RESEARCH APPLICATION PROCESS NUTRIENT SOLUTION PER PLANT IN THE ELECTRIC FIELD

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Increased yields of vegetables - one of the most important problems of agriculture Ukraine. Climatic conditions are favorable for growing both seasonal and pozasezonnyh vegetables in terms of closed and open ground. However, in vegetable acute problems associated with the use of outdated technologies foliar application of plant protection and plant nutrition.

Traditional methods of application (pneumatic, mechanical, hydraulic) nutrient solutions with low specific volume resistance not follow through with the application of quality (high polydispersity grinding (30 to 500 microns), uneven deposition (from 45 to 60%), low degree of coating solution on the back surface of plant leaves (5 to 15%, etc.), which causes loss of nutrient solutions (60%), reducing the efficiency of nutrient absorption in plants.

Addressing possible through the use of techniques and electrotechnologies primarily electrostatic method to improve the quality and efficiency of processing plants, providing a uniform coating density (more than 95 drops per 1 cm2) and homogeneity monodyspersnist droplets size (30-60 mm) high effectiveness deposition and retention drops on the back surface of the leaves (75%). The effectiveness of the method is largely determined by charging and deposition of droplets, which when applied nutrient solutions with low specific volume resistance in plants is poorly understood and require more extensive research.

The purpose of research - the study of the processes causing nutrient solutions with low specific volume resistance in plants depending on the method of charging.

Materials and methods research. The process of electrostatic application of nutrient solutions with low specific volume resistance in plants is largely driven by the size and ability to hold an electrical charge drops and primarily deposited on

plants. In the application of electrotechnology mainly used: Ion contact and induction charging methods, analysis of which showed significant advantages of induction charging method.

Important processes that influence the effectiveness of the application is movement and deposition of charged droplets on the surface of plants, accompanied by recombination and draining of electric charge.

Results. Studies show that a draining of electric charge drops nutrient solution strongly depends on the electrical properties of the medium, which is contacted drop. For nutrient solutions with low specific volume resistance ($\rho\upsilon = 2 \cdot 10^{2}..10^{3}$) Ohm · m and permittivity ($\varepsilon \approx 80$) in collaboration with leading environment while draining the charge is ($\tau = 2{,}1 \cdot 10^{-7}..10^{-8}$ s). That is the process of draining the electric charge of the droplets of nutrient solution in contact with the plant is instantaneous. The interaction of droplets of nutrient solution with dielectric environment (specific volume resistance of air $\rho_{\upsilon} \approx 1014$ Ohm · m permittivity $\varepsilon \approx 1$) time slows down and draining the charge is ($\tau = 88{,}5$ s).

Conclusions

Analysis methods for charging droplets of nutrient solution showed significant benefits of induction method that makes possible charging solutions with low specific volume resistance, the use of voltage (1-25 kV), transportation drops a considerable distance (more than 2 meters), reduction of losses.

Time draining of electric charge drops nutrient solutions greatly depends on the specific volume resistance of the environment (air when interacting with $\tau = 88{,}5$ s plant $\tau = 2{,}1 \cdot 10^{-7} ... 10^{-8}$ s) varies linearly law.