# STIMULATING EFFECT OF LASER RADIATION ON THE INITIAL STAGES OF ONTOGENESIS OF TRITICUM L.

**V. Ryzhkova[1], V. Litvyak[3], A. Batian[1], V. Kravchenko[1], A. Kliuev[2], I. Pochytskaya[3]**

*[1]Belarusian State University, ISEI BSU, Minsk, Republic of Belarus*

*[2]Belarusian State University of Informatics and Radioelectronics, Minsk, Republic of Belarus*

*[3]Scientific-Practical Center for Foodstuffs of the National Academy of Sciences of Belarus, Minsk, Republic of Belarus*

*veraryzkova@gmail.com*

It was established thatan increased growth effect of winter wheat seedlings from 17,1mm (of 11,03 %) to 38,1 mm (39,42 %) was caused by irradiating of air dried seeds using a combined laser radiation dose of 2,7 J. It was discovered that a dose of 2,7 J reduced the content of calcium by 19,54 % , the contentphosphorus by 5,97 % and the content of iron by 32,27 % in the phytomass of the seedlings. The hypothesis of the mechanism of action of the combined low-energy laser radiation was proposed.

*Keywords:* Laser irradiation; frost-resistant winter wheat; stimulating effect; biogenic elements; ontogenesis.

Radiation is a powerful and little studied phenomenon, under the influence of which a variety of changes occur in plants; by knowing the patterns of these changes, it is possible to control the growth and development of plants. Studying the factors that modify the stimulating effect of radiation, and taking into account the influence of these factors, it was possible to increase the repetition of the effects of the optimal stimulating doses.

The scientific literature emphasizes that the stimulating effect of optimal doses of laser radiationon pre-sown plant seeds is one of the topical issues of modern radiobiology. Currently, there has been no clear correlation between frequency, radiation exposure and bioactivation in plants. The mechanism of action of a low-intensity laser for living organisms remains inadequately clarified [1; 2].

The purpose of the work is to determine the stimulating effect of the combined laser and magnetic influences and to clarify the mechanism of its action at the initial stages of wheat's winter ontogenesis.

Seeds of winter wheat were irradiated with a quantum therapy device, "Vityaz" (The Republic of Belarus). The effective physical factors of the apparatus are as follows: constant red laser radiation (650 nm) with a power of 5 mW; pulse radiation (12500 Hz); infrared (850 nm); laser radiation with a power of 5 mW; magnetic field from 5 to 50 mT. The seeds were irradiated in an aluminum container: 24 seeds with a total mass of ~ 1,2 g were placed at the bottom of a container (S = 6,15 $cm^2$). The radiation power was 10 mJ/s at a distance of 1 cm from the seeds.

On the basis of the obtained results the following conclusions were made:

1. It was established that the increased growth effect of winter wheat seedlings, which were grown from presoaked seeds and irradiated with a dose of 2,7J of combined laser radiation, was of 13,7 mm (9,33 %). A similar dose of irradiation of 2,7 Jwas delivered to air dried seeds, which caused an increase in the length of the seedlingsby 17,1 mm (11,03 %) in the first experiment andby 38,1 mm (39,42 %) in the second experiment.

2. The influence of laser radiation on the dynamics of the supply of biogenic elements was detected. Irradiation reduced the calcium content by 19,54 %, decreased phosphorus by 5,97 % and increased the iron content by 37,27 %. An increase of 37,27 % of theiron in the phytomass of the seedlingspotentially activates photosynthesis as an anti-stress reaction, which gives an advantage to irradiated plants in the initial stages of ontogeny.

3. A hypothesis is proposed that explains the mechanism of low-intensity combined laser irradiation at the initial stage of the ontogeny of wheat. According to the hypothesis, laser radiationacting on hydrogen bondsdisrupts the hierarchy of the most important biomolecules, and changes the dynamics of the supply of biogenic elements to the phytomass, which leads to an acceleration of the growth of plants in the initial stage of ontogenesis.

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