DRYING AND GRAIN DISINSECTIZATION BY ELECTRIC FIELD TREBLE

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The use of modern technical advances of science in agriculture creates the possibility of improving production technologies and storage grown products. These innovations include the use in agriculture of the electric field of high frequency (HF) and ultra high frequency electromagnetic field (UHF) for pre-treatment of seeds, drying grain, berries, fruits, mushrooms, vegetables and other products and so on.

The main advantages of these technologies is low energy costs, the possibility of drying under reduced pressure air, heating uniformity and absence of overheating in some areas. When drying grain destroyed pathogenic microflora and insect pests, providing much better grain quality and reduce its loss during storage.

An important problem to be addressed during the laying of grain in storage and during storage, is dry and the fight against pests. To protect the grain from insects use different processing methods: heat, etching chemicals and low radiation. However, these methods are either ineffective or dangerous for humans.

Major advantages inherent disinfestation methods based on the use of high frequency electric field (10 - 100 MHz). In the analysis of the electric and electromagnetic fields for insects is mainly thermal concept, which, however, does not reflect the nature of the processes occurring in biological objects. There is reason to believe that the currents that flow in the body of insects that destroy important life centers, including the cell and lead to its death before achieving critical temperature for insect level.

Studying the impact of RF and microwave fields for pests held by many scientists. It is proved that under certain modes of radiation electric field of high

frequency can be achieved complete destruction of insects at all stages of their development. For example, the heating of grain contaminated rice weevil, barn weevil, flour hruschaka using electric field frequency of 39 MHz total destruction was achieved at a temperature of 39 ° C, 41 ° C and 47 ° C, respectively. On the other hand states that the effective destruction of these insects conventional heating required temperature 61 ° C with a minimum exposure of 10 minutes, and for the same result using the electromagnetic field frequency of 2.45 GHz grain temperature should reach 57 ° C. In favor of HF in the fight against pests is the fact that irradiation RF field a large number of insects killed after exposure.

To increase the effectiveness of RF radiation impact on mortality of insects manage to reduce the pressure by the camera exposure. Thus, at a pressure of 40 mm Hg. c. there mikrodischarge plasma in an environment that adversely influence on insects. In addition, the synthesis mikrodischarge cause ozone molecules, further depressing the livelihoods of living organisms. This effect is sufficient to kill insects Exposure 3 - 5 seconds. When drying grain reduce the pressure in the reactor chamber leads to lower the boiling point of water, which greatly increases the efficiency of vaporization.

The purpose of research - the creation of theoretical foundations and structural design of equipment for drying and grain disinfestation electric field of high frequency.

Materials and methods research. One of the most important technological features hardware implementation drying and disinfestation of grain is uniform heating of the entire mass of the object. The electric field is a carrier of energy in the core, where the interaction of the electric field of grain, should be substantially uniform.

When creating RF systems must also take into account that the load generator is characterized mainly capacitive and with considerable difficulty arises electrode capacitance coordination generator load, which affects the efficiency of the equipment. On the other hand, limiting the voltage across the electrodes and electrode capacitance reduces the performance settings.

Results. For high drying process and disinfestation of grain needed to ensure even distribution of the electric field in the area of interaction fields of grain.

The construction camera processing that is based on a cylindrical multielectrode multiphase electrode structure. It is proved that this design provides the active cell area uniformity, the amount of which depends on the number of electrodes so that the more electrodes, and thus the phase, the larger the area of homogeneity is achieved. By applying to each electrode harmonic voltage of the phase shift equal to the angle between adjacent curves may provide a uniform field rotation, thus achieved the maximum zone size homogeneity of the field between the electrodes.

Multiphase high voltage generator generates high voltage output signals with appropriate phases at each electrode. To ensure high uniformity of the electric field generator incorporates device control and correction of amplitude and phase voltages on the electrodes.

Analysis of the distribution of the electric field inside the space bounded multiply connected circular boundary is made based on the theory of singular integral equations in the form of interface problem. Shows formulas to determine the electric field inside the region.