmembrane transport is EP within the membrane creates a flow of essential substances from the environment into the cell, and the cell into the environment through special hydrophilic channels likely lypoproteyinovoyi nature. The rate of

penetration of ions through the membrane is determined by such properties as thickness, dielectric constant value, the presence of fixed electric charges on the membrane, the size and number of pores in the membrane, the presence of fixed charges in the pores and some others.

To clarify the impact of EMF on cell membranes can be viewed as the last electric capacitor, in which the plates are electrolytes external and internal solutions with embedded in these lipid molecules. Lipids - insulator with a dielectric constant $\varepsilon \approx 2$.

Obviously, the growing influence of microwave radiation will occur with increasing size of the cells or by cooperative interaction of several cells. The mechanism of cooperative interaction may be due to ions that surround the membrane and weakly associated with its surface.

Effects of low radiation leads to a redistribution of electrical forces involved in the operation of the membrane. As a result of changing the degree of binding of K^+, Ca^{2+} and other ions in the membrane (including ion channels) as well as emerging local changes of physical and chemical properties of the surface membrane (mikrov'yazkist, pH, surface tension, effective charge). We can assume that the process that takes place in the extracellular environment includes mechanisms able to integrate the weak field at a distance, and develops quickly on the surface of the membrane than at its transverse axis. From the above data it can be concluded that while there are no universal models vplyve low-EMF on microorganisms. An important feature of almost all models is that the surface of cell membranes is seen as the most likely place of the process.

It should be noted that the deviation from equilibrium membrane can occur under the influence of low EMF due to local compression in the longitudinal or transverse direction.

Conclution

Using microwave radiation as a method of fighting the Colorado potato beetle shows high efficiency. From an environmental point of view the development of electro devices destroying insects is appropriate.

An important task is to develop an effective and reliable method of determining the impact of electromagnetic fields on living organisms. Remains problematic identify reliable estimate changes in physiological state and basic life functions of biological objects (Colorado potato beetle) subjected to electromagnetic radiation of different range. It is also necessary to examine in more detail the interaction of electromagnetic fields and cells, first find out the physical essence of the processes occurring at the cell membrane.

The analysis showed that suppression of the reproductive capacity of the Colorado potato beetle should conduct research on establishing the primary, physically reasonable mechanisms to influence information-energy pulsed electromagnetic fields on cell membranes Colorado potato beetle and its larvae.