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Manifestations of oxidative stress in seedlings of triticale under conditions of sulfate salinity

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Abstract

The effect of the presence of sodium sulfate (120 mM) in the medium on the development of oxidative stress and the work of components of the antioxidant system in the Triticale of the winter variety "Tribune" was studied. The work was carried out with 7-day sprouts after 12, 24, 48, 72 and 96 hours of exposure in a salt solution. The following indicators were determined: hydrogen peroxide, malonic dialdehyde, catalase activity, guaiacol peroxidase and ascorbate peroxidase. Sulphate salinity caused a significant change in all these parameters. During the experiment, a 3-4-fold increase in the hydrogen peroxide content in roots and triticale shoots was observed. At the same time, the maximum content of H_2O_2 in the roots was observed already by 12 hours of the experiment, while in shoots the maximum manifested only to 72 hours. The observed increase in the content of this active form of oxygen by 12 hours was accompanied by a simultaneous increase in the amount of lipid peroxidation, which in shoots reached large values and lasted up to 48 hours, while in the roots this index decreased already by 24 hours. The activity of ascorbate peroxidase and catalase in shoots also increased by 12 hours, after which it decreased to 48 hours of the experiment. In the roots, the activity of these enzymes changed significantly less. The activity of guaiacol peroxidase in shoots after a slight increase by 12 hours was reduced by half to 24 hours. In the roots, the activity of the enzyme increased throughout the entire experiment. An analysis of the results obtained led to the conclusion that the short-term effect of sulphate salinity resulted in a more significant increase in hydrogen peroxide than in chloride salinity. At the same time, the dynamics of activity of ascorbate peroxidase, catalase and guaiacol peroxidase in triticale shoots and roots under the conditions of sulfate salinization has its own specifics in comparison with the conditions of chloride salinization.

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