MATHEMATICAL MODEL OF DYNAMIC MOTION NUTRIENT SOLUTION IN AN ELECTROSTATIC FIELD

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The mathematical model of the dynamics of nutrient solution in an electrostatic field that makes possible the definition of process parameters for the application of electro-technological complex nutrient solutions for plants.

Electrostatic field, the dynamics of movement drops, electric charge, electric field strength, resistance to the environment, the nutrient solution.

Efficiency and productivity of growing vegetables to a large extent dependent on technology protection and power plants that cause favorable conditions for their development and growth.

To date protection and power plants is carried out by foliar application solutions, preferably pneumatic, mechanical and hydraulic methods that are inherent in a significant loss of working solutions (up to 40 - 75%), uneven deposition, high polydispersity grinding (drop size from 30 to 500 microns) low degree of coating solution on the back surface of plant leaves (5 to 15%), which makes overrun nutrient solutions, pollution, detention and reduce the effectiveness of nutrient absorption in plants.

Reducing the impact of these negative factors, as shown by recent studies can be carried out through the use of electro-technological methods and primarily electrostatic method to improve the quality and efficiency of processing plants, providing a uniform and homogeneous surface coating plants monodyspersnist drops, a variety of deposition maintenance and drops to the upper and lower leaf surfaces and reduce pollution.

For the development of electro-technological complex on causing nutrient solutions for plants in the electrostatic field, it is necessary to know the electrical and technological parameters, which are determined by analyzing the dynamics of droplets.

The purpose of research - Definition of electrical parameters of electro-technological complex based on the development of mathematical models of dynamics of nutrient solution in an electrostatic field.

Materials and methods research. To determine the dynamics of motion (Figure 1) nutrient solution in an electrostatic field, solve the equation of motion, which includes the effect of a number of forces: Fe, Fg, Fc - under the electric field strength, the Earth's gravity and resistance of the medium.

The problem with initial conditions of motion of a charged drop in an external electrostatic field with regard to the resistance environment.

Results. By clicking on the time axis t generally uneven grid then prointehruvavshy equation replacing integrals in the range of trailer amounts using the following formula with weights:

The system of equations to determine the value speed and coordinates of charged droplets in n-tion time, knowing their value at the time step.

Conclusions

A new mathematical model of the dynamics of nutrient solution in an electrostatic field that determines the ability to determine the speed of the nutrient solution and its coordinates in the flow throughout the process of application.