



**Korotun O.P., Vlasyk L.I.**

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

*Department of Hygiene and Ecology  
Higher State Educational Institution of Ukraine  
«Bukovinian State Medical University»*

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**

*Department of Microbiology and Virology  
Higher State Educational Establishment of Ukraine  
"Bukovinian State Medical University"*

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.