

ABSTRACT&REFERENCES

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MOLECULAR GENETIC ANALYSIS OF VARIABILITY OF HA, NA AND NP GENES OF INFLUENZA VIRUS A (COMPARED TO H1N1 AND H7N9 STRAINS)

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Due to the high antigenic variability and properties for reassortment of influenza A virus genes, analyze the variability of genetic markers of two different antigenic subtypes of influenza A virus strains H1N1 and H7N9 isolated from different hosts (humans and avian). The nucleotide sequences for analysis were taken from the database (NCBI). Using the MEGA6 cluster analysis program and calculating genetic distances using the ClustalW algorithm for the coding sequences of the nucleotides of the HA, NA and NP-protein genes, determinations were made on a sample of influenza strains A. Determination of single nucleotide substitutions at positions with mutations was performed using the Flusurver program. The construction of the dendrogram was carried out using the UPGM group pairwise clustering method, the reliability was calculated using the but-strep analysis. The variability of the neurominidase, hemagglutinin, and nucleoprotein genes was determined by local sequence alignment using the Smith – Waterman algorithm of the VectorNTI-11 program. Consensus sequences (CS) for HA, NA and NP-genes were formed; common conservative areas (motives) were found. The analysis of viral nucleic acids on the variability of the genetic markers of the avian influenza virus HA, NA and NP, coding the virulence factors in the H1N1 and H7N9 subtypes, showed genetic variability (variability) of the hemagglutinin and neurominidase genes. A sample of gene sequences showed that the HA genes of the avian influenza virus have more interstitial polymorphism than the NA and NP protein genes. Genetic markers of high variability are the H1N1 subtype hemagglutinin genes and the NA genes in the H7N9 subtype. The article analyzes the structural features of the genes of surface proteins and nucleoproteins of influenza viruses AH1N1 and AH7N9. A certain degree of synonymy of nucleotide substitutions is determined. The relationship between the distribution of nucleotide polymorphism and indicators of synonymous and non-synonymous substitutions is established. The high variability of the NA gene, and somewhat

less NA, determines the ability of the avian influenza virus, in particular its highly virulent strain H1N1 and less virulent H7N9, to overcome the interspecific barrier, whereas the replication factor encoded by the NP gene is less important for overcoming the interspecies barrier, which causes its low compared with ON and NA variability.

Keywords: Influenza virus A, H1N1, H7N9, gene variability, hemagglutinin, neurominidase, nucleoprotein

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ANALYSIS OF THE MORPHOLOGICAL VARIABILITY OF THE BREAM (*ABRAMIS BRAMA LINNAEUS, 1758*) DNIPRO-BUH RIVER MOUTH SYSTEM

p. 9-14

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Hydraulic construction on the Dnipro River led to dramatic changes in the ichthyocenosis of the estuarine waters. As a result of the regulation of the natural flow, the dynamic balance between the abiotic and biotic parameters of the habitat of aquatic organisms throughout the Dnipro-Buh river mouth system was disturbed.

*Transformational processes that have lasted to the present time are accompanied by changes in the main structural characteristics of ichthyocenosis, where one of the most valuable representatives of commercial cyprinids has always been the bream – *Abramis brama* Linnaeus, 1758.*

Purpose. *To conduct a morphometric analysis of bream of the Dnipro-Buh river mouth system in modern conditions. To compare the results with scientific data for previous periods of succession of the ecosystem of the Dnipro-Buh river mouth system. To explain the causes of morphological variability of bream over time and analyze sexual dimorphism in the herd.*

Materials and methods. *The research work is carried out in accordance with generally accepted methods of ichthyological research. Morphological variability is determined by Student's t-test (td). Bream individuals from age groups of five-year-old and six-year-olds are used for analysis, which makes it possible to compare the obtained data with the results of previous studies.*

Results. *The study of the meristic signs of bream shows that at present the formulas of the fins are as follows: D – III 9*

(10); A – III 24-26 (27); P – I 16-18; V – II 7-8; C I 19 I, and in the sideline there are from 53 to 56 scales. The results are within the limits of similar scientific data of the last century. It is established that the most significant changes in the proportions of the body in bream during the transformation of the drain of the Dnipro occur in height and length of the dorsal fin (td=7,5–8,7; p<0,05). At the same time, an elongation of the caudal stem (td=10.2; p<0.05) and a decrease in the ante-anal distance (td=4.0; p<0.05) are noted. The presence of sexual dimorphism in the herd is proved. Among the 22 analyzed plastic signs, a significant difference is found for 13 indicators. In males, due to greater mobility, the anal fin is located closer to the fish snout (td=3.38; p<0.05), the head is more pointed (td=3.77; p<0.05) and below the body (td=3, 5; p<0.05).

Conclusions. *A comparative analysis of modern plastic signs of bream in the Dnipro-Buh river mouth system indicates changes in the proportions of the body. At present, it has been reliably established that the anal fin has shifted closer to the anterior end of the body (td=4.0; p<0.05), which is a consequence of the fundamental redistribution of river flow and a decrease in the flow velocity. This is the situation that led to the lengthening of the migration routes of the bream in the Dnipro-Buh river mouth system and the formation of a population that is characterized by high mobility.*

Keywords: *Dnipro-Buh river mouth system, bream, meristic, plastic signs, morphological variability*

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TOPOGRAPHIC PECULIARITIES OF LOCALIZATION OF FUNGI OF THE GENUS CANDIDA ISOLATED FROM SUB-BIOTOPES OF THE ORAL CAVITY OF PRACTICALLY HEALTHY PERSONS

p. 14-18

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Purpose. Establishment of topographic features of the localization of *Candida* fungi isolated from the sub-biotopes of the oral cavity of practically healthy persons without clinical signs of candidiasis.

Methods. The following methods are used: microscopic; mycological – cultural studies of biomaterial strains from practically healthy persons; biochemical – for the purpose of species identification of *Candida* fungi; statistical methods.

Research results. During the experiment, 292 sub-biotopes of the oral cavity are investigated. The material is taken from the mucous membrane of the cheek, the corner of the mouth, the mucous membrane of the surface of the tongue and the palate. According to the results of the conducted research, the level of candidiasis carriage on the oral mucosa in practically healthy individuals without clinical signs of candidiasis is 56.4 %. Candidiasis carrier level on the dorsal surface of the tongue is 38.46 %, the retromolar part of the cheek is 30.77 %, the angle of the mouth is 18.8 %, and the palate is 11.97 %. Among all isolated strains, prevails in all 4 sub-biotopes of *C. albicans* – 76.07 %. It is noted that in 8 people in the biotope of the oral cavity, but in different sub-biotopes, two species of the genus *Candida*, *C. krusei* and *C. albicans*, are isolated, and in 7 people, *C. glabrata* and *C. albicans*. In addition, the coexistence of two candida types is found in 5 sub-biotopes.

Conclusions

1. The level of candidiasis carriage in the oral biotope among practically healthy individuals without clinical signs of candidiasis is 56.4 %. The level of candidiasis carriage of the oral biotope in practically healthy persons without clinical manifestations of candidiasis has increased significantly over the past 5 years.

2. Among the identified strains, *Candida albicans* prevails – 76.07 %.

3. The highest rate of colonization compared with other sub-biotopes is observed on the dorsal surface of the tongue – 38.46 %. During the study, the coexistence of two *Candida* types is revealed. In 8 people in the biotope of the oral cavity, but in different sub-biotopes, two species of the genus *Candida*, *C. krusei* and *C. albicans*, are isolated, and in 7 people, *C. glabrata* and *C. albicans*, which confirms the importance of establishing topographic features of the fungi localization in the oral cavity for the rationality of using antimycotics if necessary

Keywords: *Candida* fungi, *Candida albicans*, candidiasis, candidiasis carriage, topographic features

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INFLUENCE OF CHLORMEQUAT CHLORIDE ON THE FORMATION OF A PHOTOSYNTHETIC APPARATUS AND PRODUCTIVITY OF LINSEED

p. 18-22

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Application of retardants as anti-gibberelline substances leads to changes in the functioning of donor-acceptor relations in the plant organism and inhibition of the growth processes. Reducing of the assimilates demand for the growth of vegetative organs leads to the accumulation of plastic substances with their redistribution to the formation of seeds and fruits.

*The purpose of the research was establishing the effect of chlormequat chloride as a retardant permitted in Ukraine on the formation of the leaf apparatus and the productivity of oil flax plants (*Linum usitatissimum* L.).*

Materials and methods. Oil flax plants of Debut and Orpheus varieties were once treated with 0.5% water solution chlormequat chloride in the budding phase. Morphological parameters of flax plants were studied every 10 days. The mesostructural organization was determined for leaves of the same age. The total amount of oil in flax seeds was determined by extraction.

Result. It was found that chlormequat chloride application led to enhance the thickening of stems of plants. Chlormequat chloride treatment resulted the formation of powerful photosynthetic apparatus. The application of retardant increased the number of leaves per plant and decreased the area of a single leaf. It was found that the application of plant growth regulators led to increase the cells size and volume of palisade chlorenchyma, the chloroplast number and size in palisade and spongy parenchyma. Such changes in the mesostructure measurement of leaves caused increase the net photosynthetic productivity that was the important prerequisite for enhancement of crop production. The flow of assimilates was directed to the development of generative organs – fruits, the number of which increased by the retardant as a result of intensive branching of the stem. It was also noted that the number of seeds per fruit and the weight of a single seed increased under the influence of growth regulator. It was established that the application of retardant stimulated a more intense synthesis of reserve compounds in the seeds and oil content in seeds increased. It was necessary to note that the amount of residual drugs substance in the seeds was significantly lower than the permissible concentrations.

Conclusions. So the chlormequat chloride treatment on the linseed during the budding period leads to improve the development of leaf apparatus and formation of fruits, which result the improvement of crop production

Keywords: *Linum usitatissimum* L., growth regulators, retardants, photosynthetic apparatus, productivity, crop structure

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PECULIARITIES OF THE COMPONENT COMPOSITION OF ETHER OILS OF SOME REPRESENTATIVES OF *Lamiaceae* Lindl FAMILY IN THE CONDITIONS OF FOREST-STEPPE OF UKRAINE AND ESTIMATION OF THEIR BIOLOGICAL ACTIVITY

p. 23-29

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The purpose of the research is to study the biochemical composition, physical-and-chemical peculiarities of ether oils of dragonhead, hyssop, monarda and to determine their biological activity.

Materials and methods. Vegetative raw materials of dragonhead, hyssop, monarda were taken during the flowering period. The component composition of ether oils was studied at a gas chromatograph "Crystal 2000" with a flame-ionization detector. Components of ether oils were identified by the time of substance keeping of the standards of Fluka, Merck, Sigma companies. The allelopathic activity of ether oils, citral, thymol, pinecamferol was studied by the bio-tests method.

Results. The component composition of ether oils of scarlet monarda (*Monarda didyma* L.), Moldavian dragonhead (*Dracocephalum moldavicum* L.), hyssop (*Hyssopus officinalis* L.) as valuable aromatic plants of polyfunctional value was studied and their physical-and-chemical parameters were determined. The main component of ether oil of hyssop plant was pinecamferol (84.68 %). The following compounds of terpenic nature as citral (49.9 %), geranilacetal (43.9 %) are found in ether oil of Moldavian dragonhead. Terpenic compounds of ether oils of scarlet monarda were represented by aromatic alcohols of thymol – 41,56 %. Growth processes of spring barley seedlings were slowed down while using oils synthesized from the vegetative material of all studied varieties at a concentration of 0.1 mcl (by 8.4–86.0 %), besides that hyssop oil had the least inhibitory effect. Concentrations

of 0.1–1.0 mcl (92.74–98.85 %) especially in the variants with Moldavian dragonhead oil had the maximum impact on the development of garden-cress.

Conclusions. The connection of biological activity with the component composition of ether oils of studied representatives and their chemically pure basic components was analyzed. The high biological activity of the studied substances, which may be a regulator of the structure and functions of individual components of the ecosystem under natural conditions, was proved. The received results indicate the prospect for further study of the peculiarities of ether oils of three varieties of studied plants of Lamiaceae Lindl family – *Hyssopus officinalis* L., *Monarda didyma* L., *Dracocephalum moldavicum* L., where aromatic substances dominate

Keywords: ether oil, pinecamferol, citral, thymol, biological activity, test-objects

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INVESTIGATION OF FUNGICIDAL ACTIVITY OF NANOPARTICLES ZnO, TiO₂ AND Ag⁰ OF DIFFERENT SIZE

p. 30-33

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The paper presents studies on the determination of fungicidal properties of colloidal solutions of various sizes of ZnO, TiO₂ and Ag⁰ nanoparticles.

The aim of the study was to determine the effect of ZnO, TiO₂ and Ag⁰ nanoparticles on their fungicidal activity.

Materials and methods. In order to achieve this goal in the article, studies were conducted to determine the fungicidal activity of different sizes of ZnO, TiO₂ and Ag⁰ nanoparticles. Also, the percentage of fungicidal effectiveness of using colloidal solutions of nanowires ZnO, TiO₂ and Ag⁰ of various sizes is estimated.

Fungicidal properties of nanosolutions were evaluated in the form of fungicidal activity and fungicidal efficacy. Fungicidal activity and fungicidal efficacy of colloidal solutions were investigated by the visual evaluation method for mold fungi of the genus *Aspergillus* (black mold or dark gray mold) and fungi of genus *Penicillium* (blue-green mold) that form colonies on rye-wheat bread.

Results. A correlation between sizes of nanoparticles of ZnO, TiO₂ and Ag⁰ and their fungicidal action has been established. For the study, the prepared aqueous solutions of ZnO and TiO₂ nanoparticles at a concentration of 0.5 % were 25 nm, 35 nm, 50 nm, and solutions of Ag⁰ nanoparticles were prepared using OS-20 surfactant and sodium citrate precursor, the sizes of synthesized nanoparticles were 35 nm and 50 nm, the concentration of solutions of nanoparticles Ag⁰ was 0.5 %. The high fungicidal activity was demonstrated by colloid solutions of nanosilver with particles sizes as 50 nm, contained sodium citrate solution, 2 points, contained OS-20 surfactant solution – 3 points.

Conclusion. As a result of the studies, a correlation was found between the size of the nanoparticles and their fungicidal activity, so that smaller particles of TiO₂ exhibit greater fungicidal activity. ZnO and Ag nanoparticles have more pronounced fungicidal properties in larger sizes.

Keywords: fungicidal activity, fungicidal effectiveness, nanoparticles of metals, colloidal solution, surfactants

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EFFICACY OF COMPLEX TREATMENT OF ACUTE NECROTIC PANCREATITIS USING ANTIBACTERIAL DRUGS AND POLYVALENT PIOBACTERIOPHAG

p. 34-38

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Among surgical diseases of the abdominal cavity, acute necrotic pancreatitis is important. The total lethality in this disease is 4.28–5.50 %, and with its destructive forms in the postoperative period, it reaches 20–40 % [1–3]. The number of cases in which the development of the disease involved antibiotic resistant microorganisms significantly increased. In this regard, the treatment of acute necrotic pancreatitis needs improvement.

Aim. Improvement of the treatment of patients with acute necrotizing pancreatitis with the complex application of polyvalent pyobacteriophage and antibacterial preparations.

Method. A bacteriological study was performed on patients with acute necrotic pancreatitis, in which 49 strains of microorganisms were isolated from the manure both in the control and the basic (experimental) group. For the treatment of acute necrotic pancreatitis, antibiotics were used in conjunction with polyvalent pyobacteriophage (main group). Only antibiotics were used to treat patients in the control group.

Main results. In the experimental group of patients with acute necrotic pancreatitis, associations of microorganisms that were acting together with antibiotics and polyvalent pyobacteriophage were isolated.

According to the data obtained, the use of antibiotics, in combination with polyvalent pyobacteriophage in the complex treatment of purulent necrotic pancreatitis, accelerated healing of surgical wounds and recovery of patients.

Thus, the data that were obtained as a result of the complex treatment of acute necrotic pancreatitis with the use of antibiotics and polyvalent pyobacteriophage purified, indicate that the treatment of patients in the main group, compared with the control, was more effective.

Conclusions. The use of the complex therapy with an antibiotic with polyvalent piobacteriophage reduces the cost of the treatment, which has an important social and economic significance.

It has been proved that the use of polyvalent piobacteriophage, together with antibiotics in the complex treatment of acute necrotic pancreatitis, reduced the duration of the treatment to 39±4, and with the use of antibiotics alone, treatment continued for 42±6 years.

With the use of this technique, patients' wound healing was at 6 ± 2 days, while at the treatment with antibiotics only wound was cleared by 12 ± 3

Keywords: bacteriophages, acute necrotic pancreatitis, antibacterial preparations, bacteria, microflora, complex treatment

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