СЕКЦИЯ ИНОСТРАННЫЙ ЯЗЫК В ПРОФЕССИОНАЛЬНОЙ СФЕРЕ И ЛИНГВОСТРАНОВЕДЕНИЕ

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A DEVICE FOR MEASURING THE SLOW INDUCTION OF CHLOROPHYLL FLUORESCENCE IN TOMATO

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Abstract: *The quality of the tomato fruit at harvest time is extremely important for maximum storage after harvest and shelf life. A device to measure the slow induction of chlorophyll fluorescence has been developed. The system contains a unit of measure, a controller, an electronic unit, and major additional units. The device consisting of a radiation source (photodiode) emitting in the blue region of the spectrum with a radiation maximum λ= 470 nm, and a radiation receiver in the red region of the spectrum. The device relates to agricultural machinery and can be used for sorting tomatoes in harvesting machines and at post-harvest processing points.*

Keywords: *slow induction of chlorophyll fluorescence, device, tomato maturity.*

Introduction. Chlorophyll fluorescence emission can enable us from detecting any slight changes in chlorophyll concentration of plant tissues before the appearance of visible morphological symptoms; this can also be used in post-harvest operations of the fruit [1]. The slow induction of chlorophyll fluorescence consists of changing the intensity of fluorescence from the maximum level to a stationary value. The vast majority of fluorescence under normal conditions is due to chlorophyll a photosystem II [2]. As in the case of sunlight, chlorophyll pigment in the plant tissue can absorb fluorescence light producing energy. Most of this energy is used for photosynthesis, while one part is dissipated as heat (non-photochemical quenching) and a small percentage is re-emitted in the form of fluorescence, as soon as a light excited electron returns back to its ground state [3]**.**

The purpose of this article is to use a new device to measure the slow induction of fluorescence of chlorophyll in tomato.

Measurements of the slow induction of chlorophyll fluorescence. The prototype [4] shown in Fig.1 has been used for measuring the parameters of the slow induction of chlorophyll fluorescence. Tomato fruits (2) were guided to UV signals emitted from UV LED (1). Then, the radiation scattered (fluorescence emission), passing through the filters (3), which minimize the measured reflected UV light or light from other undesired sources. The fluorescence emission then was recorded. The USB hub is connected to a personal computer (7).

We have developed a simple program with a user interface for receiving and processing the data. This software receives and transforms serial data into information. The wavelength of fluorescence excitation was 470 ± 8 nm and its intensity on the fruit surface was ranged between 3200 to 4700 μmol. $m^{-2}.s^{-1}$. Recorded the maximum slow induction of fluorescence chlorophyll (*Fm*) and determined the ratio of the specific photosynthetic activity by the following $Kf = (Fm - Ft)/ Fm$ (1)

where *Fm* and *Ft* – maximum and stationary levels of chlorophyll fluorescence. This parameter (*Kf*) is correlated with a specific photosynthetic activity of the cells. The program records the mean, standard deviation for the slow induction of chlorophyll fluorescence parameters and coefficients of variability in each group of fruits as in the following equation. Coefficient of variability (%) = Std. devision /mean (2)

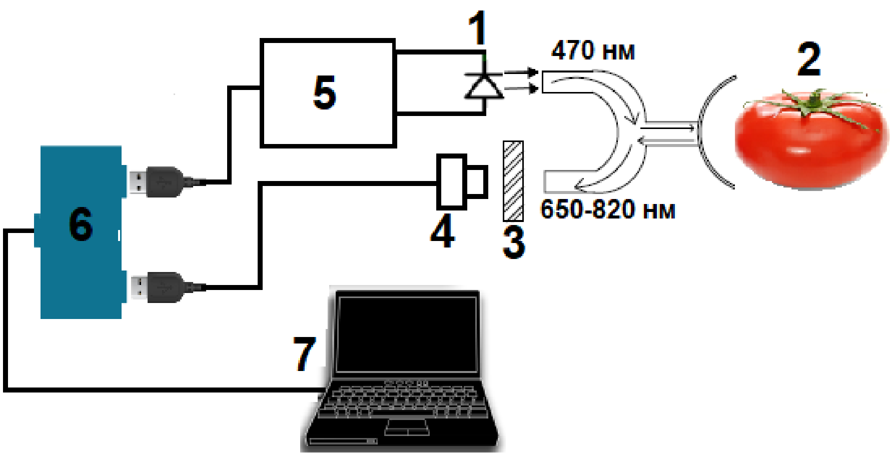

Fig.1. **Schematic diagram of a slow induction of chlorophyll fluorescence device.** 1- UV LED; 2- object (tomato); 3- light filter; 4-digital video camera; 5- Arduino-nano; 6- USB hub; 7- personal computer

Conclusion. We built a method in this study to measure the slow induction of chlorophyll fluorescence parameters. This device allows the separation of tomatoes by maturity more objectively and accurately leading to more homogenized separation.

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JUSTIFICATION OF THE IRRIGATION REGIME OF WHITE CABBAGE ON SOD-PODZOLIC SOILS OF WATERSHEDS

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Abstract: *The most important task of agricultural science and practice is to ensure the food security of Russia. To solve it, it is necessary to significantly increase the production of vegetables. The right bank of this can be Currently, in the Central part of the Non-Black Earth Zone, irrigation is mainly carried out by sprinkling. However, this irrigation method requires a large amount of water, in comparison with the drip irrigation method. achieved only with the help of irrigation This leads to large infiltration discharges of water and significant leaching of nutrients from the root layer of the soil. To restore soil fertility requires the introduction of organic and mineral fertilizers in larger volumes than with the drip method of irrigation. Also, when irrigation requires more water than with drip irrigation. These circumstances increase the value of agricultural production. Therefore, an experimental.*

Keywords: *Development, Determined, Achievement.*

The degree of development of the topic:Development of irrigation regimes, identification of water consumption characteristics of white cabbage during drip irrigation in the Volga region Grigorov MS, Borodychev VV. Modes of drip irrigation, fertilizer doses of white cabbage were developed, the features of water consumption and removal of nutrients by the culture were not studied. This determined the direction of our research.

Research objective: The purpose of this work is to study the water balance and justify the irrigation regime of white cabbage in the conditions of sod-podzolic soils of the watershed territories of the Moscow region. will be done through:

1. The study of water balance on sod-podzolic soils of watershed territories of the Moscow region.
2. Justification of the regime of irrigation cabbage.
3. Determination of the humidity control range of the calculated layer when growing cabbage.