

PROTECTIVE AND STIMULATING PROPERTIES OF NANOSELENIUM FOR INCRUSTATION OF WHEAT SEEDS

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In recent years there is an increasing interest in investigation of selenium. This is due to its lack in many regions. The least toxic and bioavailable is nanoselenium. Selenium nanoparticles have prolonged action, they generate ions and electrons which act at the cellular level. This leads to increased rate of photosynthesis, carbohydrate metabolism, respiration and the absorption of minerals. The most effective method of seed treatment is incrustation. Unlike treating with a mordant, this approach significantly increases the effectiveness of protection of seedlings from pests and diseases and also reduces negative impacts on humans and the environment.

The aim of the present study was to investigate the protective and stimulating action of nanoselenium composition stabilized with sodium alginate after treatment of wheat seeds through incrustation.

The objects for the research were the seeds of winter wheat (*Triticum aestivum* L.), varieties Podolyanka, adhesives Prilipach and Liposam in a concentration of 25 mg/L, and a water-soluble selenium nanobiocomposition. In order to determine the protective and stimulating effect of nanoselenium on seeds, they were treated through incrustation with selenium nanobiocomposition using adhesives. Concentrations of nanoselenium tested were 10.0; 20.0; 30.0; 40.0 and 50.0 mg/L. Biomass of seedling roots and aboveground parts was measured with gravimetric method after 7 days. Determination of seed infection by phytopathogens was carried out according to GOST 12044-93.

Level of seed incrustation with nanocomposition using adhesives Liposam and Prilipach were close. Increased root dry biomass and aboveground dry biomass were observed over the entire range of concentrations studied. The results correlated with the decrease of contamination by phytopathogens. Incrustation of seeds resulted in increased root dry biomass of 17.3–18.9 %, and aboveground dry biomass – 13.9–14.7 %, depending on the adhesive used. At a concentration of nanoselenium 30,0–50,0 mg/L infection is completely absent.

It was previously shown that seed soaking treatment of wheat for 4 hours in nanoselenium aqueous composition is less effective than incrustation.

Thus, a nanocomposition based on selenium and sodium alginate with adhesives can be used as an environmentally safe protective stimulant for the treatment of wheat plants using incrustation.

Keywords: nanoparticles, selenium, seed, incrustation, adhesive, wheat.

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