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## **HYGIENIC AND TOXICOLOGICAL ASSESSMENT OF NITRATES AND PESTICIDES COMBINED EXPOSURE**

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Pesticides as well as nitrates are among the most relevant and dangerous pollutants of the environment. Obviously, a high risk of the joint influence of those compounds exists. Organophosphorous pesticides (dimethoat) are one of the most often reasons of the poisoning accidents in the world. For the last years neonicotinoids (imidacloprids) have become more and more widely-used.

Therefore, the purposes of the study were to evaluate in vivo the association of in borne N-acetyltransferase activity with susceptibility to combined poisoning by dimethoat and sodium nitrate as well as imidacloprid and sodium nitrates; to identify the type and mode of its combined exposure; to detect the indices, which could be used as the effect biomarkers of this intoxications.

Exposure was modeled in 56 white male rats divided into animals with high and low (the "rapid" and "slow" acetylation type) according to activity of N-acetyltransferase using the test with amidopyrine. The rats received toxicants in threshold doses over a period of 28 days. The results were assessed using more than 20 integral and biochemical indices.

"Rapid" acetylation type rats were more susceptible to both intoxications. Specifically they had significantly bigger changes of the integral indices (behavioral responses, body weight) and methemoglobin blood level. We also observed the signs of oxidative stress development such as inhibition of the antioxidant protective enzymes and increasing of products level of lipid and proteins peroxidation in blood and hepar of rats with "rapid" type of acetylation. In contrast, in rats with "slow" acetylation type the activity of antioxidative enzymes increased, while the level of peroxidation products did not change. We appraised those changes in "slow" type animals as adaptive response.

Type of combined action of dimethoat and sodium nitrate was independent or antagonistic according to majority of assessed indices. Imidacloprid and sodium nitrates exposure caused additive change of the most of the indices and potentiation according to level of methemoglobinemia.

Thus, the "rapid" type of acetylation is a susceptibility biomarker of joint poisoning by dimethoat and sodium nitrate as well as imidacloprid and sodium nitrates. Imidacloprid exposure potentiates methemoglobin forming effect of sodium nitrates. Increasing the methemoglobin level in blood and the oxidative stress development are relevant biomarkers of effect for that intoxication.

**Popovych V.B.**

## **CHRONORHYTHMS OF BIFIDOBACTERIA IN THE LARGE INTESTINAL CAVITY OF THE INTACT WHITE RATS DEPENDING ON THE SEASON AND MONTH**

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Today, the greatest attention in the study of chronorhythms is attracted by seasonal and lunar biorhythms, as the changes in the reactivity of a living organism are mostly detected in these periods. Biological rhythms of the living organisms are formed from the first coming to the world and throughout life.

In recent years, a number of scientific regulations pertaining to the species state, population level and function of normal microbiota of humans and animals, are the subject to substantial revision. The data accumulated allow us to consider normal microflora as a kind of extracorporeal macroorganism system that performs and regulates its numerous functions. The main normal microflora of the cavity of the colon and other biotops is autochthonous obligate bacteria, among which bifidobacterium plays a leading role.

The population level of bifidobacteria was studied by bacteriological method, using a stationary anaerostat "CO<sub>2</sub> - incubator T-125" (Sweden) for one year per month in 55 intact white rats. The contents of the colon were taken in the morning (10-11 hours).

The conducted studies showed that during the year bifidobacteria were isolated in all animals monthly. The average population level of bifidobacteria during the year was 0.10 lg CFU/g. Considering the seasonal chrono-rhythms of bifidobacteria in the contents of the colon cavity every season, it is possible to note the variability of the population level of these microorganisms depending on the season and month of the year.

The highest population level of bifidobacteria was established in winter (9.98±0.15 lg CFU/g). After the winter period, the amount of bifidobacteria decreases in the contents of the colon cavity and reaches 9.13±0.09 lg CFU/g (p<0.05).

The progressive decline of the population level continues and reaches 8.52±0.005 lg CFU/g (p<0.01) in summer. In autumn there is a tendency to increase the amount of bifidobacteria in the contents of the cavity of experimental animals. Thus, the quantitative composition of bifidobacteria is subjected to seasonal chronorhythms - the highest population level of bifidobacteria in the contents of the cavity of experimental animals is detected in winter, and the lowest (below one order) - in the summer months.



Based on the results obtained and the fact that the number of intestinal infections significantly increases in the summer period, probiotics, containing bifidobacteria for the prevention of intestinal infections, are recommended to be used in summer.

**Popovych V.B., Sydorchuk I.Y., Yakovychuk N.D., Koval G.M.\***

**MONTHLY ISOLATION CHRONOGRAMS, POPULATION LEVEL AND MICROECOLOGICAL INDICATORS OF MICROORGANISM MICROBIAL MICRO-ORGANISMS MICROBIOTA OF THE COLON CAVITY OF PRACTICALLY HEALTHY PEOPLE OF NORTHERN BUKOVINA**

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The physiological significance of *Bifidobacterium* and *Lactobacillus* bacteria for the human body and their exceptional significance in the functioning of the «microorganism-macrobiorota» ecosystem has been proved by numerous studies and is no doubt in it. Deficiency of the quantity in the large intestinal cavity of these anaerobic bacteria leads to a violation of the digestive processes, absorption of nutrients, assimilation of iron, calcium, vitamin D; synthesis and adsorption of endogenous vitamins; the activity level of individual enzymes, biologically active substances decreases: hypoproteinemia, hypovitaminosis, bacteremia develops; the reactivity of the digestive tract and colonization resistance of the mucous membrane to colonization of the intestine by pathogenic and opportunistic microorganisms, which contributes to the development of purulent-inflammatory processes reduces.

The objective of the work was to investigate the persistence level of *Bifidobacterium* and *Lactobacillus* bacteria to their population level and microecological parameters that characterize their decontaminating and regulating function in self-regulation of the taxonomic composition and population level of large intestinal cavity of practically healthy people in winter, depending on the month chronorhythms. In previous research it was shown that the best indicators in bifidobacteria and lactobacilli of taxonomic composition, population level and microecological value were established in winter time.

The research proved that *Bifidobacterium* and *Lactobacillus* bacteria are found in the intestinal cavity of each practically healthy person and have a high value of Margaleff species richness index, Whittaker species diversity, Simpson and Birger - Parker species domination.

The research of the population level of these bacteria shows that their quantitative indices depend on month chronorhythms. The population level of bifidobacteria in winter is  $8.83 \pm 0.37$  lg CFU/g, lactobacilli is  $7.46 \pm 0.23$  lg CFU/g. The average annual bifidobacteria level is  $8.87 \pm 0.13$  lg CFU/g., lactobacilli is  $7.38 \pm 0.11$  lg CFU/g, which practically responds to winter season.

Indicators of the population level of bifidobacteria and lactobacilli are specifically considered in each month. It is possible to conclude that in December, the population level of bifidobacteria is reduced to 5.64 %, lactobacilli to 3.23 %. In January, the population level of bifidobacteria increases to 7.32 %, lactobacilli to 5.70 %. In February the population level of these bacteria is going on to increase. Under such conditions, the regulatory role in the self-regulation of associative microbiocenosis in the large intestinal cavity in February in bifidobacteria and lactobacilli increase to 8.06 %. While in December, the dominant role of bifidobacteria is reduced to 5.44 %, lactobacilli – to 3.98%. Thus, in practically healthy people aged 18 - 30, living in Northern Bukovina, *Bifidobacterium* and *Lactobacillus* bacteria in the large intestinal cavity are exposed month chronorhythms of winter time.

**Sydorchuk I.Y.**

**GENERAL IMMUNOLOGICAL REACTIVITY OF PATIENTS WITH COMMUNITY-ACQUIRED PNEUMONIA**

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The purpose of the work is to establish the general immunological reactivity of the body of patients with community-acquired pneumonia in the first two days of clinical course according to the immune-hematological indices and coefficients.

Dizziness, cough with predominantly mucosal-purulent sputum excretion was noted in patients aged 19-25 years (average age  $23.91 \pm 4.27$ ) who complained of general weakness, fatigue, loss of appetite, increased sweating, body temperature, palpitation, diffuse headache. Exaggerated or diminished breath sounds and dry, fine moist rales from the side of the lungs, damaged by inflammatory process, were also heard over the pulmonary areas. The diagnosis was confirmed by X-ray in each case.

At primary examination, we took the peripheral blood for the general examination and determination of the absolute and relative number of major populations of immunocompetent cells, on the basis of which the overall immunological reactivity was defined. It has been established that in patients with community-acquired pneumonia, according to the index of immune reactivity, the overall immunological reactivity of patients tends to decrease 19.44 % ( $p > 0.05$ ). Against a background of immunological reactivity decrease (in this period the first stage of the immune response takes place) the activity of the non-specific reactivity of the organism increases 57.50 % ( $p < 0.05$ ), which is