ABSTRACT & REFERENCES

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EXTRACTS OF POMEGRANATE, PERSIMMON, NETTLE, DILL, KALE AND SIDERITIS SPECIFICALLY MODULATE GUT MICROBIOTA AND LOCAL CYTOKINES PRODUCTION: IN VIVO STUDY

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The aim of the work was to use the in vivo model to reveal main changes in gut microbiota of immune competent mice in dynamic and find out the specificity of immunomodulation activity (action) of traditional foods ingredients - edible plants extracts on local mucosal cytokines to its oral administration.

Materials and methods. In this study, seven groups of immunocompetent BALB/c mice were formed. All experimental mice had been fed orally by plants' extracts (15mg/200 µl/mouse) for the 14th days. The extracts of edible plants – ingredients of traditional food such as kale leaves, persimmon, pomegranate, dill, Sideritis scardica, and nettle were obtained as described and orally administrated to experimental animals. For microbiological analysis of gut microbiota changes, the colon content has been investigated, the key microbial representatives were isolated by plating of its serial dilution on selected chromogenic medium, identified serologically and biochemically. The production of cytokines in different gut compartments and gut associated lymphoid tissues (GALT) were detected by Enzyme-linked immunosorbent assay (ELISA).

Results. In experiments in mice, the ability of Kale, Dill and Sideritis extracts, when administered orally, selectively inhibit the content of E. coli, K. pneumoniae, E. faecalis, L. acidophilus in the colon of mice had been demonstrated, and increasing of B. bifidum had been observed. Nettle extract leads to an increase in E. coli, and persimmon extract – to an increase in levels of E. faecalis, Bifidobacterium and a decrease in the content of Candida spp. Pomegranate extract specifically stimulates the growth of Bifidobacterium. There are sufficient differences in produced cytokines in fragment culture and serum of mice fed with different plants extracts. TNF-α, and IL-2 increased both systemically and locally in the different gut compartments by Dill extract, Nettle and Sideritis extracts only at mucosal sites. IL-2, but also IL-10 and IL-12, IFN-g, and IL-17 but not TNF-α were stimulated in different levels by Pomegranate, Persimmon and Kale extracts: both systemically and locally.

Conclusions. No harmful influence of tested plants had been observed. The most beneficial properties are inherent to Persimmon extract and slightly less detected in Pomegranate and Kale extracts. Siderites extract rather show no significant influence on all the studied indices while the Nettle and Dill extracts are acting pro-inflammatory.

Keywords: edible plants extracts, immunomodulation action, gut microbiota

References


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COMPARATIVE ANALYSIS OF THE COMPOSITION OF INTESTINAL MICROBIOME IN PATIENTS WITH LIVER DISEASES

p. 15–22

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Aim: to analyze the composition of the intestinal microbiome in patients with liver diseases of various etiologies.

Materials and methods: 128 patients of different sexes with pathological liver lesions were examined. The diagnosis of diseases was carried out using laboratory and instrumental methods of research. The study of the composition of microbiota in qualitative and quantitative indicators was carried out using standard bacteriological methods. The statistical analysis was performed using Student’s t-test. Differences in indicators were considered significant at P<0.05.

Results: the comparative analysis of the composition of the intestinal microbiocenosis of patients with various liver diseases showed significant drops in the titers of symbiotic bacteria: lactobacilli to 10⁸–10⁹ CFU/ml, bifidobacteria to 10⁸–10⁹ CFU/ml, enterococci to 10⁸–10⁹ CFU/ml and typical E. coli to 10⁸–10⁹ CFU/ml, as well as an increase in the number of opportunistic microorganisms: Candida to 10⁷–10⁹ CFU/ml, hemolytic E. coli to 10⁸–10⁹ CFU/ml, Staphylococcus spp. to 10⁸–10⁹ CFU/ml, Klebsiella spp. and Enterobacter spp. to 10⁸–10⁹ CFU/ml. According to the degree of colonization of associative and conditionally pathogenic microbiota of the intestinal tract, significant fluctuations in the deviations of indicators were recorded in women and men with non-alcoholic steatohepatitis, alcoholic hepatitis and hepatitis C.
Conclusions: the study revealed the significant imbalance of microbiome of the gastrointestinal tract: there was a tendency to increase the quantitative and qualitative indicators of the content of representatives of the opportunistic microbiota against the background of decreasing titers of symbiotic microorganisms. The most significant deviations in the composition of the intestinal microbiome were observed in patients with hepatitis C. The differences in the microbial landscape of the intestine of patients of different sex with liver diseases are shown, which was mentioned in the changing relationship of individual members of the intestinal microbiota

Keywords: intestinal dysbiosis, nonalcoholic fatty liver disease, alcoholic liver disease, hepatitis C

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QUORUM SENSING AUTOINDUCERS
BIOSYNTHESIS BY BIOFILM CULTURES
OF PSEUDOMONAS AERUGINOSA STRAINS
WITH DIFFERENT LEVELS OF THE CYCLIC
DIGUANOSINEMONOPHOSPHATE

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The aim of the work is to establish relationships between content of the cyclo-di-GMP and the ability of P. aeruginosa to form biofilm and synthesis of the quorum sensing system autoinducers.

Materials and methods of research. Wild-type strain P. aeruginosa PA01 and P. aeruginosa strains with low (PA01pLJN2133) and high (PA01ΔwspF) levels of cyclic diguanosine monophosphate were used. Cultivation was performed in 24-well flat-bottomed plates Nuolon at 37 °C in LB medium. Biofilm mass was determined in CV-test. The measurements were performed on a Smart Spec Plus spectrophotometer.
It was found that the strain of P. aeruginosa PA01 pJN2133, the intracellular content of cyclic-di-GMP was 4 times higher than that in the strain with its increased level, compared to the parent strain.

**Conclusions.** There is a direct proportionality between the intracellular content of cyclic-di-GMP and the ability to form a biofilm: the higher content of the secondary messenger leads to increased mass of the biofilm. The concentration of QS autoinducers in the medium is inversely related to the intracellular content of cyclic-di-GMP: it is increased in the strain with a low content of the secondary messenger and decreased in the strain with its increased level, compared to the parent strain.

**Keywords:** Pseudomonas aeruginosa, quorum sensing, biofilms, cyclic-di-GMP, QS autoinducers

**References**


To find out the morphology of the seeds and the features of their germination and to study the development of Uncaria roeoesliana Rauh (Pedaliaceae) plants in the early stages of ontogeny in connection with the problem of a seed germination and their cultivation under introduction.

Materials and methods. The latent and pregenerative periods of the ontomorphogenesis of Uncaria roeoesliana plants under growing conditions in the protected soils of the Botanical garden named after acad. O. V. Fomin were investigated. Biomorphological, introducting, histological methods were used in this work.

Results. A method of accelerating the germination of freshly harvested seeds has been developed. Uncaria roeoesliana seeds are large (about 7x5 mm), mostly wide-triangular, brown in colour with little-noticed wing around the perimeral part of the seed. The dorsal side forms folds, the hem is on the periclinical walls are convex and often with papillae. The embryo is large, occupies most of the seed, the endosperm has a lot of lipids, which is typical for the representative of the same family Sesamum indicum L. The presence of papillae probably contributes to the moisture accumulation to increase the enzymatic activity when the seeds are swell. All of these features of seed germination are consistent with the environmental conditions of Uncaria’s natural habitats: high temperatures, low rainfall and significant dry periods. Probably the plants of this species belong to macrobiotics, that is, they can retain seed germination for a long time. The germination is aboveground. During the 24 weeks of development, the plants reach the virginal stage of development: they form radish roots, 3–6 pairs of leaves, of which only two pairs remain in the young plants at this stage, and a thickened basal part of the stem.

Conclusions. Comparing Uncaria roeoesliana with other caudiciform plants, we can conclude that this plant has a high potential for survival in arid conditions due to the ability of seeds to germinate only in conditions of considerable moisture and the ability of the plant to accumulate moisture in the basal part of the stem and in fleshy roots. In this case, the plant is adapted to exist both in the mode of a dormancy and in the mode of an active growth, but in the latter case only in the presence of sufficient moisture in the soil.

Keywords: seeds, germination, early stages of ontogeny, caudiciform plant, endemic of Madagascar.
References


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RESISTANCE OF LINES OF WINTER BREAD WHEAT CREATED WITH THE PARTICIPATION OF SPRING-WINTER HYBRIDS TO LEAF STEAD DISEASES

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When studying the collection of spring soft wheat of different genetic origin, individual samples that are resistant to pathogens and can be used as sources of resistance to pathogens in their hybridization with winter varieties were selected.

The aim of our research was to study the level of resistance to pathogens of leaf-stem diseases of spring-winter hybrids of different generations depending on the winter and spring components of crossbreeding and their genetic origin, as well as the effectiveness of selection on artificial infectious and natural backgrounds to obtain disease-resistant, with a set of economically valuable features and properties.

Materials and methods. The main method of creating a new hybrid material is intraspecific hybridization of spring and winter soft wheat, followed by selection of stable genotypes of different generations on natural (against powdery mildew) and artificial infectious (against brown and stem rust) backgrounds.

The source of material for the research was a collection of samples of spring soft wheat of different genetic and ecological-geographical origin in the amount of 101 pcs, Lines F1 (18 pcs.), F2 (141 pcs.) and F3 (66 pcs.), Created from combinations crossing of spring samples with varieties of the Breeding and Genetic Institute - National Center for Seed Science and Variety Research, different in biological properties. Evaluation of collection varieties and lines was
References


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PHYSIOLOGICAL ASPECTS OF RAT ACTIVITY, THEIR ANXIETY AND MEMORY AFTER ADMINISTRATION OF FULL GABA –RECEPTOR COMPLEX AGONIST PROPOXAZEPAM

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The action of 7-bromo-5-(o-chlorophenyl)-3-propoxy-1,2-dihydro-3H-1,4-benzodiazepin-2-one (propoxazepam) with prolonged administration in various doses on behavioural reactions, anxiety and the memory of rats, as well as their muscular tone was estimated, which is important paying attention to its main (anticonvulsant and analgesic) pharmacological effects.

The aim of the study was a comparative assessment of the severity and duration of propoxazepam effect after its administration to rats at doses of 2, 5 and 10 mg/kg (10 days) on higher functions of the central nervous system according to indicators such as motor and exploratory activity, as well as reference and working memory.

Materials and methods. The study was conducted on 40 Wistar rats weighing 220-290 g. The psychophysiological state of the animals was evaluated using the "open field" test, the formation of spatial working and long-term memory in a radial eight-arm maze, muscle relaxation, imbalance and movements coordination - using the "rotating rod" method. Statistical processing was performed in Microsoft Excel 2016 with AtteStat 12.

The results of the study. When comparing the test results of the "open field", "radial labyrinth" and "rotarod" in groups of animals that were administered different doses of the compound, it was found that, in general, these parameters at doses of 2 mg/kg and 5 mg/kg statistically significantly different (increase) from control values, but are similar. At a dose of 10 mg/kg, most of the parameters (except for the rotarod test) for these animals were characterized by a downward trend.

Conclusions. The administration of the drug in doses of 2, 5 and 10 mg/kg leads to a decrease in anxious behaviour of animals, which is also accompanied by a pronounced dose-dependent negative effect on the endurance, coordination and memory of animals. The administration of the drug at a dose of 10 mg/kg impaired the learning ability of animals and reduced memory function. This should be considered in clinical studies of the compound

Keywords: propoxazepam, locomotor and exploratory activity, reference and working memory

References


