THE ECOLOGICAL GRADE OF THE VASCULAR PLANTS OF RESTORE VEGETATION OF THE FOREST-STEP OF UKRAINE (KYIV REGION)

B. Yakubenko, A. Yarmolenko, A. Tertyshnyy, A. Churilov

The ecological groups of vascular plants of restore vegetation in grasslands which depend on water regime, mineral resources, acidity of soil and quantity of calcium in soil were given.

Ecological groups, water regime, trofic, quantity of calcium, grassland vegetation, the Forest-steppe of Ukraine.

At the forest-steppe zone in the last decade has increased markedly in the structure of the fund fallow land. This trend continues as by removal of land from the land fund primarily eroded and low-arable land, and because of their non-through socio-economic reasons.

Evaluation of the floristic composition of meadow vegetation renewal fallow for environmental performance allows us to identify environmental factors ecotypes, identify the main stages of succession and direction changes.

The purpose of research - to identify the floristic composition dependence of different fallow years demutatsiy renewable meadow vegetation from exposure to environmental factors such as water treatment transit, calcium content and pH of the soil; by analyzing ascertain patterns of dynamic processes in the restoration of meadow vegetation.

Materials and methods research. Geobotanical study natural and anthropogenically disturbed meadow vegetation, its dynamics studied by applying direct and indirect methods of developing such scientists as EM Lavrenko [8] AI Tolmachev [14], ID Yurkevych, OA Kruchanovoyi [2], VD Alexandrov [1] BM Myrkina, LG Naumova, AI Solomesch [12] BA Yurtsevym [20] using herbarium material NUBiP Ukraine Department of Botany and Institute of Botany. MG Cold National Academy of Sciences of Ukraine. Identification of species composition was determined by the "High society plants of Ukraine" [14] and agreed with the current nomenclature list of vascular plants of Ukraine [24]. Environmental indicators species

were determined and coordinated by the multi-volume edition "Ekoflora Ukraine" [5-8].

Conclusions

The studies found that the range of renewable floral meadow vegetation determines the dominant type hidromorf - mesophytes (47.6%), which indicates the dostatnozabezpecheni moist habitat conditions. Mezokserofity with xerophytes are 32.4% and xerophilous line describing the genesis of meadow vegetation. They create the essence of renewable plant communities.

Group in the spectrum ekohrup for trofnistyu is mezotrofy - 29.2% of the floristic composition, slightly less eutrophic species - 26%, reflecting the richness of habitat conditions in minerals. Most of them have high rates of abundance, projective cover and play a significant role in shaping communities renewable meadow vegetation.

For demanding meadow plants calcium occupy the first position akarbonatofily, which are 47.6% of the flora forest-fallow in the Kiev region. The second position is occupied hemikarbonatofoby - 32.4%, which indicates a low level of calcium in the soil studied region.

The studies established 52.1% of acidophilic species group. The second way in flora by reference to the acidity of the species occupy a neutral reaction of soil solution, which is typical habitats of slabkokysloyu reaction of the soil solution. Conducted environmental analysis shows genetic convergence floristic composition of meadow vegetation renewable forest-fallow with Poliske, due to the influence of environmental factors.

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ANALYSIS OF CONSORTIUM AS BIONDICATION TRANSFORMED FOREST STATE ON THE BORDER OF THE KYIVS'KE POLISSYA AND THE KYIVS'KA VYSOCHYNNA OBLAST

O. Blinkova, O. Ivanenko

Consorts connection of woody plants and xylotrophic fungi in the transformed oak-horn-pine forest on the border of the Kyivs'ke Polissya and the Kyivs'ka vysochynna oblast' were analyzed as bioindication of state forests. Vitality, age, sanitary structures of Pinus sylvestris L. and Quercus robur L. and species, systematic, trophic structures of xylotrophic fungi were investigated.

Koadaptive system, xylomycobionts, Pinus sylvestris L., Quercus robur L.

The study of consorts connection as specific ecological objects is important for deeper noesis of not only biological variety, but of issues of phylogeny, regularities of historical transformation of communities, the solving of which is at the initial stage. It is now generally accepted the core role of forests in stability of biosphere due to preservation of biodiversity and its global influence upon the planet's climate (Rio, 1992). Taking into account the ecosystematic, biospheric role of tree vegetation as an active participant of substances, energy and information cycling on the Earth, as well as the environment of existence of multiple living organisms' species, the issue of studying and preservation of forests remains one of the most significant aspects of natural management in the world. In this context the consorts connection of tree vegetation and wood-destroying fungi are essential elements the study. Xylotrophic macromycetes (aphyllophoroid and agaricoid fungi) are polyphyletic group of organisms which distributed over several families and orders among the division Asco-, Basidiomycota. They execute decay of cellulose, hemicellulose and lignin of wood. These fungi are the major wooddecaying organisms. They play an important role in the nutrient cycle of forest ecosystems.

The purpose of research were to evaluation of consorts connection of tree vegetation and wood-destroying fungi of model plot on the border of Kyivs'ke Polissya and Kyivs'ka vysochynna oblast'.

Materials and methods. For the study was selected area of Boyars'ka station of forest research (BSFR) as model transformed territory in the city Boyarka of Kyyevo-Svyatoshyns'ky region. It is located on the border of Kyivs'ke Polissya and Kyivs'ka vysochynna oblast' according to the physical and geographic zoning of Ukraine. Forest of BSFR covers an area of 21,1 thousand hectares. The climate is characterized by high rainfall and relatively high average temperatures [4].

In model plot a number of ecological research was performed at different levels of diagnostics of xylotrophic fungal infestation: organ, tree bion, population (species), biogroup (stratum) of phytocoenosis, phytocoenosis. The state of trees was evaluated according to common methods of forestry and landscape ecology [1, 2]. The names of plants were given according to S.K. Cherepanov [7]. We characterized the state of surface of soil layer and determined the stage of degression by A.F. Polyakov [5]. The phytosanitary state of trees was appraised by biomorphological parameters (density of top, color, distribution of leaves, damage of insects and pathogens, state of cortex, the presence of wilting branches, etc.) in accordance with the sanitary rules [6]. The stand state index was calculated as sum of gains in the index of trees' state for the number of trees in a certain category, divided by total quantity of examined trees. The healthy ones (I) are considered the stand with index 1-1,5, the weakened ones (II) – 1,51-2,50, heavily weakened (III) – 2,51-3,50, the wilting ones (IV) – 3,51 – 4,50, "recent dead tree stand" (V) – 4,51 – 5,50, "old dead tree stand" (VI) – 5,51 – 6,50.

The measuring unit is understood as substrates of *Pinus sylvestris* L. and *Quercus robur* L. on which carpophores of fungi were detected. Collection of factual evidence was carried out during the period of visible growth and formation of carpophores of xylotrophic fungi during second ten days of September 2013. Every detected species was photographed in vivo. The species that are easily identified "in oculo nudo" and do not require additional micromorphological studies, were not included in the exsiccatae. If required, the colour, smell, structure of carpophores were noted, the reaction of punks to mechanical damage (change of colour, sap ooze); ordination on substrate. The dead substrate of the host tree of xylotrophic fungi was divided into two categories – pruning and stump, taking into account the morpho-

metric parameters. Nomenclature identified species of xylotrophic fungi concepted by the nomenclature base MycoBank (mycobank.org) and current literature [9–11].

We have used the factor Menhinika (species richness of xylomycobiota):

$$D_{Mn} = \frac{S}{\sqrt{N}},$$

S – number of species; N – number of finds;

and Shannon index (generalized assessment of diversity):

$$H = \sum p_i \log_{10} p_i,$$

p_i – relative abundance of each species [8].

Conclusions

We have analyzed consorts connection of tree vegetation and wood-destroying fungi of model plot of BSFR (c. Boyarka, Kyiv region) on the border of Kyivs'ke Polissya and Kyivs'ka vysochynna oblast' as bioidicators of state of transformed forests. It was established that the most significant criterion of "transformation" of investigated area were suboptimal composition of phytocoenoses relatively to ecotope, the age structure of the stand, absence of large-sized fallen woody debris; degradation of phytosanitary state of trees and the depletion of stands. They leads to changes of ecological regimes of forest environment. Which in turn lead to structural changes of co-adaptive system of tree vegetation and wood-destroying fungi. In general on model plot was detected 23 species of macromycetes, which refer to 19 genus, 14 families, 6 orders of divisions Ascomycota (classes Leotiomycetes) and Basidiomycota (class Agaricomycetes). Ecological structure of mycobiota evidenced of its adaptive nature in this type of forest which attributed to both climatic zones. The spreading of parasitic fungi is 9,0 %. Generalized assessment of diversity of xylomycobiota – 1,24±0,06, species richness – 3,13±0,16, fraction of stenotrophic fungi – 17,4 %. The largest number of finds of wood-destroying fungi were detected on large-sized stumps of *Quercus robur* L. (34,2 %). The little number of finds (15,8 %; 5,3 %) of xylotrophic fungi on different categories of substrates of *Pinus sylvestris* L. explained to the biological characteristics of the species. At the same time the age, vitalitative, phytosanitary structure of stands of *Q. robur*, *P. sylvestris* and specific, systematic and trophic structure of xylotrophic fungi evidences on significant pathological processes in this type of forest.

In general, the study's hypothesis was proved, that specific, trophic, systematic structure of xylotrophic fungi depicts the phytosanitary state, vitalitative and age structure of stands. This testifies the unity, inter-connection of these components at all hierarchic levels of forest ecosystem's structural organization.

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INTRODUCING THE SOUTHERN HEMP SORTS INTO THE EUROPEAN COUNTRIES

L. Horshkova, A. Bohdanova

Consider the role of South hundred and varieties of hemp from Italy, Chile, Japan and other countries on the content cannabinoid compounds, especially tetradrachmae (THC). It is shown that for output without drugs hemp varieties South of the class was excluded from the selection process and created varieties with insignificant amount of THC or its complete absence. Drugs, cannabinoids, THC (tetrahydrocannabinol), acclimatization, introduction, varieties, breeding, hybridization, chromatography.

Drug substances, cannabinoids, tetrahydrocannabinol, acclimatization, introducing, sort, selecting, hybridization, chromatography.

20 - 40 years of the twentieth century in Europe, in particular France, Poland, Hungary, Germany, Russia, Ukraine, and the United States by acclimatization and introduction of varieties and accessions from Italy, Chile, Japan and other countries have developed varieties with a high content of psychotomimetics active THC (tetrahedronal). These varieties compared to local had a high content of THC and related compounds. Further, with the aim to besaratinia hemp varieties, southern varieties were excluded from the selection process and openly varieties with minor amount of THC or its complete absence. The use of hemp seed as a source of raw materials for drugs was the basis for focusing on existing cultivars, the content of narcotic substances and especially psychotomimetics active tetrahedronal - THC, which significantly affects the Central nervous system. The origin of new varieties, especially localization in them cannabinolic connections, will allow us to trace their ancestry and history excretion South and pivdennodonbaska hemp varieties. It is believed that local varieties and samples have little THC. Introduction in the selection process of the southern varieties and accessions Italy, Turkey, China, Japan and other countries can lead to the formation of natural phenols - cannabinoids. In previous years there was a process of saturation of new varieties of hemp drugs, though they were more productive and resistant to major diseases and pests. Determination of the origin and saturation varieties of narcotic substances (cannabinoids) forms the view that the cannabinoids genetically determined and it is necessary to selectively use the original material in the selection process.

The aim of the research is to investigate the impact of introduction and acclimatization of varieties and varieties of hemp from the southern countries to the content psychotomimetics active tetrahedronal (THC) and related compounds.

Materials and methods research. In order to conduct work has been used varieties and accessions of the all-Union Institute of plant industry (VIR (, St. Petersburg), Institute of bast crops (e.g. deaf), Krasnodar Institute of agriculture, research institutions Bulgaria, Poland, Yugoslavia, China, Romania, Italy, Hungary and the USA. Quantitative determination cannabinoid substances was carried out using a gas-liquid chromatograph brand Hewlett Packard 5830 And equipped hydrogen plamenova-ionizing detector. As the carrier gas used was nitrogen. The flow rate of nitrogen and hydrogen 30 ml/min, air 300 ml/min, the Temperature of the inlet and detector was + 2400 C and + 3000 C. Glass columns were filled with 5% OV - 101 on Chromosorb WAN - DMCS (80 - 100 mesh). The content of cannabinoids in each sample was determined using integrator brand Hewlett Packard 3380 A. Internal standard was methyl ester of stearic acid - SNO.

Conclusions

On the basis of the conducted research we found:

• local varieties of hemp had a negligible content of cannabinoid compounds, including tetrahedronal (THC);

• introduction and acclimatization of varieties and accessions from the southern countries had agreed saturation novobiocin varieties tetrahedronal and related compounds;

• implementation and improvement of methods of selection and determination of cannabinoids contributed to obtaining varieties with low content of these compounds or their absence.

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SIGNIFICANCE OF GLUTATHIONE-DEPENDENT SYSTEM IN THE ADAPTATION OF PLANT VARIETIES *LOLIUM PERENNE* L. OF UKRAINIAN BREEDING

O. Leschenko

Analysis the content of reduced glutathione and antioxidant enzymes – glutathione reductase (GR) and glutathione-S-transferase (GST) in the vegetative organs of plants 5 varieties of ukrainian breeding Lolium perenne L. – Adriana-80, Leta, Orion, Sviatoshynskyi and Lytvynivskyy-1. Found varietal specificity of plant L. perenne L., which is due to the variation of the level of activity glutathione-dependent elements of the system. Experimentally established that the plants of L. perenne L. varieties Andriana-80 and Leta are the most promising for planting urbolandshaftiv, have high level of glutathione and significant activity of GR and GST.

Lolium perenne L., glutathione, glutathione-dependent system, glutathione reductase, varieties.

The lawn surface is an integral part of gardening modern arbitariness. The absence of a system of automatic irrigation and soil salinity are the main problems generated soddy coatings settlements of Ukraine. Excessive soil salinity suffers 25 % of the globe (Kuznetsov, 2006), which has a direct negative impact on the growth and development of plants. Resistance of plants to adverse environmental factors, primarily determined by their physiological and biological characteristics. Application viscoadaptive to stress conditions plants is one of the main requirements in the selection of planting material for landscape objects. Paganism perennial (L. perenne L.) is one of the main components of lawn kulturpflanzen for various purposes and is of great practical importance in landscape construction. The stability analysis of plants of L. perenne L. to adverse environmental factors may be based on an assessment of the effectiveness of the glutathione-dependent system.

Glutathione (GSH) is a biologically active substance, a Tripeptide (L-gamma-glutamyl-L-zistel-glycine), is one of the universal regulators of biochemical and physiological homeostasis of any organism. Found that thiol (solely) group is the main functional part of Tripeptide and easy as enzymatic and nonenzymatic oxidation, resulting in disulfde (the oxidized form of glutathione (GSSG) [19]. Restored glutathione (GSH) is a low molecular weight thiol, biosynthesis and catabolism which occurs by glutamin cycle. The oxidation of reduced glutathione catalyzed by enzymes with different specificity to acceptors of hydrogen. The reverse process - recovery of oxidized glutathione catalyzes the glutathion reductase (GR) [5, 8, 13, 19].

Glutathione is an important component of low molecular weight antioxidant system, its reduced form consists of residues glutamic acid, glycocol and cysteine. The study of the transformation of the glutathione system in the plant organism is quite a relevant issue in the field of gardening, because it is an indicator of sustainability. The functional role of glutathione diverse, because it is contained in almost all plant tissues and is involved in many physiological and biochemical processes: protects the body against reactive oxygen compounds, restores and sumerize disulfide bond, affects the activity of enzymes, protein biosynthesis and proliferation of nucleic acids, supports the functions of membranes, are the reserve cysteine, increases the resistance of plant cells to chemical ii physical environmental factors, leads to resistance to heavy metal cations (Dolgova, 2009).

It is established that the redox system botela glutathione causes significant changes in the activity of protein synthesis in mitochondria. There is activation of protein translation in the presence of glutathione in its active form and, conversely, the inhibition of this process, if glutathione is in the reduced form (Saturday, 2003). Thus, it is determined that in the redox control of protein synthesis in mitochondria of cereals, participates thiol-disulfde currency, which includes the redox system of glutathione.

Glutathione is a precursor photogelatin - low molecular weight peptides containing a large number of SH-groups (Grill et al, 1985), which provides stability to the plants due to the activation mechanism of detoxification of metal and the increase in the concentration of glutathione and the synthesis of PF. One of the most important mechanisms of plant resistance to the effects of metals is the detoxification of heavy metal ions in the cell by binding them with SH-groups of some low molecular weight peptides and proteins (Hall, 2002).

The action of a solution of cadmium in various concentrations (0-100 mg/dm3) on the germination of barley caused an increase in the total number of compounds containing SH-groups. It should be noted that it was found increased (compared with control) of the total pool of glutathione (GSH+GSS), and the trend has been a sharp increase in GSH in comparison GSS.

It is established that an important role in adaptation of lawn grasses to salinity plays an enzyme TRP, which is accompanied by more intensive growth of roots and shoots of plants main getnotify herbs [6].

The object of our research were the plants of L. perenne L. 5 varieties of domestic breeding - Hadrian-80, Summer, Orion, Svyatoshinsky and Litwinski-1, which were selected from the territory of the nursery Kiev experimental station NSC "FROM" NAAS of Ukraine in 2013

The aim of the research is the assessment of the content of glutathione in the vegetative organs of plants 5 varieties of the domestic breeding of L. perenne L. and identification of promising varieties for landscaping in residential areas.

Materials and methods research. The content of reduced glutathione was determined by the method of E. Beutler et al. (1963) modified by C. M. Gryshko and D. C. Sedikova [1]. The basis of the method lies reaction tolazoline exchange, during which released the anion of 2-nitro-5-thiobenzoate.

To determine the reduced forms of glutathione used a 20% homogenate of plant tissues produced at 0.3 M potassium-phosphate buffer with pH 7.5 (4.26 deaths g K2HPO4 dissolved in 100 ml H2O). The obtained homogenate was centrifuged for 20 min at 6 000 R/min To 2 ml of supernatant was added to 3 ml saguling reagent (100 ml which contains 1,67 g NRO, 0,2 g Trilon B, 30 g NaCl) and they were re-centrifugation for 10 min at 6 000 R/min Then in the cuvette was made to 2 ml of 0.3 M potassium phosphate buffer, 0.05 ml of 1 mm solution of reagent Ellman, 2 ml of the obtained supernatant and perform the measurement of optical density at 412 nm on photoelectrocolorimeter KLF-3 .

Conclusions

On the basis of experimental data it was established that plants L. perenne L. cultivars Andrian-80 and Summer is the most adapted to urban conditions and they can be recommended for landscaping unbalanced.

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EXPRESS ESTIMATION OF RESISTANT THE HORSE CHESTNUT TO THE INFLUENCE *CAMERARIA OHRIDELLA* DESCH. & DIM. BY USING THE METHOD OF THE INDUCTION OF CHLOROPHYLL FLUORESCENCE

K. E. Shavanova, O. A. Marchenko, M. V. Taran, M. F. Starodub

The purpose of the present study was to determine the effectiveness of the chlorophyll fluorescence method induction for the estimation of the functional state of the photosynthetic activity of the horse chestnut and red buckeye in green areas of three ecological zones of Kiev. It was found that the representative plants in three ecological zones have a significant difference of indexes, what shows changes of the induction of chlorophyll fluorescence that reflects the processes of transformation of energy at the early stages of photosynthesis. It was stated that value of Kpl plateau in the curve of Kautsky can be used as a test for the early selection of the forms of horse chestnut, resistant to the influence of the complex environmental factors.

A. hippocastanum L., A. pavia L., general condition, chlorophyll, fluorescence induction, express diagnostics.

In recent years, the state of green space in urban Ukraine has significantly deteriorated due to the adverse effects of a number of anthropogenic factors: emissions from motor vehicles, heavy metals, salinity, heat, disease and pests. A substantial number of plants is depressed critical physiological condition and does not stand anthropogenic pressure, leading to disturbances in their metabolism, their premature aging and shrinkage [1, 2].

According Kyivgreenbud in Kyiv urbolandshafts Aesculus hippocastanum is 22% tree plantations, but lately, due to high level of total anthropogenic influence, destruction of plant pests and diseases, much of it in quantity. Kiev is in critical condition [3, 4]. In recent years, moreover observed mass distribution chestnut moth minuyuchoyi Cameraria ohridella Desch. & Dim. Ascomycetes and Guignardia aesculi (Peck) Stev. [2, 4]. All this leads to the depletion of plants and reduce their decoration.

Today there are large methodological arsenal for the diagnosis of viral, bacterial and fungal infections of plants. It is, above all, biological testing for viral diseases herbaceous plant indicators, methods and immunofluorescence microscopy email, various modifications of the ELISA, immunodiffusion, serological tests [5]. However, all of the above diagnostic approaches are complex, time consuming, and mostly they require complex and expensive laboratory equipment. Moreover, the only known method currently widely used to express determination destruction plant chestnut moth in vivo in the field, is a visual examination. Of course, it does not meet modern requirements practices on the previous diagnosis of diseases.

Given the above, it is clear urgent need to develop and implement informative and express methods for diagnostically important indicators at an early stage of the pathological process in plants. In addition, methods used must be economically feasible and do not put the ravages of plant tissues. Among the methodological approaches that are currently being developed for the rapid diagnosis of extreme environmental factors on plants, pay attention, especially those based on determining the state of the photosynthetic apparatus. The process of photosynthesis is essential to plant life and is extremely sensitive to the effects of abiotic and biotic factors. Modern methods allow to obtain information about the state of the photosynthetic apparatus of plants and assess the degree of impact on his adverse environmental factors. A significant advantage of them is that they are able to register even small changes in the activity of the photosynthetic apparatus and let it do in the field and quickly and easily [5, 6]. The method of chlorophyll fluorescence induction based on the measurement of chlorophyll fluorescence in plants under intense light after a short period of dark adaptation. This method is sensitive enough to quickly install and changes in the photosynthetic apparatus under stress and regeneration potential of intact plants.

The aim of our study was to determine the efficacy of the method, based on an assessment of the intensity of induction of chlorophyll fluorescence to determine the functional state of the photosynthetic apparatus in leaves of Aesculus hippocastanum Horse Chestnut and red in three ecological zones m. Kyiv.

Materials and methods.

For experiments using randomly selected samples of vegetable Horse Chestnut two types: normal and red and green space m. Kyiv in three ecological zones: the Botanical Garden of the National University of Life and Environmental Sciences of Ukraine (control), parks, Holosiyivsky, Mariinsky parks and outdoor spaces near highways.

Measurements were carried out on un-chestnut leaves in ground plant growth. State of the photosynthetic apparatus of plants was determined using a prototype handheld device "Floratest" developed at the Institute of Cybernetics Glushkov National Academy of Sciences of Ukraine. The device allows you to record the fluorescence induction curve ("Kautsky curve"), the parameters of which can be analyzed as the progress of the light and dark phases of photosynthesis. Portable device "Floratest" consists of highly integrated microprocessor unit and a miniature remote optical sensor. The main characteristics of remote optical sensor is light levels and low power consumption. Optical sensor consists of a blue light-emitting diodes (type FYLS-0603UBC) and photodiode amplifier. Dimensions diodes are 6 - 3 mm. Diodes are compatible with automatic soldering equipment installation and elements that are very important in serial production. The power light emitting diodes 120 mcd, the angle of illumination - 130 °, the dominant wavelength - 470 nm. Photodiode amplifier (type TSL251R) combines a photodiode and amplifier feedback. It has low power consumption and comes in a plastic case with integrated lenses. The width of the range of photodiode amplifier is 300 nm to 1100 nm. The peak emission of chlorophyll is about 700 nm. Therefore, to narrow the range of photodiode amplifier on its surface was installed red filter. Microprocessor unit includes a controller ADuC842 low power, input amplifiers, ridynnokrystalichnyy display FDCG12864 consumption 3B, battery-powered and control buttons.

The shape of the curve of chlorophyll fluorescence induction reflects changes in every link of the process of photosynthesis caused by the influence of environmental factors and endogenous factors [6, 8].

Induction of chlorophyll fluorescence was measured in 3-time repetition of the cycle length in 3 min dark adaptation before the measurement was 10 min. For IFH curves and analysis software tool used Microsoft Office Excel.

Key indicators fotoinduktsiyi fluorescence were: Fo - background level of fluorescence; Fpl - the level of fluorescence in achieving a temporary slowdown in its signal, the so-called "plateau"; F max - the maximum fluorescence; Fst- fixed level of 3 minutes. after the lighting. All figures induction curve presented in relative fluorescence units standard (filter OC-14), with emissions in the same spectral range as the leaf chlorophyll fluorescence [9, 10].

Also defined Key = (Fmah- Fst) / Fst - factor induction fluorescence, Fv = Fmax-Fo - variable fluorescence, (Fmax-Fo) / Fmax = Fv / Fmax - depends on the efficiency of photochemical reactions of PS2, (Fpl-Fo) / Fv - if the current light intensity sufficient to reach a state of maximum vidnovlennosti QA, at the time of reaching the level of Fmax, then option (Fpl-Fo) / Fv corresponds to the relative amount QB-nevidnovlyuyuchyh PS2 complexes that do not participate in a linear electron transport, (Fmax -Fst) / Fst - value quenching of fluorescence, which affect both photochemical (CO_2 fixation) and nefotohimichni processes (thermal dissipation of the energy of the excited state of chlorophyll molecules) [10-12].

Results and discussion.

According to the literature [13], changes in chlorophyll fluorescence of photosystem 2 (PS2) reflect the redox processes in the reaction center (RC) of the photosystem. Light quanta absorbed energy can be transferred in three ways: photochemical reactions in the form of heat dissipation and radiation of light - chlorophyll fluorescence. These processes compete with each other in a way that efficiency leads to a suppression of the other two. In normal conditions, the level of fluorescence small (1-2% of the total of absorbed light), indicating that the active cells use the energy of absorbed light. After lighting adapted to the dark leaves of plants first for a few seconds a sharp rise in the intensity of fluorescence of chlorophyll - fast phase, and then in a few minutes there is a gradual decline through certain stages - from slow to stationary phase of Fst.

To characterize the photosynthetic apparatus under stress at leaf stage for rapid phase often use the ratio of variable fluorescence Fv to the maximum level F max, which is considered an indicator of potential leaf photosynthetic activity [14, 15].

However, this option has some limitations because it applies only to the primary photochemical processes in photosystem 2 and only during the first 100-500 ms.

The action of any adverse factors (in this case may be affected minuyuchoyu chestnut moth Cameraria ohridella) reduces the ability atrahuyuchu Calvin cycle that stops the flow of electrons and reaction centers go inactive (closed) position. This absorbed light energy can not be used in photosynthesis and chlorophyll fluorescence increases as around the time of registration induction range changes [11, 13].

In plants Horse Chestnut Red resistant to minuyuchoyi moths, there was an increase in intensity Fo 23.3%, and increased the maximum fluorescence Fmax 19.0% and inpatient level Fst - at 59.1%. Such changes of fluorescence induction due to the increasing number of chlorophyll molecules in susceptible plants, which does not transmit excitation energy of the reaction center (Fo), and accompanied by the growth of "integral induction losses", ie an increase in the amount of energy that does not work on photosynthesis and also displayed in slower phases of induction, reflected on Kautsky curve (Fig. 1, 2).

Spectral fluorescence study found infected leaves Horse Chestnut increase in the ratio of intensities of short and long-wave fluorestsentsiy chlorophyll - Fst680 / Fst740, indicating that the increase in the degree of recovery carriers electron transport chain between reaction centers of photosystems 1 and 2 [16]. Note also decrease by 21% fluorescence induction coefficient Ki = (Fmax-Fst) / Fmax, which characterizes the efficiency of the flow of dark photosynthetic processes and above all rybulozo-bifosfatkarboksylazy activity - the main enzyme Calvin cycle.

In the samples of plants susceptible to destruction Fo value decreased by 25.0% compared to their stable forms that may be associated with blocking resynthesis chlorophyll degradation and destruction of chloroplast structure, reducing their number to the impact of environmental factors. This, in turn, contributes to the decline of the maximum fluorescence (Fmax) at 29.0%, compared with an increase of 15.0% in value in resistant plants.

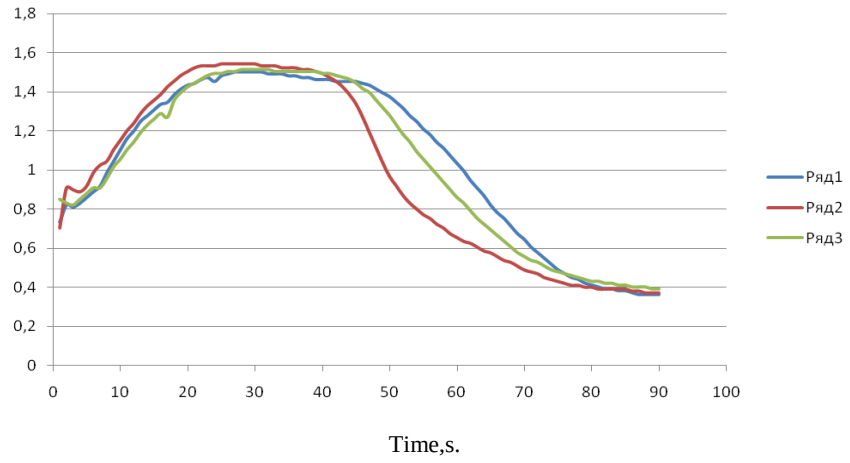

Fig. 1. Typical curves fotoinduktsiyi flyuorystsentsiyi Horse Chestnut leaf chlorophyll red moth resistant minuyuchoyi where number 1 - control number 2 - Parklands, number 3 - street stands near highways.

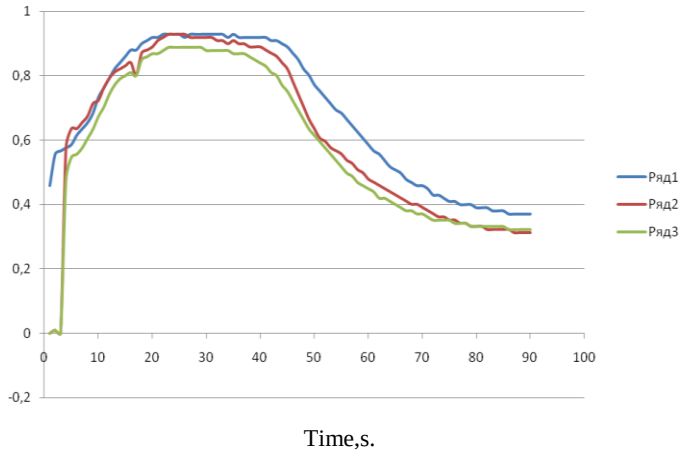

Fig. 2. Standard curves fotoinduktions flyuorystsentsions chlorophyll leaves Aesculus hippocastanum, where number 1 - control number 2 - Parklands, number 3 - street stands near highways.

The dependence of the functioning of the photosynthetic apparatus Aesculus hippocastanum leaves and red depending on locations

characteristic phenotype	Fv	Fv/Fo	(Fpl-Fo)/Fv	Fmax/Fst	Ki	Fv/Fmax	(Fpl-Fo)/Fmax	(Fmax-Fpl)/Fmax
Aesculus hippocastanum	0,517 ± 0,006	0,868 ± 0,022	0,340± 0,009	3,677 ± 0,014	0,728 ± 0,010	0,465 ± 0,017	0,158 ± 0,011	0,307± 0,007
Street planting near	0,625 ± 0,013	1,163 ± 0,024	0,375± 0,014	3,500 ± 0,008	0,714 ± 0,012	0,538 ± 0,008	0,202 ± 0,004	0,336± 0,018
highways	0,664 ±	0,782 ±	0,388± 0,006	3,876 ±	0,742 ±	0,439 ±	0,039 ±	0,400± 0,013

	0,014	0,016		0,024	0,020	0,017	0,002	
Aesculus hippocastanum	0,772 ± 0,009	1,054 ± 0,026	0,114± 0,013	4,163 ± 0,032	0,760 ± 0,017	0,513 ± 0,008	0,058 ± 0,004	0,455± 0,013
control	0,840 ± 0,012	1,195 ± 0,034	0,244± 0,006	4,158 ± 0,036	0,759 ± 0,027	0,544 ± 0,014	0,076 ± 0,003	0,468± 0,014
Aesculus hippocastanum	0,684 ± 0,021	2,121 ± 0,028	0,328± 0,017	3,552 ± 0,042	0,718 ± 0,013	0,680 ± 0,011	0,291 ± 0,004	0,388± 0,012

The most significant changes occur with the intensity of dark photosynthetic processes that reflect the slow changes in chlorophyll fluorescence induction. Against the background of general decline in chlorophyll fluorescence emission in resistant plants observed steady growth of Fst 52.2%. Under these conditions, the fluorescence induction coefficient Ki is reduced compared to susceptible plants by 73%. This indicates blocking the flow of photosynthetic processes in chloroplasts of leaves Aesculus hippocastanum.

Among the parameters of chlorophyll fluorescence induction factor Plateau Kpl = (Fpl-Fo) :(Fmax-Fo) = dFpl / Fv (where: dFpl = Fpl-Fo - amplitude plateau fluorescence; Fv = Fmax-Fo - variable fluorescence) explicitly characterize resistance Aesculus hippocastanum to biotic factors such as their pathological effects on functional status of plants. Established a significant increase in Kpl Aesculus hippocastanum of street trees near the highway compared with the same version of Red Horse Chestnut (0.340 and 0.114 respectively). This value dFpl / Fv (Kpl), which characterizes the relative amount of inactive reaction centers with respect to total reaction centers, defined as a test indicator for high adaptability of plants Horse Chestnut red.

The value of the parameter dFpl / Fv, which corresponds to the relative amount of non-renewable Qb-PS2 complexes that do not participate in the linear electron transport increases (respectively versions experiment with Aesculus hippocastanum 2.9 and 2.7 times). Note that chlorophyll fluorescence emission increases and slow phase induction curve at maximum Fmax 15.5 - 19.4%, and its stationary level Fst - more than 2.2 times. Accordingly, the ratio of fluorescence induction is reduced by 57-

58%, indicating a significant inhibition of both photophysical and photochemical processes of photosynthesis in susceptible plants. The lowest rates were reduced in these plants of both species sampled in the park areas, indicating a much lower human impact on them than those who were on the roads. And, then, the plants and the park area was under the best overall physiological condition.

Thus, the plant species studied in three ecological zones differ widely in terms of induction of chlorophyll fluorescence changes that reflect the energy conversion process in the early stages of photosynthesis. Thus, the parameter Fo in Aesculus hippocastanum susceptible to pests increases, which characterizes increase in the number of molecules of chlorophyll, which do not transfer energy to the reaction centers of PS2. These rates were highest in plants that were selected among street trees near highways city.

The increasing degree of reduction of PS2 reaction centers and chloroplasts suggests increasing the maximum level of chlorophyll fluorescence Fmax.

Conclusions.

Thus, there is every reason to believe that the induction of chlorophyll fluorescence is promising for practical use at an early rapid diagnosis of plant state. But the relationship between changes in fluorescence parameters and photosynthetic apparatus of plants as a whole is not fully installed. The primary stage of photosynthesis of plants under the influence of environmental factors are not static, but actively regulated cells according to their physiological state, which leads to complex changes in fluorescence parameters.

As a test indicator for early selection of resistant forms Horse Chestnut to the environmental impact of several factors recommended ratio Plateau Kpl = (Fpl-Fo) :(Fmax-Fo). Kpl ≥0,4-0,5 value indicates susceptibility genotypes to Horse Chestnut of negative environmental factors, including a breakdown chestnut moth. Establishing relationships between the state of the photosynthetic apparatus and mechanisms of plant resistance to biotic factors would contribute to the understanding of

photosynthesis of plants in the wild, and allow plenty of informative studies to monitor environmental conditions and plant status using fluorescence methods.

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THE ROLE OF PHYSICAL AND EPIGENETIC FACTORS ON CALLUS FORMATION *IN VITRO POTENTILLA RECTA L*. SUBSP. *LACINIOSA* (WALDST. ET KIT. EX NESTLER) NYMAN

O. Zaiats, I. Mitrofanova

The possibility of callus formation in vitro has been shown. The strains of Potentilla recta callus which are differ by light – brown color, compact texture and low vitrification have been selected during the experiment. In this case significant discrepancies in the quantitative characteristics of the obtained strains due to the type of explants, its placing on the media and physical factors of culture (darkness or light) have been found.

Potentilla recta, calluogenesis, explant, physical factors, in vitro.

Genus *Potentilla* from Rosaceae family is well known since ancient times due to its healing properties [10]. One of the species from this genus which is used in traditional medicine and homeopathy is *Potentilla recta* L. [1]. This perennial medical herbaceous plant has bactericidal, astringent and hemostatic effect. Rhizomes of *P. recta* are used for treatment and prevention of dysentery, ulcerative colitis, gastritis, cholecystitis and liver cirrhosis. Water and ethanol extracts of *P. recta* are used for wounds` treatment [1, 5, 7, 11].

Nowadays more than one third of medicines are made from stock plant material and chemical structure of substances is so complex that plants will be their only source for long time [6]. Due to the actuality of high quality stock medical material production it`s important to find new alternative and economically valuable sources of biologically active substances of plant origin. One of these sources is plant cell, organs and tissue culture.

Though ornamental and medical effects of species genus *Potentilla* are well known only single publications are devoted to the investigations of their callus formation *in vitro* [2, 8].

The aim of the investigations is to determine special features of *in vitro* callus formation for *Potentilla recta*.

Materials and methods. Objects of our investigations were leafstalks segments and parts of leaves from aseptic culture of *P. recta* L. subsp. *laciniosa* (Waldst. et Kit ex Nestler) Nyman. In our work we used common biotechnological methods [4] and methods developed in Nikitsky Botanical Gardens – National Scientific Centre (NBG-NSC) [3]. Manipulations with aseptic material were made in laminar “Fatran” (Czech Republic) and BP-4-004 (Ukraine). Leafstalk segments and leaf parts were cultured on

the modified Pierik medium [9] submitted with 6-BAP, 2,4-D or kinetin and NAA (Sigma, USA) in different concentrations and proportions. They were cultured in thermostat in dark under the temperature 26±1 °C or in the growth chamber under the temperature 24±1 °C, 16 h photoperiod and light intensity 2000-3000 Lux. Frequency of callus formation was estimated as per cent of explants that formed callus from their common number. For callus morphology analyses stereomicroscope MBS-10 (Russia) was used. Experiment was made in three variants. Statistical analyses were made using criteria Kruskal-Wallis, Mann-Whitney and chi-squared test. For calculation programmer *StatSoft Statistica* 10.0 was used.

Conclusions

It has been determined that culture conditions significantly influence on frequency of callus formation ($p = 0.042$) and frequency of rhizogenesis *in vitro* ($p = 0.001$) in different explants of *P. recta*. It has been found out that light had significantly negative influence on frequency of callus formation from leaf parts in abaxial ($p = 0.04$) and adaxial ($p = 0.02$) positions to the medium. For all types of explants and their positions on the medium significant positive influence of light on the frequency of rhizogenesis ($p \leq 0.05$) has been determined.

It has been noticed that under the light influence accumulation of dry and wet callus mass significantly decreases. Significant effect of culture conditions (light or dark), type of explants and its position on the medium on the accumulation of wet callus mass ($p = 0.029$) has been found out.

It has been demonstrated that leaf parts in abaxial position on the medium under their culture in dark had the highest indexes of accumulation of wet (31.3±18.1 mg per explants) and dry (10.2±8.0 mg per explants) callus biomass.

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THE TAXONOMIC COMPOSITION OF THE COLLECTION OF BOTH FRUIT AND ORNAMENTAL TREES AND SHRUBS IN THE NULES OF UKRAINE

V.Mezhenskyj

The estimation of taxonomic composition of the collection of both fruit and ornamental trees and shrubs in the "Agronomical Experimental Station" of the NULES of Ukraine is given, including 266 species and interspecific hybrids. They are belonging to 46 genera of 15 family from 9 orders. There are 981 specimens including 532 cultivars and selects. The Prunus s.l., Crataegus s.l., Sorbus s.str., and Malus are presented by greatest specific and varietal diversity.

Taxonomical composition, fruit and ornamental trees and shrubs.

The purpose of researches – to define a taxonomy composition of the collection of non-traditional fruit crop and ornamental trees in the NULESU.

Objects and methods of researches. Objects of research are plants of the collections of non-traditional fruit crop and ornamental trees in the Agronomical Exploratory Station of the NULESU. Plantations are established during scientific performance on a theme 110/353-pr. "Breeding of non-traditional fruit crop and ornamental trees with both phytoncide and medicine properties and working out of technologies of organic production under the conditions of the Forest-Steppe of Ukraine" (terms of performance 2010-2012) and on a theme 110/466-pr. "Introduction, breeding and working out of technologies microclonal reproduction of non-traditional fruit crops and ornamental trees under the conditions of the Forest-Steppe of Ukraine" (terms of performance 2013-2015).

Samples involved from Ukrainian and foreign scientific institutions and collections of private persons in the form of seeds, cuttings, saplings, and seedlings. The introduction carried out according to a procedure of formation of genetic resources of plants. The list of the introducts is compounded on the basis of collection register and the inventory of plantations made in May, 2014

Conclusions. The collection of non-traditional fruit crops and ornamental trees in NULESU totals 981 sample, including 532 cultivars and selects of 266 species and interspecies hybrids of trees and shrubs which belong to 46 genera 15 families 9 orders of flower plants. It represents the variety of fruit and ornamental woody plants which have value for direct use in a national economy and the further breeding for the purpose of enriching assortment useful plants in Ukraine.

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UTILIZATION OF CARBON DIOXIDE UNDER CONDITIONS OF CULTIVATION OF GRAIN CROPS BY USING OF GROWTH BIOSTIMULATORS

L. Anishun, Z. Grutsaenko, S. Ponomarenko, I. Hrigorjyk, O. Serga

It was set that the less quantity of carbon dioxide from the use of "Radostym", "Biolan", and "Emistym C" growth stimulators accumulated barley plants, and the most – winter wheat plants. The use of these stimulators causes the rise of humus in soil, chlorophyll, square of leaf blades and activity of catalaza enzyme in the leaves of spring wheat in the output of the tube and earing phases.

Crop cultures, CO_2, yield, biomus, chlorophyll, loliage area, biostimulators of plant growth.

According to expert estimates, the contribution of world agriculture is up to 20 % of total emissions of greenhouse gases, which include 50% methane, 75 - nitrogen and 5% carbon dioxide. Along with this, another 14% of the total emissions of carbon dioxide have on land use [14]. In particular, the National cadastre of anthropogenic emissions of greenhouse gases [5] noted that the optimal level of accumulation of carbon dioxide is due to biomass growth forests, and the most significant losses from arable land. The struggle for the preservation of forests reduces the level of carbon dioxide, land degradation and biodiversity loss. The improvement of the practice of agriculture leads to the reduction of carbon dioxide in the atmosphere as a result of human activities and the increase of plant biomass. Expect that in the future technology of cultivation of agricultural crops will play an important role as carbon dioxide in the atmosphere can be transformed into the plant biomass, which consists mainly of carbon. It is estimated that in Ukraine the area of arable land amounts to 33 million hectares or 50 % of the available area (60.4 million hectares). It becomes apparent that as a result of growing crops will increase the level of accumulation of carbon dioxide in the organic mass.

On the threshold of the third Millennium the world of science has been enriched by the latest technology. Thus, the newly established Ukrainian biostimulants growth (BSR) is a new generation that counteract the ecological imbalance in the plant. In addition, in modern intensive technologies of cultivation of field crops is extremely important to use environmentally safe and cheap BSR for the regulation of growth and development, increasing the resistance of plants against drought, high temperatures, salinity, lodging, disease and so on, it is Established that the use of BSR increases the

productivity of agricultural crops on average 14 to 15 % [9]. According to the research-and-production experiments using BSR involves high expenses due to the growth of crops and other crops [1].

Favorable climatic conditions and high soil fertility of Ukraine allow to obtain high quality food grains in amounts sufficient to meet domestic needs and to develop export potential. Ukraine introduced cropping patterns [7]. Under cereals and leguminous crops in 2012 allocated 15565, 2 thousand ha or 57, 2 % of the total sown area, technical - 27,0 (7549,7 thousand ha), fodder is 8.5%, which is 2348,6 thousand hectares, potatoes, vegetables and melons - 7,3%, or more than 2 million hectares. It is proved that between the atmosphere and terrestrial ecosystems occur in significant fluctuations of carbon dioxide through the operation of the processes of photosynthesis and respiration. Almost half of the carbon dioxide absorbed by plants, is spent on the processes of respiration and returned to the atmosphere. The other part involved in the formation of above-ground and below-ground biomass and dead organic matter. In the process of photosynthesis transformation of carbon dioxide occurs with participation of biological systems, the main component of which is ATP, NADH and H2O contained in talakad membranes of the chloroplasts in the leaves of plants form carbohydrates, organic acids and other spare energy substances. Human activities (deforestation, fertilizer application, irrigation, harvesting) causes disruption of the functioning of agroecosystems, including greenhouse gas fluxes - photosynthesis, death and decomposition of biomass and formation of organic matter. However, part of dead organic matter is rapidly decomposed by microorganisms and is returned in the form of carbon dioxide in the atmosphere, and the other as the humus can be stored for a certain time. However, in conditions of intensive farming undergoes degradation and degomez soils [4], which mineralize humus and wilt carbon dioxide. For the cultivation, on the contrary, there is an accumulation of humus in the soil.

The aim of the research is the evaluation of the level of savings FROM CO2 in the atmosphere and efficiency on the area of cultivation of grain crops BSR (average area of grain crops in Ukraine for the last five years is 14.7 million hectares).

Materials and methods research. The efficacy of drugs "Biolan", "Radostin and Emistim C" on the productivity of agricultural crops investigated for 2008-1012

biennium on the basis of scientific-research institutions NAAN, which are located in areas of woodlands, forest-Steppe and Northern steppe of Ukraine. **Conclusions**

The use of multicomponent BSR "Radostina", "Bolano" and "Emistim With" causes an increase in the yield of straw, PKO, content-CO2 and yield of crops. It is established that the greatest amount of carbon dioxide accumulating plants of winter wheat, the lowest - spring barley. For actions BSR is the increase in the number of chlorophyll "a" and "b" square sheet machine and activity of the enzyme catalase in plants of spring wheat in the phase of the tube and earning.

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ECOLOGICAL ASSESSMENT OF AIR TECHNOGENIC ENVIRONMENT POLLUTION IN DNIPROPETROVSK INDUSTRIAL REGION

M. Kharytonov, A. Benselhub, L. Shupranova, V. Khlopova

Comparative assessment of maximum one time concentrations and $MPC_{m.o.t.}$ approve air pollution with nitrogen dioxide, carbon oxide, sulphuretted hydrogen and phenol. Atmosphere pollution estimated over average regarding to accepted gradation on index IPA. Joint soil pollution with heavy metals near metallurgical plants assessed as «moderate threatening». The biotesting of the soil samples taken near metallurgical and by-product coke plants in Dnipropetrovsk and Dniprodzerzinsk cities was made. The decreasing in 4-day radish sprouts mass from 15 to 45% was fixed due to biotesting of soil technogenic pollution.

Atmosphere, soils, plants, aerosols, heavy metals, index of pollution, biotesting.

Now there are about 150 substances emitted into the atmosphere from factories and vehicles in large quantities and are regarded as toxicants for the biosphere objects. The main gases and aerosols that have toxic effects on the biological components of ecosystems in industrial regions include sulphur dioxides, nitrogen, heavy metals, etc [1]. The oxidation of SO2 is two ways: 1) using homogeneous reactions in the gas phase with the formation of strong oxidizing agents due to photochemical reactions; 2) heterogeneous, with preliminary absorption drops in clouds, fog, rain and subsequent liquid oxidation. Heterogeneous oxidation is carried out after the diffusion of sulfur angku in aerosol and rain water drops. It passes or catalytically, using metal ion - pollutants (e.g. Mn and Fe). The nitric oxide is oxidized to nitrogen dioxide. Nitrogen dioxide comes in a variety of photochemical reaction and is removed from the atmosphere with precipitation in the form of nitric acid [4].

The most harmful effect of air pollution is observed near sources of emission of fumes and gases. This causes a reduction in growth forest and agricultural plants, deterioration in the quality of food crops.

The most negative consequences associated with loss of man-made dust, which contains compounds of heavy metals are the main factors of soil phytotoxicity [6]. The vast majority of aerotechnology emissions (nearly 80 %) are in the industrial city of Dnepropetrovsk, Dneprodzerzhinsk and Krivoy Rog [1].

The aim of the research is a comprehensive environmental assessment aerotechnology pollution in the area of metallurgical and coke-chemical production cities of Dnipropetrovsk and Dnipropetrovsk.

Materials and methods research. Current information using a network of fixed stations in the cities of Dnipropetrovsk (NAM) and Dnipropetrovsk (RS) fixed laboratory evaluation of air pollution system Rosgidromet. For the assessment of atmospheric pollution laboratory use, rapid and automatic control methods. The data obtained background monitoring of the investigated substances in the atmospheric air are compared by different techniques. Today Dnipropetrovsk regional center for Hydrometeorology conducts sampling of atmospheric air at six fixed stations, Dnepropetrovsk, and four in the, Dneprodzerzhinsk.

Conclusions

1. Comparison of the maximum one-time concentration Gdcm.R. evidence of pollution by nitrogen dioxide, carbon monoxide, hydrogen sulfide and phenol.

2. According to the accepted levels of air pollution index - API rated above average.

3. The indicator Zc contamination of soils with heavy metals near the steel mills assessed as "moderately threatening".

4. Biotesting of technogenic pollution of soils revealed a discount in the mass of shoots of satirically shoots of radish from 15 to 45 %.

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USE HEAT BIOTERMICHNOYI OF LOW FERMENTATION AGRICULTURAL WASTE ORGANIC

V. Tarhonya, N. Lesovoy, Doctor of Agricultural Sciences.

The results of biotpower researches of biotechnological process of punching of organic agrowastes are resulted in the isolated reactor systems with forced аерацією, certainly prospects of subsequent development of the proper technologies and equipment for енергозабезпечення of agricultural production, mechnical and technological solution of equipment is offered.

Biotthermal punching, reactor systems, biotpower researches, mechnical and technological

Results bioenergy research biotechnological process agricultural composting of organic waste in isolated reactor systems with forced aeration. The prospects for further development of appropriate technologies and equipment for agricultural production of energy. A technical and technological solutions equipment.

Biotermichne composting reactor systems, bioenergy research, technical and technological solutions equipment.

One of the real ways of increasing the production of organic fertilizers is creating and implementing various technologies composting organic waste. Composting - a managed process of creating and maintaining optimal conditions for microbiological processes (humidity, temperature, structure, composition and the presence of nutrients) and minimizing the term recycling. The final product, compost contains stable organic compounds decomposition products, biomass dead microorganisms, some of green products and chemical interaction of these components [1, 5].

Composting is a dynamic biotech process that proceeds through life consortium of microorganisms of different groups. In the process of composting involves many types of bacteria - more than 2000 and at least 50 species of fungi. However, aerobic waste processing orhanomistkyh can receive low-grade heat that is appropriate and can be used for commercial purposes to reduce energy dependence and energy efficiency of small livestock farms [2, 3].

The purpose of research - the study of biotechnological process of composting organic waste in isolated reactor systems.

Materials and methods research. Research conducted by biotermichnoho composting of personal experimental composting process. This was used composting system like "pie with forced aeration", which is relatively simple and inexpensive. Indicators determined in accordance with the requirements of the JMA 74.3-37-268: 2005 [4].

Results. Based on research developed overall mass balance of fermentation (oxidation biotermichnoho) in bioenergy installation with forced aeration (Fig. 1).

1 kg of biomass contributed 2.490 air / cycle. 2.490 kg of air supplied to bioenergy installations, divided in the gas phase in 1.733 kg of nitrogen that enters the gas mixture of oxygen and 0.757 kg, which is directly involved in the process of composting.

1 kg of solid biomass loses 0.710 kg destruktovanoyi biomass, and is 0.290 kg of compost. During the composting process, taking input 3.490 kg / cycle is lost by evaporation CO2 1.042 kg and 0.425 kg of steam, for a total of 3,200 kg of gas emissions and organic compost is 0.290 kg.

Thus, during composting major heat losses out of steam and gas phase, indicating that the need to improve the design and methods of composting organic matter.

Using analytical and experimental data, taken overall energy balance of the process of fermentation (oxidation biotermichnoho) in bioenergy installation with forced aeration (Figure 2).

Initial data for the calculation of the energy balance of the process of fermentation (oxidation biotermichnoho) in bioenergy installation with forced aeration:

- Enerhovmist manure biomass (humidity 80%) - 0.42 MJ / kg;
- Enerhovmist filler (straw moisture content of 14%) - 16,19 MJ / kg;
- Enerhovmist kompostuvalnoyi mixture (70% humidity) - 5.65 MJ / kg;
- Exposure of fermentation - 7 days;
- Working volume of the fermentation chamber - 500 l;
- Temperature during fermentation of biomass - 55,0 ° C;
- Temperature - 0,0 ° C;
- Temperature gas emissions - 54,8 ° C;

- Initial water temperature - 12,0 ° C;

- The final water temperature - 40,0 ° C;

- The volume of water that is heated - 34.5 liters / day;

- Specific teplomistkist water - 4.19 kJ / (kg • deg.);

- Specific teplomistkist air (gas phase) - 1,005 kJ / (kg • deg.);

- Specific teplomistkist compost - 2.00 kJ / (kg • deg.);

- The amount of heat released from 1 kg of compost - 597 kJ.

- The amount of heat required to heat the compost at 1 ° C is calculated as follows:

(1)

where:

c - specific heat manure biomass of 1.73 kJ / (kg • K);

m - mass of one kilogram of compost kg;

- The difference of the final and initial temperature composting ° C

Since the specific heat of biomass is given in Kelvin temperature 71 ° C composting convert to Kelvin t = 345,15 ºK.

Q = 1,73 • 1 • 345,15 = 597 kJ,

Similarly, other indicators calculated that affect the process biotermichnoho composting.

Enerhovmist kompostuvalnoyi mixture (70% moisture) with 1 kg - 5.65 MJ / kg, we have input. During the composting process of heat loss from gas emissions at thermal radiation lost 1.12 MJ, the energy consumption of 0.35 mJ life of bacteria, the amount of heat released during the life of bacteria is 1.13 MJ.

Using biotermichnoho oxidation process 1 kg of biomass to bioenergy installation with forced aeration to heat water with a temperature of 55 ° C composting, daily 0.69 liters of water heated to 40 ° C.

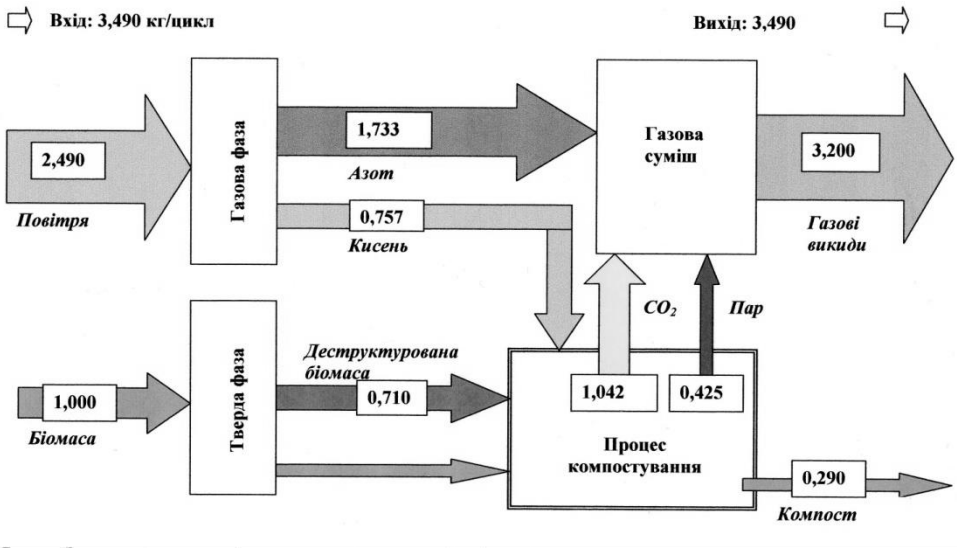

Fig. 1. The total mass balance of fermentation (oxidation biotermichnoho) in bioenergy installation with forced aeration.

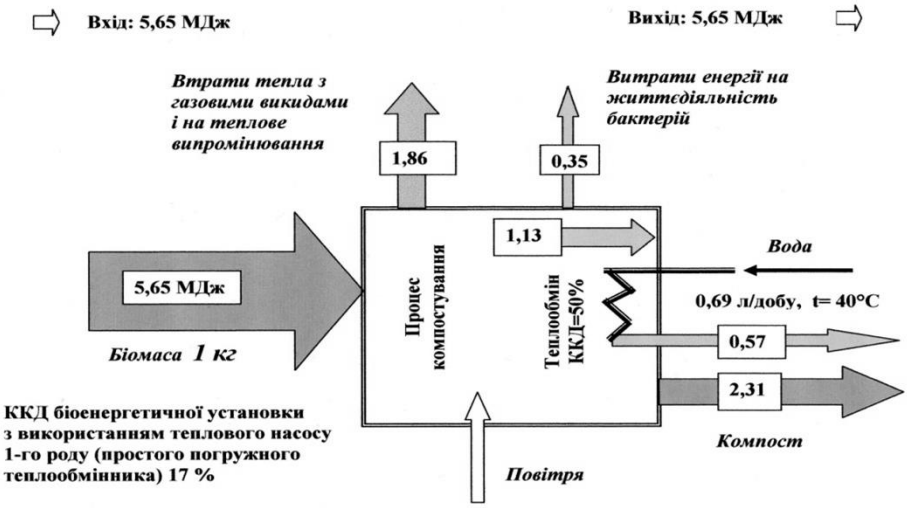

Fig. 2. The overall energy balance of the process of fermentation (oxidation biotermichnoho) in bioenergy installation with forced aeration

On the basis of scientific, technical and patent literature, and experimental results, we developed a structural scheme of universal solid microbial reactor, which can operate in either anaerobic and aerobic fermentation mode of solid waste.

The design of universal solid microbial reactor and its implementation are shown in Fig. 3.

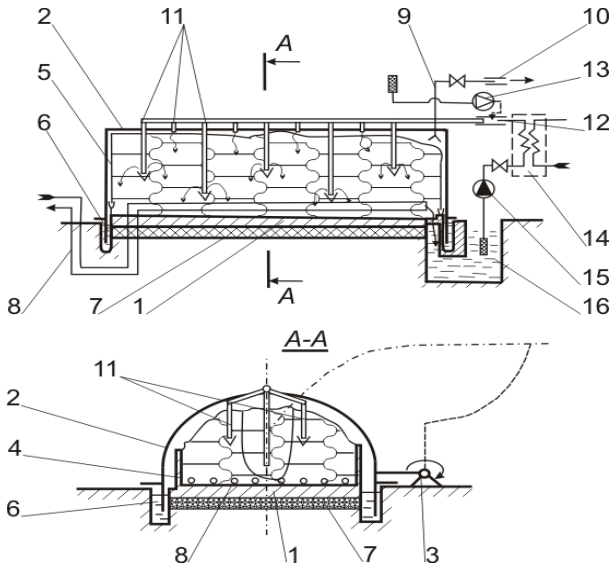

Fig. 3. Universal microbiological solid phase reactor (composting with forced aeration)

1 - horizontal platform; 2 - the case; 3 - hinge; 4 - longitudinal bulkhead;

5 - transverse bulkhead; 6 - hidrodozatvor; 7 - ground insulation;

8 - internal heat exchanger; 9 - drain pipe gas phase; 10 - flexible connection; 11 - feeding tube with a tip; 12 - coupling; 13 - air compressor; 14 - external heat exchanger; 15 - pump; 16 - capacity for liquids

Conclusions

1. composting multicomponent mixtures of biomass in addition to traditional systems clamps, should be used as solid aerobic microbiological reactors periodic action (devices for rapid fermentation biotermichnoyi) equipped with forced aeration systems and biofiltruvannya exhaust.

2. Efficiency of bioenergy plants by using the conventional heat exchanger to heat the water is at least 17%, indicating that the prospects of using heat pumps.

INDEXES OF THE INDUCTION OF CHLOROPHYL FLUORESCENCE IN PLANTS OF LUPINUS LUTEUS AFFECTED BY CARBONATE CHLOROSIS AT THE TRETMANT OF COLLOIDAL SOLUTIONS OF Zn AND Fe.

N.Starodub, R.Son'ko, K. Lopat'ko, V.Trach

The results of study about the effect of colloidal solutions of Fe and Zn, on the photosynthetic activity of plants Lupinus Luteus by the determination of the chlorophyll fluorescence intensity. It was shown the change in fluorescence of the main parameters in healthy plants and affected by carbonate chlorosis. When impressed carbonate plant chlorosis the efficiency of photosystem II was decreased. Processing plants by the colloidal solutions of metals iron and zinc improved the work of the photosynthetic apparatus.

Colloidal solution, induction fluorescence, carbonate chlorosis.

For rapid diagnosis of extreme environmental factors on plants developed different methods to the corresponding instrumental support. One of them is a method based on the detection of fluorescence of chlorophyll, which provides information about the activity of the photosynthetic apparatus, and the latter, in turn, reflects the general state of the plant [11]. It consists in assessing individual performance fluorescence of chlorophyll, which occurs when light-intensity light it adapted to the dark leaves of the plant. Light energy absorbed by molecules of chlorophyll in the leaves can be used for one of three processes: generation of photochemical reactions, energy dissipation as heat or radiation as fluorescence. These three processes are pro-competitive, so changing the effectiveness of one of them leads to variation of parameters for the other two. Thus, determining the characteristics parameters fluorescence of chlorophyll or detailed specifications Kautsky curve gives information about changes photochemical reaction flow efficiency [4]. Nonmonotonic character of the curve associated with the kinetic features of the primary processes of photosynthesis, the state of light-collecting complex reaction center, acceptor and donor of photosystem II part: of electron-transport-foot chain combination of dark and light phases of photosynthesis and alternative processes consumption of energy quanta, whose intensity is about efficiency of photosystem [8].

But for the effective use of this method should learn more depending on changes in fluorescence parameters and state photo-synthetic apparatus for plants of various

factors. Now this phenomenon is already being used in scientific practice in the study of effects on the body of plants such factors as temperature, drought, mineral nutrition, herbicides, and in the case of choosing the optimal technology for growing plants, environmental pollution monitoring, assessment virus and fungus-term infections and in other cases [2,10]. In addition, the method of determination of IFH monitors the state of plants in real time, which is especially important in the study of mechanisms of influence on plant new drugs and new technologies, which include nanotechnology. Relevant questions remain efficient and environmentally friendly products containing minerals in a biologically available form for use in an environment where there are functional diseases that are caused by unavailability of micronutrients. In this connection, studied the possibility of using metal colloids for the improvement of plants grown on calcareous soils and salinity conditions, when there is a violation of mineral nutrition. Carbonate chlorosis is a functional disease that occurs in plants in soils with a high content of calcium carbonate. Chlorosis appears in yellowing of leaves, which is an external sign of a sharp decrease in chlorophyll content. Carbonate chlorosis occupies a special place among the various types of chlorosis, because it is widespread in large areas of gardens and vineyards, located on calcareous soils. It is known that calcareous soils occupy 30% of the earth's surface [7]. During the chemical, physiological and agrochemical research it was found that a significant concentration of calcium carbonate in the soil lowers the solubility and availability to plants of iron and some other batteries. At this time, we can assume that the point of view of carbonate chlorosis as "Iron" is common [3,6]. These properties calcareous soils create a kind of balance of power plants macro and micronutrients especially characterized insufficient intake of certain metals, which mainly belong to the first transition group. Imbalance of power plants in calcareous soils, refers primarily to metals such as iron, manganese, cobalt, copper, zinc. With a lack of any of these elements in plants appear different disease.

The aim of research was to study the efficiency of colloidal solutions of Fe and/or Zn for the prevention and treatment of chlorosis carbonate with an analysis of changes in the photosynthetic apparatus of plants by fluorescence of chlorophyll.

Materials and methods research. In experiments conducted test cultures were yellow lupine plants, varieties " Kyyivs′kyy ranniy" grown on normal (black soil, sand in the ratio 2: 1) and carbonate (black soil: sand 2: 1 containing 30% calcium carbonate) soils. Plants treated with foliar 14 days of growth. The treatment was carried colloidal solutions of iron and/or zinc. Assessment of the state of the photosynthetic apparatus of plants was performed at 28 and 36 days. Accounting mass aboveground plant parts and root mass that processed spent aged 69 days (6 weeks after a single treatment). Control plants were grown in normal soil, which contained no calcium carbonate. And in the case study of the influence of colloidal solutions as additional controls were plants, which sprayed with distilled water and grown in both soils.

State of the photosynthetic apparatus was determined by assessing the intensity of IFH using a portable fluorimeter "Floratest" developed at the Glushkov Institute of Cybernetic of NAS of Ukraine [9]. Measurements conducted on the leaves middle-tier mode 10 s, ie detected rapid phase of chlorophyll fluorescence. For adaptation to darkness leaves were kept under these conditions for at least 3 minutes. Measurements performed in triple repetition.

On the curve of chlorophyll fluorescence were recorded following indicators and parameters [1,2]: Fo is the level of fluorescence that is emitted complexes of photosystem II reaction centers open in which the acceptor Qa is oxidized state; Fm is the intensity of fluorescence of chlorophyll in the "closed" reaction centers of photosystem II when all Qa restored and can not accept electrons from the reaction centers. Also used for the analysis of parameters: Fv = (Fm-Fo) is the value of the variable fluorescence, which caused part of the light energy, which is the primary reactions of photosynthesis utilized in open reaction centers; Fv/Fm is the measure used indicator of potential photosynthetic activity of the leaf and the value of which depends on the efficiency of photosystem II photochemical reactions. Statistical analysis of data was performed using the program MS Excel. The reliability of the difference between the variants was assessed by Student's criterion for significance level at $P < 0.05$.

So lesions carbonate plant chlorosis causes undesired their photosynthetic apparatus, as evidenced by an increase in the level of background fluorescence and

maximum reduction of weight and aerial parts and roots. Processing plants colloidal solutions of metals shows a positive effect and increases the vegetative mass of plants. Changes in the photosynthetic apparatus, which are determined by colloidal solutions of metals, pointing to enhance photosynthetic function in plants affected by carbonate chlorosis.

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CYTOSTATIC EFFECT OF FOOD FLAVORINGS IN THE EXAMPLE TEST-OBJECT *ALLIUM CEPA* L.

Taran M.V., Shavanova K.Ye., Lihanov A.F., Starodub N.F..

The effect of food flavors on the Allium cepa L. test object was determined. It was estimated the level vigor, germination, mitotic index, aberrations in cells and the delay root growth of onions.

Ana-telofaznyy analysis, chromosomal aberrations, mitotic index, food flavorings.

Real food industry is very diverse. Production of food supplements in the world tends to a continuous quantitative and qualitative growth: Europe - 2% in the US - 4.4%, in Asia - 10-15% [6]. Most synthetic food flavors presented with a set of components that are produced by chemical synthesis, and although their composition and purity provides constant control, they can be hazardous to human health [1]. In addition, the legislation of Ukraine does not have mandatory testing of new food additives mutagen activity, which creates the potential dangers of their use.

The classic method for studying the toxic and mutagenic effects of chemicals on living objects are tested for plant cells, including root meristem A. cepa L. (Allium-test). An important advantage of this method is the close correlation of the results with data obtained in other test systems [2, 3].

The aim of our study was to investigate the potential danger of food flavorings "Hazelnut", "Coffee", "Caramel", their cytostatic and mutagenic action.

Materials and methods.

The paper studied the food flavors, "Hazelnut"; "Coffee"); "Caramel" Daily doses for flavorings "Hazelnut" - 0.5 mg / L, "Coffee" - 0.5 mg / L, "Caramel" - 0.5 mg / l.

For the detection of chromosomal aberrations and cytostatic action of these substances used Allium-test. Seeds of onion (A. cepa L.) sterilize 1% solution of KMnO4, washed in water and germinated for 72 h filter paper in petri dishes at a temperature of 22 ° C. Roots length of 0.5 - 1 cm were fixed 24 hours in a mixture

Clark, washed three times Dist. H_2O and 70% C_2H_5OH and stored in 70% ethanol. Chromosomes were stained with Schiff's reagent (Merk) by cold hydrolysis by Feulgen [5].

As an indicator of cytostatic activity flavorings used mitotic activity index (MI) of root meristem cells. The frequency of aberrant anaphase (CHAA) was calculated as a percentage, the ratio of aberrant ana-telophase and all analyzed according to the formula:

$$CHAA = n*a \cdot 100\% / n,$$

where n*a - number of aberrant ana-telophase,

n - total number of analyzed ana-telophase.

Statistical significance of differences indices MI and CHAA meristem cells was performed by methods № 2. Initial processing of the data was performed to analyze the program package Microsoft Office Excel 2007.

Results.

Sprouting seeds A. cepa revealed a linear relationship between the rate of germination and its concentration of these substances. Established that increasing the concentration of flavors reduces vigor. Was the most toxic flavor "Coffee": the concentration of 1.0 mg / l chemical components that are part of it, completely blocked the seed germination (Table. 1)

1. Effect of food flavorings energy seed germination A. cepa L.,% nutritional

flavorings	flavorings concentration, mg / l					
	Control	0,2	0,4	0,6	0,8	1,0
Hazelnut	27,0 ±1,34	15,0 ± 0,87	7,0 ± 0,57	3,0 ± 0,21	3,0 ± 0,21	1,0 ± 0,05
Coffee	21,0 ± 1,07	11,0 ± 0,62	4,0 ± 0,38	2,0 ± 0,17	1,0 ± 0,05	0
Caramel	23,0 ± 1,13	12,0 ± 0,69	5,0 ± 0,42	2,0 ± 0,17	2,0 ± 0,17	1,0 ± 0,05

It should be noted that the seeds of A. cepa in control had low similarity of 42-54%, but with increasing concentration of food flavors, this figure was significantly decreased significantly (Table. 2).

2. Germination of seeds Allium cepa L.,%

flavorings	flavorings concentration, mg / l					
	Control	0,2	0,4	0,6	0,8	1,0
Hazelnut	54 ± 2,03	30 ± 1,13	14 ± 0,78	6 ± 0,34	6 ± 0,34	2 ± 0,05
Coffee	42 ± 1,45	22 ± 1,08	8 ± 0,43	4 ± 0,12	2 ± 0,05	0
Caramel	46 ± 1,76	24 ± 1,10	10 ± 0,65	4 ± 0,12	4 ± 0,12	2 ± 0,05

When germination of A. cepa bulbs roots in solutions at concentrations flavors 0,2-0,6 mg / l slowed down the growth of roots in 3-4 times, and at concentrations of 0.8-1.0 mg / ml of root growth is almost entirely pryzupynyavsya . Normally, the area's largest mitotic activity of meristem cells located at a distance of 1300-1800 m from the center of cells peace. In the roots, which in solutions proroschuvalysya flavors "Coffee" and "Hazelnut" zone of active cell division decreased 3-6 times (250 - 600 microns).

Cells were for endoderm, after cold hydrolysis showed a positive reaction for DNA magenta-sulfuric acid. Under the influence of synthetic flavoring "coffee" in the cells of the primary cortex roots of onion experienced a rapid destruction of nucleic acids (confirmed Schiff reaction for DNA). Even with short (30-60 min) treatment of roots flavors cell division in the apical meristem almost pryzupynyavsya (Fig. 1).

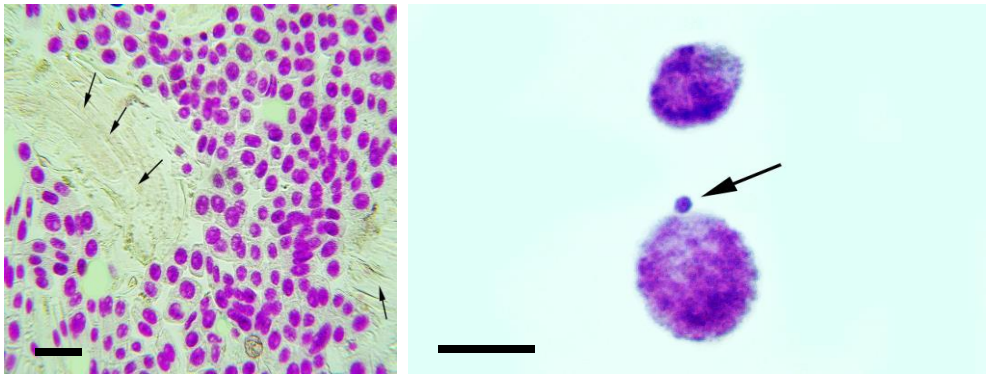

Fig.1. Cytotoxic and mutagenic action of food flavorings "Coffee" in the apical meristem cells of A. cepa (Feulgen reaction for DNA): left - the degradation of nucleic acids and area nekrotyzations cells (range - 30 mm); right - arrow shows the formation of micronuclei (range - 10 microns)

After processing roots synthetic flavors slowed cell division. In terms of cytotoxic effect of the rate of diffusion of active substances and their penetration

through Apoplast testified that the processes of cell division and tension are sensitive to chemicals flavors. Under their influence mitotic index decreased by 10-15 times, from 8.12% to 0.5-1%.

Due to massive violations of cell division, fragmentation, and the backlog of individual chromosomes or fragments formed numerous cells with micronuclei in diameter from 0.8 to 3 microns. Micronuclei in protoplasts aberrant cells are gradually destroyed. Thus, the nucleus in cells that are directly under the influence of synthetic fragrances, gradually acquired traits anomalies lost land or even entire chromosomes. Disruption of the normal mitosis, uneven distribution of genetic material led to the formation of aneuploid and polyploid cells that arise as a result of C-mitosis, cytokinesis without kariokinezu and others. According to our data fragments mitotic chromosomes sometimes united in chromosome aggregates that formed in late telophase some microkernel (1, sometimes 2, 3). Cytogenetic studies have shown (Table. 3), mitotic index figures for flavorings "Hazelnut" and "Caramel" was not significantly different from control. Ander influence flavor "Coffee" mitotic index was significantly lower (χ^2 2 = 10,41, p <0,01).

3. Indicators mitotic index (MI) in A. cepa cells under food flavorings

name of sample	Cells were analyzed for accounting MI	MI ± Sp	importance χ^2
hazelnut	2400	5,08 ± 0,45	0,39
coffee	3900	3,10 ± 0,28*	10,41
caramel	3600	4,89 ± 0,36	0,12
control	2700	4,67 ± 0,41	-

* - Confidence level of p <0,01

Since a significant deviation values MI detected using flavoring "Coffee", we have analyzed the length of the passage of cells of different phases of mitosis. The frequency of anaphase cells aberatnyh A. cepa roots significantly higher than control value only in the sample "Coffee." In samples "Hazelnut" and "Caramel" significant deviations were found (Table. 4).

4. Frequency aberatnyh anaphase (CHAA) root meristem cells A.cepa influenced investigated flavors

Name of the sample	analyzed roots	analyzed anaphase	Revealed aberrant anaphase	CHAA ± Sp	importance χ^2
hazelnut	13	537	19	3,54 ± 0,80	3,28
coffee	12	597	38	6,37 ± 1,00*	15,35
caramel	7	643	17	2,64 ± 0,63	1,02
control	9	555	9	1,62 ± 0,54	-

* - Confidence level of p <0,01

The results confirmed the impact of food flavorings "Coffee" on the ratio of cells in different phases of mitosis, its cytostatic and mutagenic activity.

Conclusions.

Thus, in terms of cytotoxicity investigated flavors can be arranged as follows: "Coffee"> "Hazelnut"> "Caramel". A direct correlation between vigor and seed germination A. cepa concentration and food flavorings.

At concentrations 0,2-0,6 mg / l flavors slowdown root growth 3-4 times, increasing their concentration to 0.8-1.0 mg / ml be suspendedroot growth. Food flavor "Coffee" at a concentration of 0.6 mg / l is a violation of mitosis (asymmetric mitosis, K-mitosis, the formation of micronuclei) and causes partial necrosis of tissue in the apical meristem and root zones stretching cells A. cepa.

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EVALUATION OF INFLUENCE OF ZINC AND COPPER NANOAQUACITRATE ON GROWTH DYNAMICS OF YOUNG CYPRINUS CARPIO L.

O. Kravchenko, I. Zlatskiy, V. Maksin

The general regularities of zinc and copper nanoaquacitrate influence on the change of mass and growth rate of young C. carpio L has been established. The application of specific growth rate indicator in ecotoxicological monitoring of nanomaterials has been justified. The possibility of nanoaquacitrates usage for practical purposes has been assessed.

Nanoaquacitrate, hydroecosystems, toxicity, fish, specific growth rate.

Nanotechnology is applied in biology, medicine, ecology. More than 2000 kinds of nanomaterials are industrially produced in the world. Nanoaquacitrates of transition metals obtained through erosion and explosive nanotechnology has become widespread in Ukraine. Fish are the most convenient test-object of hydro monitoring.

Fish as higher order consuments and sufficiently long-lived organisms have the highest capacity for bioaccumulation of xenobiotics that allows registering the effects and consequences caused by short or long-term chronic exposure to adverse environmental conditions. Thus, changes in fish is an integral factor of environmental and biosafety compounds. The aim of research - analysis the effect of different concentrations of copper and zinc nanoaquacitrates to changes of weight and specific growth rate in larvae in *C. carpio L*.

Fortnightly C. carpio were collected for the experiment. The experimental group of fish kept in an environment formed by adding nanoaquacitrates of copper and zinc at concentrations that have antibacterial properties, and at the same time did not cause lethal effects (0.01 to 0.1 mg / dm^3), 2 aquariums were used as control - variant without compounds. Conditions of control organisms did not differ from experimental.

Growth fish at concentrations of 0.01, 0.05 and 0.1 mg/dm^3 copper nanoaquacitrates was almost the same that the body weight of fish in the control aquarium.

Significant changes in the dynamics of growth were recorded only in the variant at concentration nanoaquacitrates copper of 0.1 mg/dm^3 during the fourth week of the

experiment, although by the end of the experiment uniform trend of fish weight was remains.

Similar values were recorded for the actions of zinc nanoaquacitrates. In all experimental variants fish weight gradually decreased relative to controls after the third week. At the same time, tendency to body weight grow were marked in each variant.

Therefore, determine the toxicity nanoaquacitrtates to the changes of fish weight body is impossible because growth dynamics were observed throughout the experiment

Unlike graphics of weight change at the impact of copper nanoaquacitrates, specific growth rate is characterized a significant amplitude fluctuations.

During the first two weeks of the experiment the specific growth rate increases rapidly in control variants and in aquariums with concentrations of 0.01 and 0.05 mg / dm^3 copper nanoaquacitrtates, during the third week specific growth fell and again increased during the last week.

The value of specific growth rate in the presence of 0.01 mg /dm^3 zinc concentrations and in the control variant are oscillatory, similar to the graphs obtained by the action copper nanoaquacitrates.

Meanwhile, there was a sharp deviation of values in aquariums with 0.05 mg /dm^3 and 0.1 mg / dm^3 of zinc nanoaquacitrates compared with a control variant. Permanent reduction of specific growth rate was points to presence of additional limiting factors besides deficits of food. Thus, the results testified to toxic effects of of 0.05 and 0.1 mg / dm^3 zinc nanoaquacitrates to young *C. carpio L*.

Conclusions. It was determined that the concentration of 0.01 mg / dm^3 copper and zinc nanoaquacitrtes did not have the toxic effect to *C. carpio*.

It was established that the change of body weight may not fully reflect all impact to the nanoaquacitrtes of transition metals in organisms fish

It was proven the value of the specific growth rate appropriate to use in ecotoxicological monitoring of nanomaterials.

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NANO-STRUCTURED SILICON AS EFFECTIVE TRANSDUCER FOR IMMUNE BIOSENSORS

N. Starodub, N.Slyshyk, K. Shavanova, M. Mel'nichenko, A. Zherdev, B. Dzantiev

It will be presented the experimental results about the investigations of the efficiency of the structured nanopouroussilicon (sNPS) application astransducer in the immunebiosensors designed for the control of retroviralbovineleucosis (RBL) and the determination of the level such my cotoxinsas T2 and patulin among environmental objects.

Nanostructuredsilicon, immunebiosensors, T2 mycotoxin, patulin,l eucosis, diagnostics.

Previously [1] we have developed several types of optical imunobiosensoriv based on surface plasmon resonance and total internal reflection ellipsometry. To fulfill all practical requirements for high sensitivity analysis, and simplicity, cheapness and speed of it, we suggest using a structured nanoporous silicon (sNPK) as transdyuserdlya imunobiosensoriv the registration of a specific signal based on the change of chemiluminescence (CL) or photocurrent this structure.

As a model, we used low-toxin T-2 mycotoxin patulin and. Also, consider the effectiveness of the proposed imunobiosensora for biochemical diagnosis LVRH.

Mycotoxins, including T2, aflatoxins, zearelenon, patulin, are of great interest because they are common and are characterized by high levels of toxicity. Mycotoxins, which is the product life microscopic fungi, recently attracted increasing attention. These substances are toxic to living organisms (embryotoxic, mutagenic and carcinogenic effects) and recently there was a danger of their use in bioterrorism purposes (for example, the use of such a representative, as T2, compared with mustard or Lewisite, is several orders of magnitude more deaths) [2].

Viral leukemia as mycotoxins, distributed everywhere and on all continents. It must be emphasized that this disease can be transmitted through food from infected

animals to humans. Quality and food safety are a priority on the background of the environment on the one hand and by reducing sanitary conditions on the other.

The traditional methodology of analysis of mycotoxins and other low molecular weight toxins, and biochemical diagnosis of diseases, including retroviral LVRH, based generally on the use of instrumental analysis such as high performance liquid or gas chromatography with mass spectroscopy or liquid chromatography with mass spectroscopy or ELISA- method. Due to the extremely high complexity and cost analysis performed by these methods, the development of innovative approaches, such as immune assays and the development of specific chemo- and biosensors are very important [3].

The purpose of research - to provide data on some physical and chemical properties sNPK, development of algorithm analysis, results of biosensor and plausible mechanism for the formation of a specific signal.

Materials and methods research. We used boron doped monocrystalline silicon square plate with resistivity 1 Ohm × cm, area of 100 cm2 and a thickness of 0.3 mkm.Poverhnyu plates not polished. Layers sNPK were obtained by etching in a solution of HF: HNO3 at room temperature, natural sunlight and a duration of 1 to 20 minutes. The thickness of the layer sNPK ranged from 3 to 60 nm process parameters controlled by chemical modification of the surface of single-crystal silicon was determined using Auger electron (Auger) electron spectroscopy in LAS-2000. SNPK surface structure was studied using a scanning tunneling microscope (STM) and scanning electron microscope. Analysis of the images shows that the surface sNPK regularly covered with pores up to 20 nm.

Using a transducer sNPK helps create a very simple to use and stable imunobiosensoriv. Specific immune complex formation on the surface sNPK can be registered by measuring the PL or photoconductivity. In accordance with the results of the application of the immune biosensors to monitor the content of mycotoxins in the environment, as well as biochemical diagnosis of bovine leukemia, we can conclude that they comply with the requirements of practice, such as sensitivity, simplicity, speed of analysis and the possibility of conduct in the field. These biosensors can be used to record any significant biochemical variables that can form immune complexes.

Further research should focus on the study of the biochemical mechanisms of signal registration sNPK and technical characteristics of the specific points in performance analysis.

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APPLICATION EFFICIENCY OF PLANT PROTECTION PRODUCTS FOR RESTRICTING THE DEVELOPMENT OF SUGAR BEET BACTERIAL DISEASES

Sablyk V., Doctor of Agricultural Science

Dvorak K., postgraduate student*

Institute of Bioenergy Crops and Sugar Beet of NAAS of Ukraine

Suslyk L., Ph.D. in Agricultural Science

Uladovo–Lyulinets Experimental Breeding station

Butsenko L., Ph.D. in Biological Science

Zabolotny Institute of Microbiology and Virology of the National Academy of Sciences of Ukraine

The article presents the results of laboratory studies for determining the bactericidal action of wide spectrum of crop protection chemicals concerning the pathogens of sugar beet bacterial diseases. It is shown the results of field researches of fungicides efficiency in oder to restrict the development of bacterial leaf spot of sugar beet.

Sugar beet, fungicides, bacteria, affection, efficiency, bactericidal effect.

In relation to the intensification of growing crops technologies and application of new pesticides, introduction of monocultures, innovation systems of fertilization and soil treatment on the background of agro-climatic changes, the issues of phytosanitary control in agrocenoses become actual. Primarily, it concerns the phytopathological condition of agrophytocenoses, namely the problems of determination of plant diseases etiology and selection of effective crop protection products. If earlier agrarians had to minimize the harm of fungal infections in the fields, so today diseases of bacterial origin become more common and widespread [4].

Phytopathogenic bacteria cause a number of diseases on the sugar beet leaves and roots that have very important economical value [3, 9].

During growing season the plants of sugar beet are affected by bacterial leaf spot, vein streak virus, bacterial scab, tail rot, cancer and tuberculosis of roots.

In addition, some diseases that are usually caused by fungi, occurring in beets with the participation of bacteria, and as a result appear bacterial forms of root feeder, necrosis fibrovascular bundles and gray rot [5, 9].

In order to limit the development of phytopathogenic fungi on the market we can find a wide arsenal of fungicides, while the influence of the most preparations on pathogenic bacteria for plants has not yet been fully investigated.

The purpose of research – to study the influence of pesticides on pathogenic bacteria that are able to initiate the infectious process on sugar beet plants in the laboratory and field conditions.

Materials and methods.

Effects of pesticides against bacteria strains was studied, that are pathogens of sugar beet bacterial diseases and in a collection of phytopathogenic bacteria in the Zabolotny Institute of Microbiology and Virology of the National Academy of Sciences of Ukraine are stored. The strains have been isolated in the territory of Ukraine in different years and was received from foreign collections. The sensitivity of phytopathogenic bacteria to pesticides found by the intensity of growth on potato agar with pesticides added to it in manufacturer's recommended dosages, that is increased and reduced the tenfold.

For this study the following strains of phytopathogenic bacteria were used: *Rhizobium vitis* (Ophel, Kerr 1990) Young et al. 2001 strains 9054, 9052, 8628; *Pseudomonas syringae* pv. *aptata* (Brown & Jamieson 1913) Yong, Dye & Wilkie 1978 strains 8545 and 8544; *Xanthomonas axonopodis* Starr & Garces 1950 strains 8715, 10, 7325; *Pseudomonas syringae* van Hall 1902 strains 7921 and 7923, which are the causative agents of tuberculosis roots, striation veins of leaves, tail rot and bacterial leaf spot of sugar beet.

Pesticides that are allowed to use in Ukraine and are intended for seed treatment and sowing of sugar beet for limiting development of various pathogens were used in the experiment: that are fungicides disinfectants on the basis of thiram 480 g/l, thiram 200 g/l + carboxin 200 g/l, fludioxonil 25 g/l + 10 g/l metalaxyl-M; insecticidal

disinfectants with active substances of thiamethoxam 350 g/l and 600 g/l, bifenthrin 200 g/l, imidacloprid 700 g/kg, clothianidin 400 g/l + beta-cyfluthrin 53 g/l; fungicides on the basis of spiroxamine 250 g/l + tebukonazole 167 g/l + triadimenol 43g/l, flutriafol 250 g/l, tiofanat-methyl 700 g/kg, propikonazole 250 g/l + cyproconazole 80 g/l, benomile 500 g/kg; insecticides with active substances of fenitrothion 50 g/l and beta-cyfluthrin 12,5 g/l + imidacloprid 100 g/l [7].

Field researches carried out during 2012-2013 years in Uladovo–Lyulinets Experimental Breeding station (ULEBS, Vinnytsia region) in the sufficient moisture zone of the Right-Bank Forest-Steppe of Ukraine. The effectiveness of fungicides against bacterial leaf spot of sugar beet was determined in the experiment.

Scheme of the experiment: *Factor A.* Hybrids: foreign selection – Canyon, Baccara and domestic – Alexandria, Ukrainian ChS-72.

Factor B. Fungicides spraying of sugar beet: Control – water spraying; preparation spraying – Alto Super 330 EC, c.e. (0,5 l/ha), Impact 12,5% c.s. (0,25 l/ha), Falcon 460 EC, c.e. (0,6 l/ha).

Application of fungicides conducted by using knapsack sprayer according to the scheme of experiment. Recordings of plant infestation by diseases carried out according to the methodology developed by the Institute of Bioenergy Crops and Sugar Beet [6].

Results and discussion.

From the list of investigated pesticides in laboratory conditions bactericidal effect showed five preparations and just two of them Vitavaks 200 FF, w.s.c. with active substances tyram 200 g/l + karboksyn 200 g/l and Impact 12,5% c.s. on the basis of flutriafol 250 g/l, had effect of influence in the dose recommended by the manufacturer and increased tenfold, while limiting the bacteria growth *P. syringae* strain 7923 that cause bacterial leaf spot of sugar beets. Insecticidal disinfectant on the basis of bifenthrin 200 g/l initiate a partial inhibition of the growth of bacteria *P. syringae* 7921, *P. syringae* pv. *aptata* 8545, 8544, *X. axonopodis* 6, 10 and R. *vitis* 9052 in a tenfold increase in dose.

It is marked the absence of growth the tail rot pathogen of sugar beet roots of bacteria *X. axonopodis* 7325 by adding to nutrient medium RMx10 of fungicide Falcon

460 EC, c.e. with three active substances spiroxamine 250 g/l + tebukonazole 167 g/l + triadimenol 43g/l. Bactericidal effect was found towards bacterial spot and vein streak virus of sugar beet leaves *P. syringae* 7923 and *P. syringae* pv. *aptata* 8545 of preparation Impact 12,5 % c.s. son the basis of flutriafol 250 g/l. Ten times increased doses of fungicide Alto Super, 33% c.e. with active substances propiconazole 250 g/l + cyproconazole 80 g/l initiated the absence of growth of pathogenic *P. syringae* 7923, *X. axonopodis* 7325, *R. vitis* 8628 (Table. 1).

1. Sensitivity of pathogens of sugar beet bacterioses to different doses of pesticides

Title of the active substance	The main purpose of drug	Sensitive strains of pathogenic bacteria	Dose that limits the growth of bacteria
Tyram 200 g/l + karboksyn 200 g/l	Fungicides disinfectants	*Pseudomonas syringae* 7923	RMx10, RM
Bifenthrin 200 g/l	Insecticidal disinfectants	*Pseudomonas syringae* 7921*	RMx10
		Pseudomonas syringae pv. *aptata* 8545*	RMx10
		Pseudomonas syringae pv. *aptata* 8544*	RMx10
		Xanthomonas axonopodis 6*	RMx10
		Xanthomonas axonopodis 10*	RMx10
		Rhizobium vitis 9052*	RMx10
Spiroxamine 250 g/l + tebukonazole 167 g/l + triadimenol 43g/l	Fungicide	*Xanthomonas axonopodis* 7325	RMx10
Flutriafol 250 g/l	Fungicide	*Pseudomonas syringae* 7923	RMx10, RM
		Pseudomonas syringae pv. *aptata* 8545	RMx10
Propiconazole 250 g/l + cyproconazole 80 g/l	Pungicide	*Pseudomonas syringae* 7923	RMx10
		Xanthomonas axonopodis 7325	RMx10
		Rhizobium vitis 8628	RMx10

Note: RM – doze of the pesticide that is recommended by manufacturer, * - partial inhibition of bacterial growth.

Having completed investigations concerning the influence on pathogenic for sugar beet, bacteria of pesticides, that used on other cultures, we determined bactericidal effect of preparations, which include mankotseb [2]. This accords with the results of other researchers who detected the antibacterial activity of mankotseb-containing preparations Atsydan 72%, Penkotseb 80%, Tattu 55%, Rydomil Gold 68 WG in relation to pathogenic bacteria of different genus and species that are pathogens of cereal crops and tomato [1, 8].

In field conditions we conducted observations and recordings of plant infestation by bacterial leaf spot. The disease manifests itself in the form of oily, necrotic spots of round or irregular shape with a dark border. The spots merge and tissue inside of them dries up and falls out [9].

Due to the recordings of plant infestation by this disease committed in 2012–2013 years in conditions of ULEBS, the first signs of the disease on young plants under favorable conditions for pathogens in the phase of 2–3 pairs of leaves was found. It is determined that indicators of extension and intensity of disease development on plants hybrids of foreign selection are not considerably higher in comparison with corresponding indicators on hybrids of domestic selection. Also we carried out crop spraying with working solution of fungicides in the III decade of June.

Indicators of extension and intensity of bacterial leaf spot of sugar beet were higher on experimental plots, fungicides treatment of which was not carried out. Thus on the plots without spraying with plants protection chemicals per 2012–2013 years in the beginning of July the most common this disease was on the plants of the hybrid Canyon (15,2%) with growth intensity of 9,4%. Maximum intensity of disease development was fixed during the lesions of Baccara hybrid – 10,1% in conditions of disease extension 14,3%.

After determining the intensity of the disease development on plots that have been sprayed with fungicides, we found that higher efficiency in comparison with other variants of the experiment, showed Impact 12,5 % c.s. Its effectiveness was 30% and 32% on the crops of foreign hybrids Canyon and Baccara, and 25 % and 27% in the Ukrainian ChS-72 and Alexandria respectively. It is established that in the field conditions the least influence on the intensity of bacterial leaf spot developmebt has fungicide Falcon 460 EC, c.e.

The effectiveness of its use in conditions of plant processing with hybrid Canyon was 5%, higher it was with Baccara spraying – 13%. Within two years of studies the efficiency of preparation Alto Super 330 EC, c.e. was on average 17% in conditions of plant processing with german hybrids Canyon and Baccara, and 13% and 14% for plant spraying with hybrids of domestic selection Alexandria and Ukrainian ChS-72 (Table 2).

2. Fungicides effectiveness in restricting development of bacterial leaf spot of sugar beet ULEBS, 2012-2013

Hybrid	Fungicide treatment	Extension of disease, %	Intensity of disease development, %	Effectiveness of fungicides, %
Canyon	Control*	15,2	9,4	–
	Alto Super 330 EC, c.e.	13,3	7,8	17,0
	Impact 12,5% c.s.	12,4	6,6	30,0
	Falcon 460 EC, c.e.	14,7	8,9	5,0
Baccara	Control *	14,3	10,1	–
	Alto Super 330 EC, c.e.	13,2	8,4	17,0
	Impact 12,5% c.s.	10,7	6,9	32,0
	Falcon 460 EC, c.e.	13,7	8,8	13,0
Alexandria	Control*	13,0	8,6	–
	Alto Super 330 EC, c.e.	12,9	7,5	13,0
	Impact 12,5% c.s.	11,4	6,3	27,0
	Falcon 460 EC, c.e.	11,9	7,7	10,5
Ukrainian ChS-72	Control*	11,6	8,4	–
	Alto Super 330 EC, c.e.	10,7	7,2	14,0
	Impact 12,5% c.s.	8,9	6,3	25,0
	Falcon 460 EC, c.e.	11,5	7,8	7,0

Note: Control* - spraying crops with water.

Thus the efficiency indicators of the studied fungicides Alto Super 330 EC, Impact 12,5 % and Falcon 460 EC in the field conditions indicate that the ability to influence on the extension and intensity of leaf spot development of sugar beet, caused by phytopathogenic bacteria is low. Higher in comparison with other preparations efficiency indicators of fungicide Impact 12,5 % show the possibility of its use for the main appointment – to restrict the development of plant diseases caused by phytopathogenic micromicetes and in order to influence on pathological process on plant, initiated by bacteria.

Obtained data from laboratory and field researches concerning the effectiveness of chemical plant protection products with different active substances for restricting the development of bacterial diseases of sugar beet point to the necessity of finding alternative protection methods, because from a wide spectrum of preparations, the bactericidal effect show just some of them and fungicides usage in the field conditions is a few effective or even ineffective.

Conclusions

1. In laboratory conditions it was found the absence of bactericidal effect of the majority of preparations that are used for seeds processing and sugar beet sowing in order to restrict the development of various pathogenic organisms, except disinfectants Vitavaks 200 FF, w.s.c, fungicides Impact 12,5 % c.s., Alto Super 330 EC, c.e. and Falcon 460 EC, c.e. that influence on certain strains of pathogens.
2. Fungicides efficiency in the field conditions in restricting the development of bacterial leaf spot of sugar beet in 2012-2013 years amounted to: Alto Super 330 EC, c.e. from 13% on the hybrid plants Alexandria up to 17% on crops of foreign hybrids Baccara and Canyon; Impact 12,5% c.s. from 25% on the Ukrainian Chs-72 up to 32% on plots of Baccara hybrid; the least influence on the intensity of bacterial leaf spot developmebt has fungicide Falcon 460 EC, c.e.: 13% on crops hybrid Baccara, 10,5% on the plants Alexandria, 7 % on the hybrid plants Ukrainian Chs-72 and 5% on the plants of hybrid Canyon.

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Викладено результати лабораторних досліджень з визначення бактерицидної дії широкого спектра хімічних засобів захисту рослин на збудників бактеріальних хвороб цукрових буряків та результати польових досліджень з встановлення ефективності фунгіцидів для обмеження розвитку бактеріальної плямистості листків цукрових буряків.

Цукрові буряки, фунгіциди, бактерії, ураження, ефективність, бактерицидна дія.

Изложены результаты лабораторных исследований по определению бактерицидного действия широкого спектра химических средств защиты растений на возбудителей бактериальных болезней сахарной свеклы и результаты полевых исследований по установлению эффективности фунгицидов для ограничения развития бактериальной пятнистости листьев сахарной свеклы.

Сахарная свекла, фунгициды, бактерии, поражения, эффективность, бактерицидное действие.

THE CREATION OF BIOPREPARATION BASED ON BIOCHEMICAL COMPONENTS OF DIFFERENT BASIDIOMYCETES SPECIES AND HIGHER PLANTS.

O. Boyko, S. Veselskiy, I. Grygoryuk, M.Melnychuk

The question of the formation processes of biological products that were based on biochemical fractions from Basidiomycetes fungi and higher plants. Latest served carriers selected components used for industrial purposes. Done multifaceted experiments, which involve 15 species of fungi and plant material different families. Before using this material screening conducted its analysis on contamination with pathogens of different nature.

Mushrooms, plants, bacteria, viruses, biochemical compounds performance.

Recently, some companies and research centers developed many biological drugs that are used to create productive and high quality crop and valuable drugs [9,16-19].

It should be noted that these challenges are particularly relevant, because monoculture in the fields, growing plants for new biotechnology often give rise to the emergence of aggressive pests and pathogens that unexpectedly negative impact on product quality crops.

However, keeping a commercial basis, researchers have increasingly focused on the development of biological products based on components of living systems that must interact harmoniously with environmental conditions agrocenoses chain and transformed environment in biotechnological processes.

It is known biologically active substances belonging to different classes of compounds as polymer and heterocyclic and nanomernoyi structure. These components are allocated peptides that are polymeric compounds and mainly formed from a large number of amino acids linked by amide bonds. Often these compounds play an important key role in the regulation of physiological and biochemical processes in the body both animal and vegetable origin and are almost always available in different types of tissues. This is also important steroid compound structure.

Out of monomer components with different initial structure of molecules of interest are free amino acids, which themselves can directly influence the various processes in animals and plants, and are able to be the basis for the biosynthesis of certain hormones and neurotransmitters. It is in the above is in their experiments, we

first evaluated the overall compounds of plant origin, mushrooms and integrated source of the drug. Thus we have chosen different kinds of Basidiomycetes, which are producers of a wide range of substances metabolites [2-4,8], phytohormones, inhibitors, antibiotics.

In addition, for example, the cultural mushroom edible basidiomycetes higher protein contains essential amino acids, which allows to obtain food biomass under the conditions of the process [5].

It should be noted that most of the work with the use of mushrooms in various fields unfortunately do not pass the initial screening for contamination and destruction of pathogens of different nature. However, this applies to the plant material used in the relevant processes in growing mushrooms and joint biochemical fractions from fruiting bodies and plants. This is when the mycelium of fungi and stand by our research fifteen pathogens of various taxonomic groups [2]. This situation causes significant negative impacts on the quality of products for various applications. It should be emphasized that drugs based on biochemical components of mushrooms lose their ability therapeutic activity.

Thus, the raw material of various species of fungi, plants should always be selected with quality biological objects for later use. Otherwise, researchers and manufacturers will have to deal in the process of structures microscopic fungi, viruses and bacteria. For example, some species of fungi in the defeat of psevdomonosamy (bacteria) are active and bacteriophages such structures as piroverdin providing certain properties of bacterial cells, altering their function [2].

The purpose of research - the creation of biological products based on biochemical components basidiomycetes and plants.

Materials and methods research. Selection of fungi was carried out under the conditions of the environment and processes for further analysis on pathogen contamination and receiving biochemical fractions of healthy fruit bodies [2,3]. To determine this kind of basidiomycetes evaluated habit of fruiting bodies, defeat viruses, bacteria and microscopic fungi. The technological process involved: Fluorescent and transmissive electron microscopy, ELISA, Uhterloni method, determination of microorganisms in the conditions of culture medium, electrophoretic analysis of

proteins and diagnosis of pathogens from the first time we have developed rapid method, which proved productive for this purpose [2].

It uses 15 types of fungi that were selected for further studies. Thus, the fraction of mushrooms received and evaluated by three positions: mushroom homogenate in phosphate buffer (pH 7.2, 1/15 m); fraktsiyuvannya at 8-10 thousand. / min, 15 min at low speed centrifugation (using supernatant); dyferentsionalnoho centrifugation (high 25-30 thousand. / min 35 min, the use of post-treatment sludge) separating the supernatant through a gel filtration.

We also used method for fractions of mushrooms, which was used in the allocation hlikozydaz intracellular microorganisms (modified L.V.Varbanets and N.V.Borzovoyi) [6]. The method consists in the fact that biomass suspended in 0.01 M kaliyfosfatnomu buffer (pH 7.2) followed by treatment with a suspension of ultrasound (22 kHz at 0.4 A) with multiple replications. Homogenate after its receipt of such centrifuged 30-35 min at 10,000 rev / min, the supernatant was then assayed for activity and subjected to further refining (gel filtration).

As holders of biologics used biochemical composition of plant compounds with family Asteraceae, rannykovyh, birch, zhymolestovyh, konoplevyh.

Depending on the purpose of the final preparation formed in various combinations [10, 11].

As a model system for assessing the growth and development of plants under different variants of the drug was determined on sunflower seedlings, which were found to sensitively react to various changes in the compositions of the drug. The research results were given the opportunity to select homogenates types of fungi that stimulate the growth and development of seedlings of sunflower (sort of Zaporozhye). These criteria were laid the basis for the selection of initial homogenate stimulating certain species of fungi with subsequent refining and biochemical analysis.

This technological approach given the opportunity to choose the faction of the rare species of fungi that are adapted to their properties on the basis of the drug for use in industrial conditions in the respective crops.

Today, on this basis, we have developed 4 different biological product (Bioekofunhe - 1). Changing the biochemical components of the drug and their carriers

were given the opportunity to solve problems using for different purposes comprehensive action: antypatohennoho impact on application conditions in vitro and greenhouse, seed processing plants and vehetatuyuchyh agrocenoses. It should be noted that the resulting complex preparation can prepack in liquid and lyophilized condition. According to different requirements biorechovyn main composition may be supplemented with natural minerals (drug "boa", "Bioekofunhe - 1").

To determine the nature of the components of the peptide adopted the following methods: biochemical photometry [1], the definition of physiologically active peptides [15]. In the studied samples of drugs lipid substances [12], including steroid, extracted and separated on the basis of thin-layer chromatography [13]. The overall level of amino acids in the samples was assessed by their characteristic ninhydrin - positive reaction to photoelectric (CPK-2) [7].

The problems of technological processes of forming biochemical preparation, which based on biochemical fractions from Basidiomycetes mushrooms and plant sare considered. The last one (plants) were carriers of selected components, which were applied for manufacture purposes. During making multifaceted experiments the 15 types of mushrooms and plant material of different families were involved. Screening analysis of contamination it with pathogens of different nature were conducted before using this material.

Mushrooms, plants, bacteria, viruses, biochemical compounds, productivity.

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INFLUENSE OF SOYBEAN INOCULATION BY BIOLOGICAL FUNGICIDES ON DEVELOPMENT FUNGAL DISEASES

I.Koshevsky, C. Laska

The effect of inoculation of soybean seeds varieties South-30 biological agents on the development of fungal diseases (Septoria, Anthracnose and Downy mildew). Demonstrate the high efficiency of fungicidal agents Mikosan H, Trihodermin and Ekovital.

Soybean, disease, Septoria, Anthracnose, Downy mildew, biofungicide, disease progression, biological efficiency, productivity.

Soy has been and remains one of the key strategic food and feed crops on the planet. The volume of production it ranks fourth in the world after maize, wheat and rice. Global acreage of soybeans in 2011. reached 102 million hectares and the gross grain harvest amounted to 259 million tons In Ukraine there is a positive trend in soybean cultivation. If in 2003 it was cultivated on 189,6 thousand hectares in 2013 the area under crops was 1414,0 thousand ha Potential yield, recorded in the register of varieties of soybean, is 2.0 - 2.5 t/ha [3]. One of the reasons for the shortage of crops soybeans have the disease, which significantly reduce its quantity and quality. According to some scholars [2, 3] the most skazocinii diseases of soybean are: Septoria leaf blotch, spot blight and disease. Significant changes in weather and climate conditions in recent years have affected the structure of the complex of phytopathogenic soybean, caused the emergence of new diseases that were not previously met in the forest-Steppe zone of Ukraine, or have had little development. Therefore, it is very effective in limiting the development of diseases of soybean is the search for new effective plant protection products, especially biological. Now they remain effective for its disinfecting effect in agriculture [2, 4].

Every year on the market of pesticides and agrochemicals Ukraine goes more biological agents that protect the seeds of soybean from diseases and are effective fungicidal effect on pre-sowing the seeds inoculation.

The aim of the research is to determine the impact of biological drugs on the development of diseases of soybean and its performance.

Materials and methods research. In order to limit the development of diseases of soybeans we have conducted pre-sowing seed inoculation of bacterial drug Ecotal compatible with befunge Nicosan - N and Trichodermin. Research conducted in 2012-2013, in temporary field experiments of the Department of plant protection from pests and diseases NSC "Institute of agriculture NAAN" on soils sod-podzolic spasciani soils with a humus content of 0.85%. The action of biological agents was studied on a variety of soy-South-30. The seeding rate was 600 thousand of viable seeds per hectare. The size of the accounting Department - of 12.6 m2. Experiment was repeated fourfold. Accounting for the destruction of plant diseases was carried out according to standard techniques [1] in the phase of flowering and education soy beans.

Conclusions

The application of biological disinfectants Milsana-N and Trichodermin in combination with associ drug Ecotal during the processing of soybean seeds can reduce the development of Septoria 1.9 - 2.4 times, disease - 13.6 - 36 %, disease - 13.0 - 57.5 per cent., to increase the mass of 1000 grains soybeans 1.39 - 2,78 g, yield - 0,51 - value of 0.52 t/ha

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BACTERIAL DISEASES OF TOMATOES IN THE FARM DNIPROPETROVSK REGION

J.V. Kolomiec, J. F. Avetisyan

Diagnosing tomato diseases in the Dnipropetrovsk region. It is shown that the defeat of tomato pathogens associated with bacterial spot X. vesicatoria and bacterial species Pseudomonas, which do not form a fluorescent pigment.

Tomato, bacterial diseases, identification, bacterial spot, bacterial spot.

Introduction

In Ukraine tomatoes (Lycopersicon esculentum Mill.) Occupy a leading place in terms of gross harvest of vegetables [9]. Good conditions Odesa, Zaporizhia, Nikolaev, Dnepropetrovsk, Kherson regions contribute to the development of tomato production in the state, providing public source of vitamins and minerals throughout the year.

However, during May-June frequent changes in temperature, high humidity in the morning, promotes the culture of bacterial diseases that According to data of Food and Agriculture Organization (FAO), is causing the loss of 30% yield [5, 8, 10].

The species composition of bacterial diseases of tomato constantly changing. In 1975 CG Beltyukova isolated C. michiganensis subsp. michiganensis and X. vesicatoria [10]. Works L. V Kabashnoyi and M. A Shaban proven presence in Ukraine P. carotovorum subsp. carotovorum, *P. herbicola*, *P. fluorescens*, *P. syringae* pv. *tomato*, *X. vesicatoria*, *C. michiganensis* subsp. *michiganensis* [2, 3]. Research conducted by E. Chernenko, R. P. Hvozdyakom, S. Moroz showed that economic value in Ukraine with bacterial cancer *C. michiganensis* subsp. *michiganensis*, bacterial black spot *X. vesicat*oria, bacterial wilt and bacterial *R. solanacearum* and *P. syringae* pv. *tomato* [1, 11].

Diagnosis and making decisions on treatment, isolation of the lesion are effective ways to preserve the harvest of epiphytoties [12].

The purpose of research - determine the cause of mass death planting tomato farms in Dnipropetrovsk region.

Materials and methods.

Tomatoes with signs of bacterial lesions treated in different periods of growth of the economy Dnipropetrovsk region. The study was conducted by standard microbiological methods and Phytopathological [4, 6, 13].

Pure cultures of pathogens isolated from pieces of fruit, leaves, stems, which bordered healthy and affected tissue. The samples were washed under running water, then rinsed in sterile water and homonizuvaly in sterile porcelain mortar. The resulting suspension was plated on potato agar in Petri dishes. Incubated 72 h. at 27 ° C. Colonies of bacteria were selected for further study of pathogenic, morphological and physiological properties.

The morphological properties were studied as described in [13]. Physiological and biochemical properties were studied using a set of identification of bacteria API 20E (bioMerieus). Dispose Levan observed during the growth of bacteria on the IPA with 5% sucrose.

So, microbiological studies have confirmed that the disease of tomatoes in selected farms Dnepropetrovsk region we have bacterial origin and may be associated with bacterial spot *X. vesicatoria* and bacteria species *Pseudomonas*, which do not form a fluorescent pigment.

To clarify the results obtained should diagnose PCR and ELISA methods.

Our studies provide an opportunity to choose and implement preventive and specialized agronomic methods for protecting tomato plantations in the Dnipropetrovsk region of bacterial diseases

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INVESTIGATION OF CYTOKININ BAP INFLUENCE ON THE GROWTH AND DEVELOPMENT OF EXPLANTS IN SOME CULTIVARS OF GARDEN GROUPS MINIATURE ROSES *IN VITRO*

T. Pilipchuk, I. Mitrofanova

Thus, the optimal concentrations of BAP for the shooting induction in 6 cultivars of garden groups of miniature roses have been identified. The optimal terms of culture in 6 cultivars of miniature roses on medium supplemented with BAP for active adventives shooting have been shown.

Rose, morphogenesis, vegetative bud, culture in vitro

The rose garden is widely used in landscaping and occupies one of leading places in ornamental horticulture. In the Nikitsky Botanical garden - National scientific centre (NBG-NSC) has a rich collection of garden roses. Important biological feature of miniature roses is early, long and with repetition of flowering, which continues in the South coast up to 200 days (from mid-April to December-January), which makes them indispensable in planting gardens and parks, where they can be used to create low curbs and borders, as well as dwarf boles. Miniature roses are also good at horackova culture [3].

Successful reproduction miniature roses can be achieved by application of the methods of culture of organs and tissues, which allows not only to improve the health of plants, but also to obtain planting material in large quantities in a shorter time than when using traditional breeding methods [1, 7].

Research conducted in the Department of biotechnology and biochemistry of NBG-NSC, showed the possibility of cultivation in vitro of some promising varieties of roses from 9 horticultural groups. Scientists have studied the conditions for the introduction of in vitro vegetative buds and induction pobegoobrazuyuschaya promising varieties of roses for future long-term preservation in the form of a slowly growing collection of [2, 4]. Also, we have studied the features of clonal micropropagation (obtaining aseptic culture, regeneration of primary explants and actually micropropagation) varieties of miniature roses [5].

There are a number of messages about the study of decorative roses, both domestic and foreign scientists. The vast majority of publications devoted to production of virus-free planting material and raw materials for the perfume industry. In these works indicated that the composition of the nutrient medium was chosen by optimizing the concentrations of trace elements, vitamins and growth regulators. For the introduction of in vitro culture used the apical meristem [8, 9].

The aim of the research is to determine the peculiarities of growth and development of explants under the influence of various concentrations of 6-benzylaminopurine.

Materials and methods research. As objects of study used a prospective types of garden group miniature roses from the collection of NBG-NSC. Variety selection of NBG-NSC: Boy-with-Finger. Varieties of foreign selection: Baby Bunting, Twerking, Roll, Rod, Mandarin. As output explants used segment of the shoot (the middle part) from the kidney. The selection of material was carried out during the whole vegetation period of plants.

Conclusions

The optimum concentrations of BAP for induction in 6 varieties of horticultural group of miniature roses. Shows the optimal timing of cultivation of these varieties in the medium with the addition of BAP to the active formation of adventitious micropolygon. There is a high percent of education additional micropolygon varieties in the Roll on the environment with a concentration of BAP 1.5 mg/l Revealed that in the medium with 1.0 mg/l BAP after 6 weeks of cultivation.

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THE ANTAGONISTIC ACTIVITY OF THE PGPB BACTERIA AGAINST OF *SOLANUM TUBEROSUM* L. PATHOGENS

V.V.BORODAY , PhD. Biol. Science, Associate Professor
S.E.SAFRONOVA , Master's student

The microbiological preparation Ekstrasol based on the consortium of ssociative bacteria investigated, the wide spectrum of antibiotic action against Fusarium solani, F.oxysporum, F. sambucinum, Alternaria solani and Pectobacterium carotovorum was found. The growth of pathogens was inhibited by application of Ekstrasol in the 1,4-1,9 times compared to Fitotsyd and in the 1,7- 2,3 times - to Planryz.

Introduction. Potato (*Solanum tuberosum L.*) is a valuable food and technical culture. However, obtaining high and stable yields prevents widespread diseases that diseased of tubers during storage – fusariosis, scab and other pathogens, the loss of which can reach 50-85% [4]. Modern Trends in Plant Protection aimed at developing and finding environmentally safe management techniques the number of pathogens, including microbiological preparations for plant protection and bacterial fertilizers. Rhizospheric and entophytic bacteria belonging to the group microorganisms that promote plant growth (of Plant Growth-Promoting Bacteria - PGPB) successfully used for biocontrol of pathogens [1,3,6]. Bacteria of *Pseudomonas* and *Bacillus* genera, which used as biological plant protection agents, indirectly induce protein expression of systemic inductive resistance; promote accumulation in the affected area of certain phenols, antioxidant enzymes systems and products of their operation (reactive oxygen species, phytoalexins, lignin). The microorganisms - components of natural microbiological agents induce systemic plant resistance to disease at the horizontal level, have an effect, which is stored in postharvesting period, which is especially important for long-term storage potatoes and vegetables. In Ukraine, efficiency of various associative bacteria such as *Artrobacter*, *Flavobacterium*, *Agrobacterium*, *Bacillus*, *Pseudomonas*, *Azospirillum* are not discovered. The biological preparation

Ekstrasol was designed at the Russian Institute of Agricultural Microbiology, it can storage during 2 years[1].

The purpose of researches - analysis of antagonistic activity of preparations against pathogens of potato tubers in the model laboratory researches to study the possibility of using biological preparation Ekstrasol to protect potato tubers during storage, which we analyzed.

Materials and methods of the research. The work was conducted in the Industrial Biotechnology laboratory of the Department of Ecobiotechnology and Biodiversity of NULES of Ukraine in 2012-2014 years. Phytopathogenic bacteria and fungi *Fusarium solani*, *Fusarium oxysporum*, *Fusarium sambucinum*, *Alternaria solani* and *Pectobacterium carotovorum* were the objects of researches. They were cultivated on selective media at controlled temperatures [2,4]. Evaluation of fungal and bacterial activity was performed by agar diffusion using paper disks impregnated with preparation by conventional methods [2,4,5]. We investigated the following preparations: control - water treatment; biological control - Phitotsyd-R (based on the bacteria *Bacillus subtilis*, BTU Center, Ukraine), Ekstrasol (consortium of associative bacteria, Russian Research Institute of Agricultural Microbiology); Planryz (based on the bacteria *Pseudomonas fluorescence*, made in biolaboratory of State Inspection for Plant Protection, Lviv region). The plates were incubated at controlled temperature 18-22 ° C for 24 h. The evaluation of antagonistic activity of microbial preparations to pathogens carried on by height of inhibition zone (mm), formed around colonies.

Conclusions

Microbiological preparation Ekstrasol, based on consortium of associative bacteria *Artrobacter mycorens* 7, *Flavobacterium sp. L*.-30, *Agrobacterium radiobacter* 204, *Agrobacterium radiobacter* 10, *Bacillus subtilis* B-13, *Pseudomonas fluorescens* 2137, *Azospirillum lipoferum* 137 had the wide spectrum of antibiotic action to *Fusarium solani*, *F.oxysporum* and *F.sambucinum*, *Alternaria solani* and *Pectobacterium carotovorum*. The applying of Ekstrasol inhibited of pathogenic growth in 1,4-1,9 times compared to Phitotsyd-R and in 1,7-2,3 times – to Planryz.

The microbiological preparation Ekstrasol was investigated (based on the consortium of associative bacteria), that had a wide range of antibiotic action in

relation to Fusarium solani, F.oxysporum, F.sambucinum, Alternaria solani, and Pectobacterium carotovorum. It was studied, that the applying of Ekstrasol inhibited of phytopathogenes growth in 1.4–1.9 times more compared to Fitotsid-R and in 1.7–2.3 times -to Planriz.

Antagonistic activity, microbiological preparations, rhizosphere and endophytic bacteria, phytopathogens.

PECULIARITIES OF POWDERY MILDEW AGENT ON DIFFERENT AS FOR RESISTANCE VARIETIES OF WINTER WHEAT DEVELOPMENT

O. Dermenko

By the method of artificial inoculation of plants by powdery mildew agent (Erysiphe graminis f. sp. tritici) was studied the development of fungus on the leaves of different resistant as for resistance varieties of winter wheat.

Winter wheat, resistance, powdery mildew, pathogenic agent, sporulation, conidium, appressorium, cleistotecium.

The purpose of research - the study of the intensity and germination of the pathogen powdery mildew on the surface of winter wheat plants. Research conducted in 2012-2013 in problem research laboratory of mycology and plant pathology department of Phytopathology them. Acad. VF Peresypkin NUBiP Ukraine. The object of research were different resistance to powdery mildew varieties of winter wheat.

Materials and methods research. Plants were grown for an experiment in greenhouse. In the second phase of leaf spent their freshly inoculated conidia suspension of Erysiphe graminis f. sp. tritici. Infectious material collected from infected plants in the fields of research NUBiP of Ukraine "Agronomic research station."

The study of the initial stages of infection of plants was carried out by our improved method prints of leaves.

Square pillows mildew established formula ellipse area, and leaf surface area calculated by the formula [6].

Statistical analysis of the results of research carried out by the method of Dospyehov [4].

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UDC 602.2:632.38:635.652

PCR DIAGNOSTIC OF THE BEAN YELLOW MOSAIC VIRUS

I.O. Antipov, candidate of agricultural sciences

Nucleotide sequences of various isolates of the bean yellow mosaic virus (BYMV) analysed. It is showing conserved nucleotide sequence of the part of gene encoding the coat protein and developed design primers for the BYMV identification. Developed a polymerase chain reaction (PCR) diagnostic test-system for BYMV detection.

Bean yellow mosaic virus, polymerase chain reaction, diagnostic.

Bean yellow mosaic virus is a member of the *Potyviridae* genera, genus *Potyvirus.* Virions filamentous, not enveloped, usually flexuous with a clear modal length of 750 nm and 12-15 nm wide [5].

Symptoms of BYMV on plants are very diverse and are largely dependent on the variety and environmental conditions. The main feature is the mosaic, green and pale green spots on leaves [6, 9].

BYMV is distributed worldwide and causes disease of many legumes and ornamentals [4]. Today the virus is believed to be distributed worldwide. BYMV is known to infect *Vicia faba*, several species of clover (*Trifolium hybridum*, *T. vesiculosum*, *T. incarnatum*, *T. pratense*, *T. repens*, *T. subterraneum*), alfalfa (*Medicago sativa*), vetch (*Vicia sativa*), lupine (*Lupinus luteus*). Compared to other viruses of the genera *Potyviridae*, BYMV has a wide range of host plants. Transmission of the virus from plant to plant occurs in different ways: through insects, seeds, grafting and contact [7, 8].

For early detection of viral diseases and for developing the protective measures is necessary to determine the causes of their illness, identify factors that affect the plant. The studies of this problem are very limited and require further development. It is important to develop diagnostic methods to identify of BYMV.

The aim of the study is to develop a diagnostic test-system for the detection of bean yellow mosaic virus with polymerase chain reaction (PCR).

Research materials and methods. To search for nucleotide sequences of various isolates of the bean yellow mosaic virus was used a database of NCBI (National Center for Biotechnological Information) [3]. Alignment of

nucleotide sequences was performed using the software «MultAline» (Multiple sequence alignment) [2]. Design of primers developed using software «Primer3» [1].

Extraction of RNA was performed using a commercial kit "RIBO-sorb» (AmpliSens, Russia), reverse transcription reaction was performed using a commercial kit "Reverta-L-100» (AmpliSens, Russia), according to manufacturer's recommendations.

The reaction mixture for the polymerase chain reaction, a volume of 15 µl containing: 1 × PCR buffer with 1.5 mM $MgCl_2$ (Amplisens, Russia), 0.2 mM deoxynucleoside triphosphates (dNTPs) (Amplisens, Rossio), 10-40 ng of cDNA, 0,5 units *Taq* polymerase (Amplisens, Russia). All primers were used at final concentration of 1 pmol per 15 µl in PCR reaction. Cycling conditions consisted of an initial denaturation step at 94 C^0 for 10 min, followed by 30 cycles at 94 C^0 for 30 s, 60 C^0 for 30 s and 72 C^0 for 30 s followed by a final elongation step at 72 C^0 for 7

min in an Thermocyclers "Tertsyk" TP4-PCR-01. PCR products were separated by electrophoresis in 1.5% agarose gels and visualized under an ultraviolet light after staining with ethidium bromide.

The research results. The nucleotide sequence of the BYMV genome for analysis were collected using genetic database of NCBI. It was carried out an alignment of the nucleotide sequences of parts of the gene encoding coat protein BYMV. Based on the analysis, consensus nucleotide sequence was constructed (Figure 1). It is showing conservative (uppercase letters) and polymorphic (small letters) fragments of the gene encoding a virus coat protein. Strictly conserved fragments were selected for further primers design. Polymorphic sites of the genome were excluded from the analysis.

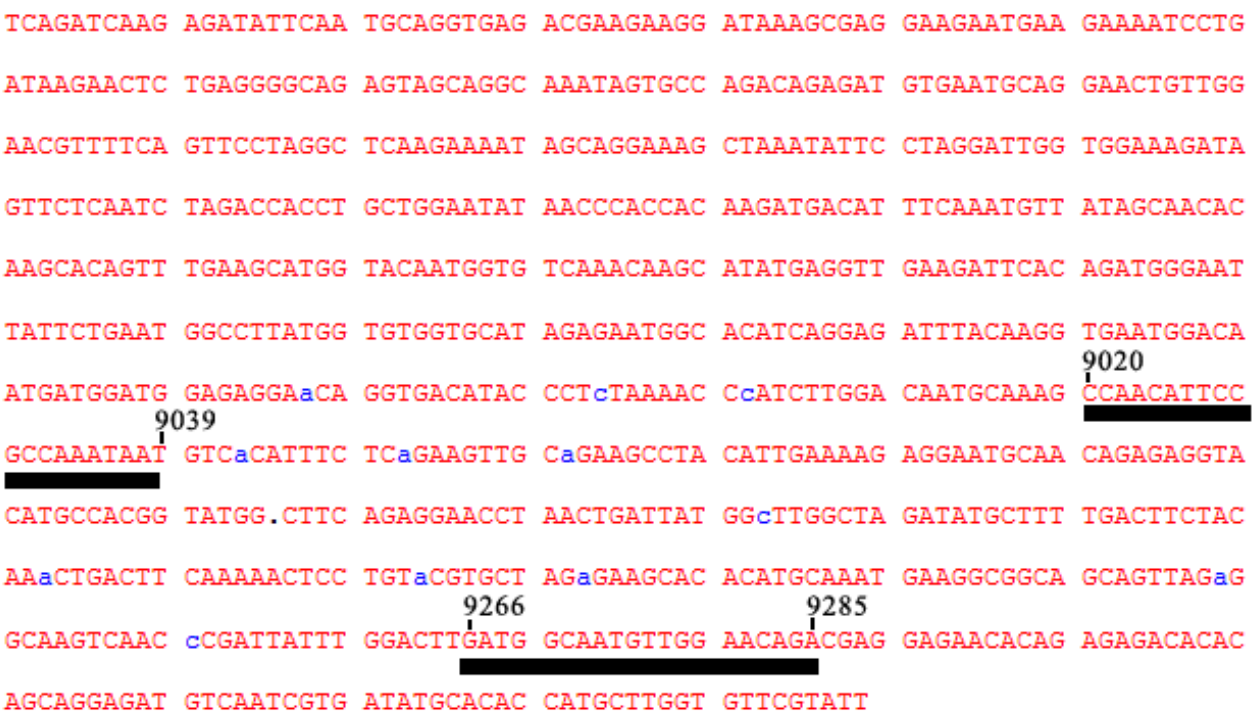

Figure 1. Location of BYMV primers hybridization sites to the DNA consensus of coat protein encoding sequence.

It was carried out a primers design with optimal performance. For synthesis was chosen primers: Forward 5'-CCAACATTCCGCCAAATAAT-3 'and Reverse 5'-TCTGTTCCAACATTGCCATC-3' with the names of BYMV-F and BYMV-R. The calculated optimum temperature for annealing is 59.66 ^{0}C forward primer and reverse primer for 59.50 ^{0}C. Percentage deoxyadenosine-5'-phosphate and deoxycytidine-5'-phosphate is 40% of forward primer and 45% of reverse primer. Selected primers did not form hairpin formation and was not self-annealing.

Molecular characterization of primers for BYMV identification

Position on the matrix	The nucleotide sequence of the 5'-3 '	Number of nucleotides	Annealing temperature, ^{0}C	GC-composition, %	Size of product, b.p.
Forward	ccaacattccgccaaataat	20	59,66	40,0	266
Reverse	tctgttccaacattgccatc	20	59,50	45,0	

Primer BYMV-F cDNA is annealing on the genome matrix in 9020-9039 n position and primer BYMV-R on 9266-9285n position respectively. The expected size of the amplification product was 266 base pairs.

Plants of beans (Phaséolus vulgáris) with BYMV symptoms was collected from Kiev region. Leafs of infected plants was used for RNA extraction. PCR was performed using cDNA Ukrainian isolate of BYMV (Figure 2).

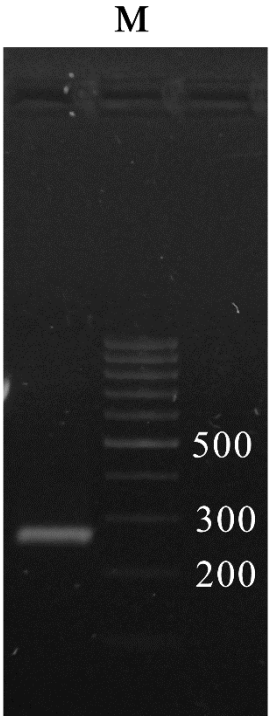

Figure 2. PCR analysis of Ukrainian isolate of BYMV (GeneRuler 10 bp DNA Lader 0241) - marker lengths of fragments (base pairs)

BYMV was detected in leafs with symptoms amplifying viral genome regions between nucleotides 9020-9285. It was showing amplifying PCR product with expected size (266 b.p.) on electrophoresis.

Conclusions

BYMV diagnostic and identification PCR test-system was developed. It was showing an effectiveness of developed test-system. It is proposed to use PCR as a highly sensitive method for laboratory BYMV diagnosis and identification.

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Проведено біоінформативний аналіз нуклеотидних послідовностей ізолятів віруса жовтої мозаїки квасолі (ВЖМК). Показано консервативні послідовності ділянки гену, що кодує білок оболонки та розроблено дизайн праймерів для ідентифікації ВЖМК. Розроблено діагностичну тест-систему на основі полімеразної ланцюгової реакції (ПЛР) для виявлення віруса жовтої мозаїки квасолі.

Вірус жовтої мозаїки квасолі, полімеразна ланцюгова реакція, діагностичні тест-системи.

Проведено биоинформативний анализ нуклеотидных последовательностей изолятов вируса желтой мозаики фасоли (ВЖМФ). Показано консервативные последовательности участка гена, кодирующего белок оболочки и разработан дизайн праймеров для идентификации ВЖМФ. Разработан диагностическую тест-систему на основе полимеразной цепной реакции (ПЦР) для выявления вируса желтой мозаики фасоли.

Вирус желтой мозаики фасоли, полимеразная цепная реакция, диагностические тест-системы.

THE ECOLOGICAL GRADE OF THE VASCULAR PLANTS OF RESTORE VEGETATION OF THE FOREST-STEP OF UKRAINE (KYIV REGION)

B. Yakubenko, A. Yarmolenko, A. Tertyshnyy, A. Churilov

The ecological groups of vascular plants of restore vegetation in grasslands which depend on water regime, mineral resources, acidity of soil and quantity of calcium in soil were given.

Ecological groups, water regime, trofic, quantity of calcium, grassland vegetation, the Forest-steppe of Ukraine.

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