

"Nanochemistry and biotechnology"

The effect of pre-sowing seed treatment with nonionic colloidal solutions of metal nanoparticles on lectin activity of winter wheat seedlings infected by the eyespot causal agent

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The use of metal nanoparticles in agriculture for pre-sowing seeds treatment or for the foliar application improves the quality of seeding material, increases plants resistance to pathogens, enhances crops productivity and allows to get ecologically pure products. The protective proteins – lectins are one of the factors of plant resistance to pathogens. They interact with the surface of bacterial cells, spores and hyphae of fungi that leads to their growth stopping and prevents the pathological process development. Thereby, the aim of our study was to reveal the effect of pre-sowing seeds treatment by nonionic colloidal solutions of silver and copper nanoparticles on lectin activity (LA) of winter wheat (*Triticum aestivum* L.) seedlings under infection.

The pre-sowing seed treatment with nonionic colloidal solutions of metal nanoparticles caused increase of wheat seedlings LA of susceptible to eyespot causal agent variety Myronivska 808 and resistant variety Renan, especially in variants with infection. However, the LA dynamics in different cell fractions of seedlings of investigated varieties was differed: one LA peak at the 4-th day after infection was observed in seedlings of susceptible variety, while two LA peaks at the 2-nd and 4-th days were found in seedlings of resistant variety.

It should be noted that the maximum LA in seedlings of susceptible variety Myronivska 808 was identified with copper and in seedlings of resistant variety Renan – with silver. In addition, LA of different cell fractions of Renan variety seedlings was higher than LA of Myronivska 808 variety seedlings, moreover LA of cell wall fraction was higher than LA of cell organelles fraction for both varieties. Considering that nanoparticles of silver and copper in used concentrations did not affect the growth of eyespot causal agent mycelium [1], we can assume that they activated the protective reactions of wheat seedlings, component of which is the increase of the LA.

1. *V.N. Belava, O.O. Panyuta, G.M. Yakovleva, Y.M. Pysmenna, M.V. Volkogon. The Effect of Silver and Copper Nanoparticles on the Wheat – Pseudocercospora herpotrichoides Pathosystem // Nanoscale Research Letters. – 2017. – 12:250*