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DEVELOPMENT OF AN INSTALLATION FOR THE ANALYSIS OF THE PROCESS OF ELECTROPLASMOLYSIS OF PLANT RAW MATERIALS

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Fruit and vegetable raw materials are a very important and valuable basis for obtaining healthy food products. Fruits and vegetables, being sources of easily digestible carbohydrates, vitamins, dietary fibers and natural antioxidants, contribute to the regulation of the most important physiological functions of the body. Therefore, fruit and vegetable processing technologies should be focused on the rational use of raw materials with maximum preservation of physiologically valuable components of raw materials and an increase in the warranty period of storage of finished products.

Keywords: *raw plant, laboratory equipment, cell, electroplasmolysis.*

Relevance of research. Fruit and vegetable raw materials are a very important and valuable basis for obtaining healthy food products. Fruits and vegetables, being sources of easily digestible carbohydrates, vitamins, dietary fibers and natural antioxidants, contribute to the regulation of the most important physiological functions of the body. Therefore, fruit and vegetable processing technologies should be focused on the rational use of raw materials with maximum preservation of physiologically valuable components of raw materials and an increase in the warranty period of storage of finished products**.**

From the point of view of the safety of the obtained products, processing technologies using non-reactive physical influences have advantages. The use of various electrophysical effects allows you to significantly intensify technological processes, and sometimes to obtain results that are not achievable with traditional processing.

Thus, to ensure the intensive development of the agro-industrial complex, it is necessary to develop new and improve the existing electrophysical methods of processing agricultural products.

Purpose of this work to develop an installation for the analysis of the process of electroplasmolysis of plant raw materials

Research results: When developing a laboratory installation, it is necessary to use a regulated power source and devices for registering transient processes and directly recording changes in the structure of cells [1].

The appearance of the experimental setup is shown in Fig. 1. It consists of a laboratory autotransformer T1, two thyristors VD1 and VD2 connected in opposite parallel, a measuring shunt R1 with limiting resistors, an oscilloscope and working electrodes. By controlling the thyristors, we can adjust the duration of processing within specified limits[2].

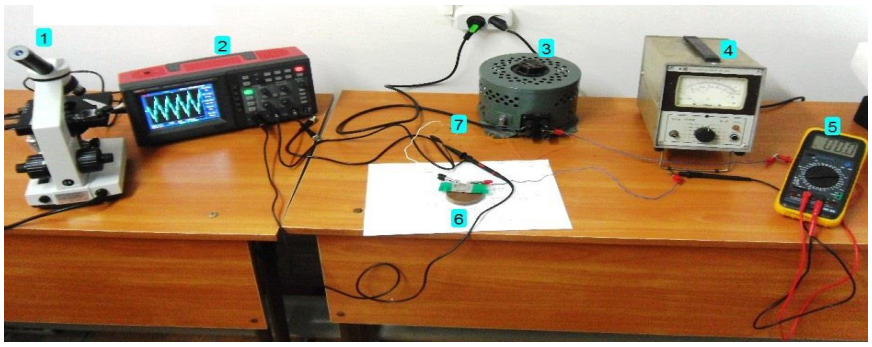

Fig. 1 – Appearance of the experimental setup for electroplasmolysis research: 1 – MICROMED biological microscope; 2 – digital oscilloscope; 3 – laboratory autotransformer; 4 – millivoltmeter; 5 – digital multimeter MY-64; 6 – experimental sample of vegetable raw materials; 7 – shunt for current measurement

With the help of the above-mentioned installation, the dependence of the current on time during the processing of vegetable raw materials was removed. The data of these studies are presented in fig. 2. The scale on the horizontal axis is 10 ms per division, and on the vertical axis is 0.01 Ampere per division. Thus, we can see that due to the processes taking place in the cells, the nature of the passage of electric current through the studied sample changes. In this way, it is possible to develop an automatic system for monitoring the state of plant mass processing [3].

The processing of the results of the experiment can be done with the help of a biological microscope and a digital camera. Data that will be obtained with the help of an experimental setup will help to determine the presence of the phenomenon of electroplasmolysis when an electric current passes through plant material, based on the experiment of physiological changes in the cells of the plant shell [4].

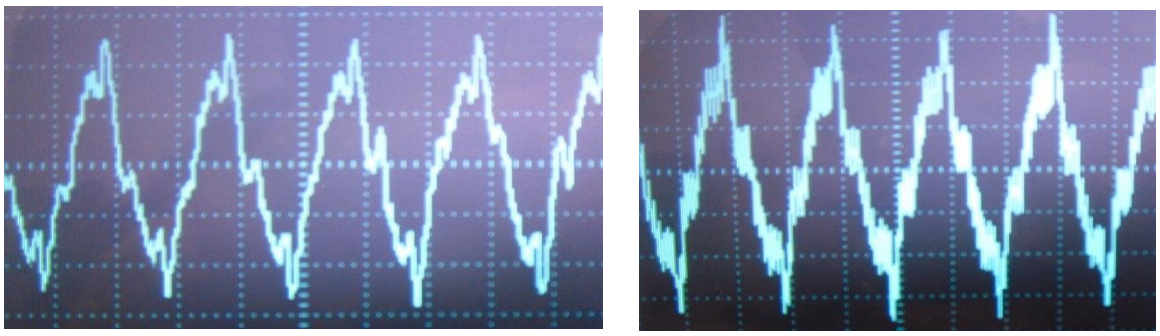

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Fig. 2 – Current oscillogram: a – at the beginning of the process electroplasmolysis; b – at the end of electric current treatment of the cell sample

Conclusions. 1. The paper analyzes modern equipment for receiving high-voltage pulses with an amplitude of up to 100 kV and above. The expediency of using resonant transformers without a ferromagnetic core to create compact installations for testing the electrical strength of the insulation of electrotechnological equipment, and in particular devices of electronic-ion technology for agricultural purposes, is substantiated.

2. An analysis of the transient processes occurring in the resonant air transformer was carried out, from which it can be seen that by changing the coupling coefficient, the rate of increase and the maximum value of the output voltage can be adjusted. Thus, we see that as a result of the processes taking place in the cells, the nature of the passage of electric current through the plant material changes.

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