

ABSTRACT&REFERENCES

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INFLUENCE OF PRE-SOWING SEED TREATMENTS WITH BIOLOGICALLY ACTIVE SUBSTANCES ON SPRING WHEAT RHIZOSPHERE MICROBIOCENOSIS

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Aim of research. To evaluate changes in the spring wheat rhizosphere microbiocenosis at the pre-sowing treatment by citrates of biogenic metals, created based on nanotechnologies and inoculation of the consortium of root microorganisms in soil at the effect of these arrangements on the enzymatic activity of leaf tissues and productivity of wheat plants.

Methods. Microbiological methods – inoculation on solid nutritive mediums for determining the content of main groups of soil microorganisms in the rhizosphere of plants; biochemical – for determining the activity of antioxidant enzymes of catalase and peroxidase; biometric – for determining the mass of 1000 seeds and seed productivity on experimental areas; statistical.

Results of research. Field experiments of crops of spring wheat Pecheryanka demonstrate that at the pre-sowing treatment of seeds by 1 %-solutions of biologically active substances in the content of composite fields of citrates of nanoparticles of Ag+Cu and Co+Cu+Zn+Fe+Mn+Mo+Mg (Avatar-1) and ions I-Se and introduction of the consortium of soil-useful microorganisms (biopreparation BP Extrakon), there were observed changes of ratios of main microbial groups in the composition of soil microbiocenosis: aerobic nitrogen-fixers, actinomycetes, fungal microflora, oligotrophic bacteria, that in some way correlated with the seed productivity.

Conclusions.

1. It has been established, that the ratio of microbial groups, especially the percent of groups of aerobic nitrogen-fixers increased in the wheat rhizosphere relating to the control in the following succession – in the earing phase: BP Extrakon>Extrakon+I-Se, and in the milk ripeness phase – in the following succession: BP Extrakon+I-Se>BP Extrakon>>Avatar-1>Ag-Cu. Actinomycetes prevailed on the variant with the pre-sowing treatment by I-Se, and the fungal microflora – in the milk ripeness phase.

2. The activity of catalase and peroxidase in leaf tissues at the pre-sowing treatment by biologically active substances was lower than in the control, except the variant of the pre-sowing treatment by citrates of nanoparticles of Ag-Cu, where the catalase activity a bit grew – by 7.9 %.

3. It has been revealed, that indicators of the seed productivity improved most essentially at inoculation of the consortium of root microorganisms in soil, and also at the treatment that favored the increase of aerobic nitrogen-fixers in the soil rhizosphere, thus the seed productivity increased on the variants in the succession: BP Extrakon>BP Extrakon+I-Se>Avatar-1>Ag+Cu, decreasing at the variant with the treatment by I-Se

Keywords: *Triticum aestivum*, wheat, microbiocenosis, microorganisms, catalase, nanoparticles, nitrogen-fixers, actinomycetes, micromycetes

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INFLUENCE OF GIBBERELLIN ON THE MESOSTRUCTURAL ORGANIZATION OF THE LEAF, ACCUMULATION AND REDISTRIBUTION OF ASSIMILATES AND FEEDING ELEMENTS OF THE GOOSEBERRY PLANTS (*GROSSULARIA RECLINATA*) IN CONNECTION WITH THE PRODUCTIVITY OF CULTURE

p. 10-13

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The effect of gibberellic acid on morphogenesis, mesostructural leaf organization, accumulation and redistribution of various forms of carbohydrates, nitrogen, phosphorus and potassium between the organs of gooseberry plants of the Mashenka variety in relation to the productivity of the culture has been established.

The aim of the study was to find out the peculiarities of morphogenesis, the formation of the leaf apparatus, the accumulation and redistribution of assimilates and nitrogen-containing compounds between the organs of gooseberry plants for the actions of gibberellic acid in connection with the productivity of the culture.

Materials and methods. Plants were treated once during the budding period with a 0.05 % m gibberellic acid solution during the budding phase. The carbohydrate content was determined by the iodometric method, nitrogen – by Keldahl, phosphorus – by the intensity of the formation of the phosphorus-molibdenovogo complex, potassium – by flame-photometric, the content of chlorophylls – spectrophotometrically.

Results. Under the influence of the drug, a more powerful donor sphere was formed due to the growth of chlorenchyma due to an increase in the volume and linear dimensions of the cells of the columnar and spongy assimilation tissue. This led to enhanced assimilation, an increase in the content of non-structural carbohydrates (sugar + starch) in the shoots. Processing gibberellin contributed to the optimization of nitrogen, phosphorus and potassium in the leaves and shoots. A significant deponvalous capacity of the stems in the temporary redundancy of an aksimilit and gooseberry plant nutrients with the subsequent reutilization of them to the processes of carpogenesis has been established. Changes in the nature of donor-acceptor relations in gooseberry plants under the influence of gibberellic acid caused the redistribution of assimilate and nutrient fluxes from vegetative organs to fruits, and had a positive effect on the crop productivity.

Conclusions. The use of gibberellic acid led to the formation of a more powerful donor sphere, the accumulation and temporary deposit of the part of carbohydrates and mineral nutrients in the vegetative organs of gooseberry plants, followed by their remobilization on the need for fruit formation and growth, led to a significant increase in yield and improved the product quality

Keywords: gooseberry, gibberellins, photosynthetic apparatus, mesostructure, donor-acceptor system, morphogenesis, carbohydrates, mineral nutrition elements, yield, product quality

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POTENTIAL IMPACT OF CERIU DIOXIDE NANOPARTICLES (NANOCERIA) ON THE CONCENTRATION OF C-REACTIVE PROTEIN AND MIDDLE-MASS MOLECULES AFTER WOUND TREATMENT IN RATS

p. 14-19

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Wound healing which is a usual biological process in our body is attained by four accurate and highly organized stages: hemostasis, inflammation, proliferation, and remodeling. In order to achieve a proper and successful wound healing, all these stages must occur in an appropriate sequence under a certain period of time. Many factors can disturb one or more stage of this process, hence resulting an inappropriate or ruined wound healing.

Aim of research. This article investigates the influence of nanoceria on C-reactive protein and Middle-mass molecules concentration in blood serum of rats after full-thickness wound model.

Materials and Methods. These two factors are considered to be indicators for endogenous intoxication, thus controlling their level in blood serum plays a key role in the wound healing process. The experimental procedure was conducted by the Gabrielyan method for Middle-mass molecules (MMM) concentration measurement and turbidimetry for C-reactive protein.

Result. It was shown the elevated level of MMM in blood serum in the control group of rats. In contrast, where

the treatment of wounds was carried out by *Nanoceria* in experimental group, the level of MMM decreased significantly in each day of experiment till 20th day when the full re-epithelialization occurred. And we demonstrated an increase in the level of CRP on the 3rd, 6th, 9th and 14th days of the experiment in comparison with the control in blood serum of all the experimental groups. Restoration of this indicator to normal values was observed in the groups of animals that received *Nanoceria* on the 20th day of the experiment, it correlated with full re-epithelialization.

Conclusion. Due to several other advantages of *Nanoceria*, such as balancing some growth factors, Antioxidant, Antimicrobial, ROS reduction, SOD restoration, Catalase reduction properties that were investigated and proved in our previous studies, we consider *Nanoceria* as a promising drug for further investigation

Keywords: C-reactive protein, Middle-mass molecules, *Nanoceria*, Gabrielyan method, turbidimetry

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SOZOPHYTES AND HABITAT IN THE TERRITORY OF THE STOW KHORTYTSIA UNDER PROTECTION OF THE BERN CONVENTION

p. 19-24

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Aim. In order to preserve the phytocenosis fund of the Khortytsia tract, we set the goal to include it in the territory of

a special nature conservation value which is the Emerald Object. To do this, a phytosociological assessment of the territory was carried out regarding its compliance with the requirements of the Berne Convention.

Results. The Khortitsa stow is the territory which landscapes represent a characteristic of the Zaporizhzhia oblast, especially steppe, with natural vegetation in a well-preserved state.

The study of the flora and vegetation was carried out by the expeditionary route method, as well as setting stationary experimental areas of 100 m² and transecting in accordance with generally accepted methods.

On the territory of the tract there were discovered:

– All arid types of E1 category herb groups classified EUNIS, described for Zaporizhzhia oblast (E1.11, E1.2.1.1 – E1.2.1.7);

– 20 types of habitats, protected by resolution No. 4 of the Bern Convention (C 1.226; C1.33; C1.3411; C 2.33; C2.34; C 3.4; C 3.51; D 5.2; E 1.1.1; E 1.2; E 3.4; E 5.4; G1.11; G 1.3; G 1.7; X 18).

– 3 types of vascular plants (*Aldrovanda vesiculosa* L., *Jurinea cyanoides* DC., *Serratula lycopifolia* Beck.), listed in Appendix No. 1 of Resolution No. 6 of the Bern Convention. The obtained data were included into the standard data forms of the objects of the Emerald Network applicants and were defended at the Emerald Network Biogeographical Seminar for all habitats and species (except birds) for the Steppic region (the Republic of Moldova, the Russian Federation and Ukraine), the Alpine Caucasus (the Russian Federation), the Marine Black Sea (Ukraine, the Russian Federation) and the Marine Caspian Sea (which was held in Kyiv from on September 6 till 8, 2016).

Conclusion. In 2016 the stow was included in the Emerald Network of Ukraine UA0000106 “Kakhovka Reservoir”. The research materials show that Khortytisia stow has a great phytosociological value and needs arrangements for protection and conservation of its biodiversity.

Keywords: Wild flora, sozophytes, habitats, Khortytisia ravine, rare component, Berne Convention, Emerald Network.

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STRUCTURAL-FUNCTIONAL STATE OF KIDNEYS OF RATS OF TWO GENERATIONS WHEN USING GLYPHOSATE-RESISTANT GENETICALLY MODIFIED SOY AND HERBICIDE ROUNDUP

p. 25-29

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Due to the widespread use of transgenic soy and the Roundup herbicide, we conducted histological studies of the kidneys

of two generations of rats that received genetically modified soybean “Roundup Ready”, not treated with a herbicide, the same genetically modified soybean, treated with a herbicide and the “Roundup” herbicide together with drinking water.

Materials and methods. *The subjects of the study were male rats of the Wistar line at the age of 4 months, weighing 180-200 g. The experimental animals were grouped into 5 groups of 12 rats each (6 females and 6 males): Group I – the intact animals (kept on a standard vivarium diet); Group II – the animals with up to 26 % of standard diet nutritional value, replaced by traditional soybean; Group III – the rats with up to 26 % of the standard diet, replaced by genetically modified soybeans, not treated with the herbicide Roundup; Group IV – the rats, fed with feed containing up to 26 % of genetically modified soybean, treated with the herbicide Roundup; Group V – the rats, received the herbicide Roundup with drinking water at a concentration (0.1 µg/L). After 42 days, all groups of rats were paired, and thus the second generation was obtained. At the age of 12 months, the rats of all groups were decapitated, and pieces, selected from the middle part of the kidneys (indicate which ones), then these pieces were fixed in 10 % neutral solution of formalin for 48 hours. At performing morphological studies, commonly used histological techniques were used.*

Results. *The evaluation of histopathological changes in the kidneys of the experimental animals, fed with genetically modified soybean, not treated with the Roundup herbicide (Group III), the ones, fed with transgenic soybean, treated with a herbicide (Group IV), and the ones received the Roundup herbicide with water (Group V) was realized. The analysis of histological sections of the kidneys in all rat groups showed changes in the structure of the kidneys in the IV and V groups. As a result of the experiment, reversible swelling of the renal tubule epithelium in these groups and signs of necrosis of individual cells in the first generation of rats were noted, and in the second generation there was a destruction of the tubule cells and a violation of their functions.*

Conclusions. *The use of genetically modified soybean, treated with the herbicide «Roundup» and herbicide, results in the loss of the structure of renal glomeruli and in the disruption of their functions, both in the first and second generation. Such results indicate a negative effect of the herbicide on the rat’s organism and its ability to accumulate in soybean seeds*
Keywords: *biotechnology, traditional soya, transgenic, glyphosate-resistant, kidneys, herbicide, glomeruli, hydrophilic swelling*

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CATALASE ACTIVITY OF MACROMYCETE *PLEUROTUS OSTREATUS* (JACQ.:FR.) P. KUMM. AT THE EFFECT OF LASER IRRADIATION

p. 30-36

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Enzyme catalase is characterized by the high catalytic activity, almost doesn't need activation energy, reaction velocity of this enzyme limits not only the velocity of substrate diffusion to the active center. The action mechanism of catalase is in disintegration of hydrogen peroxide with emission of molecular oxygen. The enzyme is used as a component of biosensors for determining the quantitative content of hydrogen peroxide and ethanol.

Aim of the work was to study the influence of laser radiation on the catalase activity of macromycete *Pleurotus ostreatus* (Jacq.:Fr.) P. Kumm..

Materials and methods. Irradiations of inoculum of always the same density and age were realized before inoculation using LED lasers of red, blue and green light with power 100 mWt. The catalase activity in mycelium and cultural filtrate was determined spectrophotometrically, based on the ability of hydrogen peroxide to form the stable colored complex with molybdenum salts.

Results. The obtained results allow to make a conclusion about changeability of studied strains in the catalase activity of CF and MH. In particular, the highest index of catalase activity of cultural filtrate and mycelium homogenate was fixed for the strain P-191 of the fungus *P. ostreatus*. The worst producer of extracellular catalase is the strain P-108. The least value of the activity of mycelium catalase has been established for the strain P-192. It is probably explained by individual characteristics of these strains. Laser irradiation had a positive influence on the catalase activity of cultural filtrate and mycelium homogenate. Thus, in cultural filtrate the maximum catalase activity was fixed as a result of irradiation by the blue laser for the strain P-191 of fungus *P. ostreatus* – 2986,72±11,26 mcat/l. The catalase activity growth in mycelium homogenate has been established for the strain P-192 also at the effect of blue laser irradiation – by 29,59 %.

Conclusions. It has been established, that laser irradiation by blue and green light with duration 10 s results in the catalase activity growth of cultural filtrate and mycelium homogenate of the studied strains of *P. ostreatus*. The effect of red light doesn't cause reliable changes of the enzyme activity in most studied strains. The most reaction was inherent to the strains P-191 and P-192 of fungus *P. ostreatus* as a response to irradiation by blue light. Thus, the index of catalase activity of cultural filtrate for the strain P-191 grew by 20,18 %, and the catalase activity of mycelium grew by 29,59 % for the strain P-192. Other studied strains had less essential changes of the catalase function as a response to irradiation

Keywords: basidiomycota, catalase activity, laser irradiation

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