

THE EFFECTS OF NON-THERMAL PLASMA ON PLANTS AND PHYTOPATHOGENS

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In the agro-industrial complex, an urgent task is to increase yields and improve the storage capacity of grown raw materials and plant foods in which spoilage processes occur. Thus, according to the FAO at the UN, grain losses during storage amount to at least 10% and increase when storage conditions deviate in temperature and humidity. Losses are mainly associated with pest damage, as well as bacteriological damage. In addition, with long-term grain storage in unfavourable conditions, the ability to germinate is impaired, germination deteriorates, and quality decreases.

One currently being developed physical method of processing plant agricultural products is a non-thermal plasma of atmospheric pressure (NTAP). Non-thermal plasma is an ionized gas where electrons have a high temperature, and positively charged ions have a low temperature.

The installation of NTAP was developed at the RIRAE (Obninsk, Russia). The hardware complex is designed to provide the possibility of creating and maintaining a microwave (streamer) discharge in an argon flow at a pressure close to atmospheric.

The effect of NTAP treatment on the germination of spring barley seeds and initial growth processes in a laboratory experiment has been studied. It was found that plasma exposure from 1 to 10 minutes (argon consumption was 4-5 l/min) does not change the main morphometric parameters (2019-2020). The literature provides contradictory data on the plasma effect on growth rates - some researchers observe a stimulating effect, while others do not. Apparently, this depends on the installation construction and the plasma source.

Our studies have shown that irradiation of barley seeds with NTAP decreases the total microbial contamination (by 36.7% when treated for 5 minutes). This is due to the Quantity of Mesophilic Aerobic and Facultative Anaerobic Microorganisms (QMAFAnM), yeasts, and mold fungi (2020).

The biocidal effect of NTAP treatment was found in a lactobacilli culture, which was evaluated by the diameter of growth inhibition zones (2020). NTAP treatment also provides a biocidal effect on *Phytophthora* spp. culture (2021).

The consequences of a single exposure to NTAP on barley plants in var-

ious phases of organogenesis were investigated in the work process (2022). The stimulating effect of NTAP treatment on the morphometric parameters and the structure of the barley yield after exposure for 1 and 5 minutes was not revealed. A 15-minute treatment of barley plants with NTAP in the tillering phase stimulated some parameters. The effect of NTAP on barley plants during the booting phase was less pronounced than at earlier stages of development.