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Protein hydrolysates as biostimulants for agricultural crops

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In recent years, the Department of Plant Physiology and Biochemistry at the Agricultural University of Plovdiv has been conducting laboratory, pot, and field trials with biostimulants on various agricultural crops. The physiological status of the plants is analyzed using modern scientific equipment, which significantly increases the reliability of the obtained results. Biostimulants from different groups are tested – protein hydrolysates, humic acids, seaweed extracts, combined products, etc. Here, we have presented some results obtained from trials with protein hydrolysates.

Effect of a Protein Biostimulant on the Physiological Status of IMI-R Sunflower Plants Treated with the Herbicide Pulsar

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The effect of the biostimulant Tera-Sorb Foliar on young IMI-R sunflower plants treated with the herbicide Pulsar 40 (imazamox) was studied. The plants were treated separately and jointly with the two products as follows: Pulsar – 132 µg per plant (corresponding to 100 ml / decare) and Tera-Sorb – 1 ml per plant at a concentration of 10 ml / liter. The treatment was applied at the 2-3 leaf pair stage. Clearfield sunflower hybrids are resistant to imazamox, but in certain cases such as overdose, combination of treatment with unfavorable climatic conditions, and others, a temporary herbicidal effect is observed, manifested as yellowing of the vegetative apex and growth suppression.

The mechanism of action of imazamox is the inhibition of the biosynthesis of the amino acids valine, leucine, and isoleucine, which leads to disturbances in protein metabolism in susceptible plant species. Tera-Sorb Foliar is a protein hydrolysate containing mainly amino acids, peptides, and macro- and microelements. The working hypothesis of the study is that the combined application of the herbicide Pulsar 40 (imazamox) with the biostimulant Tera-Sorb Foliar will limit the manifestations of herbicidal phytotoxicity.

The results of the conducted experiment show that in sunflower plants treated with herbicide+biostimulant, phytotoxic manifestations are absent, while in plants treated only with herbicide, there is some growth suppression.

Effect of the Biostimulant NaturAmin-WSP on the Physiological Status of Young Maize Plants Subjected to Low-Temperature Stress

The curative effect of the biostimulant NaturAmin (PH1) on the physiological status of young maize plants subjected to low-temperature exposure was studied. The biostimulant NaturAmin belongs to the group of protein hydrolysates. Maize plants at the 3-4 leaf stage were exposed for 7 days at a temperature of 10°C. After this period, the plant leaves were sprayed with NaturAmin at a dose of 1 ml per plant and a concentration of 1 g / liter. The plants were grown for the next 7 days at the same low temperature, after which they were recovered at 25 °C.

It was found that plants subjected to low-temperature stress have suppressed growth. Chlorosis is observed in them, covering the area from the base to the middle of the leaf blade, the signs of which are less pronounced in plants treated with NaturAmin. The application of the biostimulant has a positive effect on the plants. The rate of photosynthesis (PS) in plants treated with NaturAmin is about 30% higher compared to untreated (control) plants. The mass of these plants and their leaf area also have higher values.

The full text can be read in issue 2/2017 of the special supplement "BIOSTIMULANTS FOR AGRICULTURAL CROPS", which is distributed together with the main body of the journal "Plant Protection"