

МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ  
БУКОВИНСЬКИЙ ДЕРЖАВНИЙ МЕДИЧНИЙ УНІВЕРСИТЕТ



**МАТЕРІАЛИ**  
**106-ї підсумкової науково-практичної конференції**  
**з міжнародною участю**  
**професорсько-викладацького колективу**  
**БУКОВИНСЬКОГО ДЕРЖАВНОГО МЕДИЧНОГО УНІВЕРСИТЕТУ**  
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Матеріали підсумкової 106-ї науково-практичної конференції з міжнародною участю професорсько-викладацького колективу Буковинського державного медичного університету (м. Чернівці, 03, 05, 10 лютого 2025 р.) – Чернівці: Медуніверситет, 2025. – 450 с. іл.

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**Panasenko N. V.**  
**SYNTHESIS AND ANTIMICROBIAL ACTIVITY**  
**N-HETERYLIDENEHYDRAZIDES**  
**4-NITROIMIDAZOLE-5-THIOACETIC ACID**  
*Department of Medical and Pharmaceutical Chemistry*  
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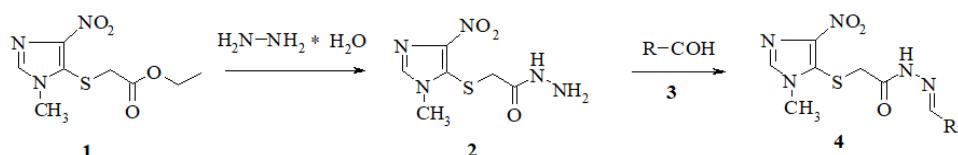
**Introduction.** In modern methodologies for the rational design of new biologically active substances and lead compounds for the creation of medicinal products, imidazole-containing structures play a key role due to their powerful medical and biological potential. An important place among imidazoles is occupied by various types of their functionalized derivatives, which are characterized by antibacterial, antifungal, anticancer, and antituberculosis action. Modification of the nitro-containing imidazole ring with other functional groups proved to be quite productive for the construction of structures with increased pharmacological potential.

**The aim of the study.** Realization of targeted synthesis of new 4-nitroimidazole structures with 5-sulfanyl-functionalized fragments, additionally modified by pharmacophoric hydrazide-hydrazone groups, and investigation of their antimicrobial action.

**Materials and Methods.** Organic synthesis, analytical and spectral methods, pharmacological screening, molecular docking.

**Results.** The synthetic aspect of the problem was solved by a two-stage transformation of the available basic substrate - ethyl ester of 1-methyl-4-nitroimidazole-5-thioacetic acid 1. In the first stage, as a result of boiling ester 1 in ethanol for 3 hours with 90% hydrazine hydrate, hydrazide was obtained 1-methyl-4-nitroimidazole-5-thioacetic acid 2 with a yield of 92%. Its further boiling in ethanol for 3 hours with heterylaldehydes 3 leads to the formation of hydrazones 4, which were isolated with yields of 67-92%.

The composition and structure of the intermediate and target compounds were confirmed by elemental analysis data and chromato-mass, <sup>1</sup>H NMR spectra. The antimicrobial activity of synthesized semicarbazones was screened against several test strains of gram-positive and gram-negative bacteria and fungi.



$R = 3\text{-ClC}_6\text{H}_4, 3\text{-MeOC}_6\text{H}_4, 3\text{-F}_2\text{CHOC}_6\text{H}_4, 3\text{-Pyridyl}$

**Conclusions.** New N-hetarylidene hydrazides of 4-nitroimidazole-5-thioacetic acid were synthesized by condensation of 1-methyl-4-nitroimidazole-5-thioacetic acid hydrazide with various carbaldehydes. The initial microbiological screening of the synthesized compounds revealed the presence of a pronounced antimicrobial effect among them and showed the promise of their further in-depth study.

**Velyka A.Ya.**  
**CHANGES IN CATALASE ACTIVITY IN THE BLOOD OF RATS UNDER THE EFFECT**  
**OF MERCURY DICHLORIDE AGAINST A BACKGROUND OF SALT LOADING**  
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**Introduction.** Antioxidant defense processes play a significant role in the pathogenesis of various diseases, as the imbalance between the activation of free radical oxidation of

macromolecules and the failure of the antioxidant defense system can accelerate the development of various pathological processes underlying kidney diseases. One of these enzymes is catalase (CAT) [EC 1.11.1.6], which breaks down hydrogen peroxide formed by the action of aerobic dehydrogenases. The main function of catalase in the cell is the decomposition of hydrogen peroxide formed during the dismutation of the superoxide anion radical. CAT is present in the blood, bone marrow, mucous membrane linings, liver, and kidneys. In many tissues, including the kidneys, there are microbodies, and peroxisomes, rich in aerobic dehydrogenases and catalase. Therefore, the study of antioxidant defense enzyme activity, particularly catalase, which maintains the oxidant-antioxidant balance in the blood, is relevant.

**The aim of the study.** To determine the specific effects of salt loading in mercuric nephropathy on changes in catalase activity in the blood of rats.

**Materials and Methods.** The study was conducted on white non-linear sexually mature male rats weighing  $180\pm10$  g. The animals were kept in a vivarium with stable temperature and light conditions and divided into three groups. Intoxication with mercuric chloride was performed by subcutaneous injection of 0.1% mercuric chloride at a dose of 5 mg/kg body weight. After 72 hours of intoxication, a 3% salt load was administered; the salt load was performed 2 hours before euthanasia via a metal probe intragastrically. Two hours after loading, the animals were euthanized by decapitation under light ether anesthesia. Euthanasia was performed according to the requirements of the European Convention for the Protection of Experimental Animals (86/609 EEC). Blood was collected into tubes with heparin to obtain heparinized plasma. Catalase activity was determined in heparinized blood serum by the rate of hydrogen peroxide decomposition.

**Results.** Under the influence of abiotic factors such as toxic substances, water, or salt loading, free radicals are formed in the body. The increase in reactive oxygen species in the body leads to a shift in the oxidant-antioxidant balance in the blood of rats towards the activation of oxidative processes. As a result of the action of such strong oxidants, the body's antioxidant defense mechanism is triggered, supported by enzymatic activity, particularly catalase, which sequentially reduces  $H_2O_2$  and organic hydroperoxides, preventing the development of lipid and protein peroxidation in biomembranes. In conditions of 3% salt loading against the background of mercuric nephropathy, an increase in catalase activity by 79% was noted in the blood of rats compared to the values in the group of animals subjected only to salt loading. However, under conditions of 3% salt loading, catalase activity did not change compared to the control.

**Conclusions.** The increase in reactive oxygen species in the body leads to a shift in the oxidant-antioxidant balance in the blood of rats towards the activation of oxidative processes. Changes in catalase activity were observed in the blood of rats under conditions of 3% salt loading against the background of mercuric intoxication. Under these same conditions, the catalase activity in the blood of rats subjected to salt loading did not change compared to the control.

**Winkler I. A.**

## **INFLUENCE OF NATURAL SUCROSE SUBSTITUENTS AND PECTIN ON THE VISCOSITY AND STABILITY OF WHEAT DOUGH**

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**Introduction.** Sugar is a constituent component of various dough compositions and many other food items: pastry, beverages, and others. It is necessary to provide the sweetness of confectionery or regular dough, to maintain its nutritional value, and to keep the required value of some technological parameters such as dough viscosity and stability. The latter requirement is important in the context of dough storage and transportation, keeping organoleptic parameters of dough and pastry such as porosity, stability, friability, general shape, and appearance. Even though regular sugar is the cheapest and the most widely used sweetener, which is required for normal nutrition and functioning of the digestive system and other organs of humans, in many cases, it should be partially or completely substituted by other components because of dietary requirements, individual sucrose intolerance or other reasons.