

ABSTRACT&REFERENCES

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**INFLUENCE OF GIBBERELLIN AND
TEBUCONAZOLE ON THE DYNAMICS OF
THE CONTENT OF NON-STRUCTURAL
CARBOHYDRATES IN LEAVES, THE
ANATOMICAL STRUCTURE AND CHEMICAL
COMPOSITION OF SHOOTS AND THE YIELD OF
GOOSEBERRIES (*GROSSULARIA RECLINA* (L.)
MILL)**

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The effect of gibberellin and tebuconazole on the content of sugars and starch in the leaves of gooseberry cultivar Mashenka in plant ontogenesis is established, the anatomical features and biochemical changes in the shoots for the actions of the preparations are analyzed, the effect of the preparations on the crop yield is fixed.

The aim of the study was to find out the dynamics of the accumulation of non-structural carbohydrates (sugar + starch) in the leaves, growth characteristics, the formation of the anatomical structure and changes in the chemical composition of the shoots and the yield of gooseberries due to the effects of gibberellic acid and tebuconazole.

Materials and methods. According to the experimental variants, the plants were treated once in the budding phase with a 0.005 % solution of gibberellic acid and a 0.025 % aqueous solution of tebuconazole. Determination of cellulose, pectin and lignin was carried out by the gravimetric method, hemicellulose and non-structural carbohydrates (sugars and starch) in the leaves and stems of gooseberries were studied by the iodometric method.—Features of the anatomical structure were determined on a fixed material of annual shoots at the end of the growing season (October).

The results of the study. Due to the formation of a powerful donor sphere for the actions of the preparations, gooseberry plants accumulated more non-structural carbohydrates (sugar + starch) in the leaves, which became a prerequisite for increasing the yield of experimental plants, while the

effectiveness of tebuconazole was higher than gibberellin. The excess of assimilates was used not only for the processes of carpogenesis, but also for the formation of shoots: the content of structural biopolymers of the cell walls increased under the action of the preparations, more sugars and starch accumulated in wintering shoots, which is a prerequisite for more frost-resistant plants.

Conclusions. The use of gibberellin and tebuconazole leads to an increase in the content of non-structural carbohydrates (sugar + starch) in gooseberry leaves. This helps to increase the productivity of the culture, the restructuring of the anatomical structure and the accumulation of biopolymers of cell walls and reserve carbohydrates in shoots, which is a prerequisite for increasing plant frost resistance.

Keywords: gooseberries, gibberellins, tebuconazole, donor-acceptor system, carbohydrates, productivity

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EFFECTS OF VIRAL INFECTION ON BIOCHEMICAL PROTECTIVE REACTIONS OF WHEAT PLANTS

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The aim of the work – to investigate the influence of viral infection on the biochemical plant protective reactions

Materials and methods of the research – The researches were conducted on wheat plants (*Triticum aestivum* L.) of the Julia variety of foreign plant breeding.

Methods of the research: Biometrics, DAS-ELISA, Kjeldahl method, anthron method for the determination of sugars, spectrophotometric methods. The statistical analysis of experimental data was carried out using the program “Libre Office Calc” GNU Lesser General Public License v 3).

Results of the researches. The obtained results indicate that some of the response of wheat plants to infection with wheat stripe mosaic virus (WSMV) is disturbances in the functioning of the photosynthetic apparatus of wheat leaves and a decrease in protein content. An increase of the soluble sugars and flavonoids content and activity of chitinase and β -1,3-glucanase at the affecting of WSMV was established. It may have a protective value.

It was found, that the WSMV causes such nonspecific reactions of the plant cell as activation of lipid peroxidation and decrease of certain antioxidant enzymes (catalase et al.). It has been shown, that the activation of peroxidase,

an increase of reduced glutathione content of cells, affected by WSMV, is the wheat plant protective reaction to the secondary oxidative stress that occurs in cells in the case of virus penetration.

Conclusions. *The study of the biochemical composition of wheat plants infected by WSMV, showed the presence of changes in some biochemical parameters which connected with the formation of plant defense mechanisms (content of photosynthetic pigments, protein, sugars, flavonoids, activity of PR proteins, intensity of oxidative and antioxidant processes). The obtained results can be used for selection of wheat varieties with economically valuable traits and complex resistance (both to climatic conditions of the environment and to phytoviral infections), which may be recommended for introduction into plant breeding and agricultural practice.*

Keywords: *wheat, WSMV, resistance, biochemical protective reactions*

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FEATURES OF PARENTS' SELECTION AND EFFICIENCY OF ARTIFICIAL HYBRIDIZATION OF *CANNA* L.

p. 16-23

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Possibilities of artificial hybridization with the use of genotypes from different Cannas groups and the prospect of attracting introduced species for genetically breeding enrichment of the modern Cannas variety are considered.

*The purpose of the work was to select parental pairs for artificial hybridization of *Canna* for genetically-selective enrichment of its diversity for cultivation in the southern arid region of Ukraine (in Kryvyi Rih). The pollen fertility index of introduced species and varieties of different groups of *Canna* was used for the selection of parental pairs.*

Materials and Methods. *The research was done on 7 species (*C. tuerckheimii* Kraenzl.; *C. indica* var. *warscewiczii* Nob. Tanaka; *C. iridiflora* Ruiz&Pav.; *C. flacida* Salisd.; *C. indica* var. *edulis* Ker Gawl.; *C. indica* var. *coccinea* Mill.; *C. indica* L.) and 28 varieties of *Canna* of this collectors' fund. Pollen was chosen in finishing phase of budding for the cytologic analysis and fertility was being defined by iodine reaction of starch, according to the approved method. Hybridization was brought into action using known techniques for *Canna*. Dates of artificial hybridization and times of castration of the flower have been set according to ecological and climatic conditions of the industrial region.*

Results. *On the basis of cytogenetic analysis of pollen of introduced species and promising varieties of *Canna*, parental pairs for artificial hybridization for the purpose of genetically-selective enrichment of its diversity and ob-*

*taining specimens, suitable for cultivation in the steppe zone of Ukraine, in particular in the ecologically destabilized region were selected. The approach to the selection of the original forms of *Canna* for artificial hybridization on the basis of cytogenetic analysis of pollen is developed.*
Conclusions. *According to the index of pollen quality (FI) in final period of bud formation prospective introduced species *Canna* were marked for further usage as parental forms in hybridization schemes. The most effective combinations of crossings were found on the basis of performed artificial hybridization as promising introduced *Canna* varieties for steppe zone and industrial region of Ukraine. The most effective combinations were obtained when crossing among the varieties of the Crozy group.*

*Two selection forms have been pointed out from the received fund of hybrid plants *Canna* as to the complex of ornamental characteristic and have been introduced to the collection fund for their further implementation in landscape gardening*

Keywords: *species and varieties of the genus *Canna*, pollen, sterility, fertility index, hybridization, parental forms, selection*

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COMPARATIVE CHARACTERISTICS OF BIOLOGICAL AGE AND RATE OF AGING OF INTERNALLY DISPLACED AND LOCAL STUDENTS

p. 24-29

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Our goal is to study the biological age and the aging rate of students, who have the status of internally displaced persons 2–4 years after evacuation from uncontrolled territories in order to determine the leading factors of aging for further development of preventive measures.

Materials and research methods: We surveyed 106 students of Vasyl Stus Donetsk National University. The students' biological age was determined by the method of Vladimir Voitenko.

Results: the biological age of internally displaced male students was found to be 41.3 years on average (passport age 21.8 years), 89.4 % higher than the calendar age. A survey of students of the same chronological age, who reside in the city of Vinnitsa found that their biological age was 37.6 years (passport age – 20.5), which is 83.4 % higher than the calendar age. The biological age of internally displaced female students has increased to 25.8 years (passport age is 20 years), which is 29 % higher than the calendar age. The biological age of local female students is 29.2 years (passport age is 20 years), which is 46 % higher than the calendar age. A study of the aging rate of students found that about half have strongly increased rates of aging. When studying the rate of aging of female students, it was found, that only 12 % had a strongly increased rate of aging. In addition, in internally displaced students (60.6 %), the rate of aging is within normal limits.

Conclusions: The biological age and aging rate of male students are strongly increased, with no significant differences between internally displaced and local students. The biological age and the aging rate of female students is progressing not so fast, the internally displaced female students have indicators that are within the normal range for the population

Keywords: aging, biological age, passport age, calendar age, aging rate, premature aging, static balancing, self-esteem

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HOW TO ESCAPE ‘THE ESKAPE PATHOGENS’ USING PLANT EXTRACTS

p. 30-37

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The aim of the work was to determine the content of biologically active substances, namely polyphenols and anthocyanins, in the extracts of cherryplum, blueberries, jostaberry, sweet cherries, plums, red and black currants, and to study the effect of these extracts on the growth and biofilm formation of clinical isolates of ESKAPE Pathogens in vitro.

Materials and methods. *The antibiotic resistance of the following clinical isolates: Enterococcus faecalis, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa, Enterobacter cloacae was determined by the Kirby-Bauer diffusion method. The bioactive substances content was determined with a thin layer chromatography method. The effect of berry extracts on the above-mentioned isolates was studied by the method of compatible cultivation. The capacity of clinical isolates to form a biofilm was studied by a spectrophotometric method, using gentian violet.*

Results. *Having analyzed the results of the antibiotic sensitivity of clinical isolates, it was found, that they were resistant to all antimicrobials used. The analysis of the content of bioactive substances of berry extracts showed that they contain a large amount of anthocyanins and polyphenols. It was revealed, that clinical isolates are capable of forming biofilms, and the selected berry extracts had the ability to inhibit the formed biofilms with isolates of clinical origin, such as Klebsiella pneumoniae and Pseudomonas aeruginosa.*

Conclusions. *Researching the antibacterial properties of anthocyanins and polyphenols, extracted from berries, we can conclude, that they are capable of inhibiting the growth of not only planktonic strains forms, selected by us, but also inhibit the biofilms, formed by them*

Keywords: *isolates of clinical origin, biofilms, plant extracts*

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IMPACT OF TECHNOLOGICALLY PROCESSED RAPESEEDS ON THE CONTENT OF GLUCOSINOLATES

p. 38-41

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The purpose of the study is to determine the content of glucosinolates in rapeseed and its processing products, depending on the technological methods of its processing at different processing plants.

Materials and methods. *The studies were conducted using marketable rapeseed seeds, as well as by-products of its processing into oil – meal and cake. Samples of the initial and final products of processing were selected at those enterprises of Ukraine, which in the last few years have been engaged in processing rapeseed.*

The biochemical analysis of samples of seeds, meal and cake was performed by known methods.

Calculated and analytical research methods were used to analyze the results obtained.

Results. *The studies have shown that reducing the content of glucosinolates also occurs in the process of industrial processing of commercial rapeseed oil. In the case of oil extraction enterprises, this figure is reduced by 50 %, and in enterprises where there are no stages of extraction and toasting – by 25 %.*

The analysis showed that the content of glucosinolates in domestic products of processing rapeseed (cake, meal) at this stage is an average of 25 µmol/g. However, this level is still higher than what is thought to be used in feeding monogastric animals without restriction, since then the content of glucosinolates in these products should not exceed 20 µmol/g.

Conclusions. *The content of the main anti-nutrients in rapeseed meal/cake of domestic production in the current year was 25,1–25,8 µmol/g d.m., which is still higher than the level that allows to use these products of processing rapeseed in feeding monogastric animals without limits*

Keywords: *rape plant, seeds, press cake, protein meals, processing technology, glucosinolates, effectiveness of using, feeding*

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