## Nanochemistry and Nanobiotechnology

# Effects of nonionic colloid solutions of metals nanoparticles on wheat seedlings under biotic stress

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The application of metal nanoparticles (MNPs) in agriculture for pre-seed treatment allows improving the quality of seed, increasing resistance to pathogens and improving yields [1]. Effect of processing wheat seeds by nonionic colloid solutions of metals nanoparticles (Zn, Ag, Fe, Mn, Cu) on formation of protective reactions of winter wheat seedlings under eyespot causal agent *Pseudocercosporella herpotrichoides* (Fron) Deighton was assessed by the accumulation of lipid peroxidation products and the level of pathogenesis related proteins (PR-proteins) – lectins (PR-4) activity.

Decrease of lipid peroxidation products in wheat seedlings after treatment of seeds by non-ionic colloidal solutions of nanoparticles biogenic metals was observed. Lipid peroxidation products content in infected seedlings obtained from untreated MNPs seeds was higher than in other experimental variants. Therefore, we assumed that studied nonionic colloid solutions of metals nanoparticles act as antioxidants [2].

The treatment of wheat seeds by MNPs caused increasing of the lectin activity, especially significant under infection. It was observed earlier than in the variants without seed treatment by studied nonionic colloid solutions of metals nanoparticles. That can be the result of induction of endogenous protective reactions of wheat seedlings to the pathogen.

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1. *Masarovičová E, Kráľová K.* Metal nanoparticles and plants // Ecol Chem Eng S.-2013.-**20**, N 1.-P. 9-22.
2. *Taran N., Batsmanova L., Kalenskiy V., Lopatko K.* Use of metal nanoparticles in technologies of cereal crops growing – Kyiv, 2012.- 73 p.