important role in various processes such as lipid metabolism, peroxidation, gluconeogenesis, electron transfer in the respiratory chain, and also provide protection against many microorganisms and play a significant role in the regulation of blood pressure. However, a high concentration of free radicals in the cell leads to numerous damages to its components from the cell membrane to nuclei acids and proteins, which can lead to the development of serious diseases

To compare the antioxidant properties of molecules (table 1), electronic properties were calculated by the non-empirical method of the theory of the density functional B3LYP/6-31G** in water as a solvent.

Table 1

Electronic properties of Molecule 1 and Molecule 2

Properties	Molecule 1	Molecule 2
E_{HOMO} (eV)	–5,71	–5,44
E_{LUMO} (eV)	–1,36	–1,63
E_g (eV)	4,35	3,81

According to the calculations, molecule 1 – (4,6-dimethylpyrimidin-2-ylamino)(5-p-tolylisoxazol-3-yl)methanol and molecule 2 – N-(4,6-dimethylpyrimi-din-2-yl)-5-phenylisoxazole-3-carboxamide both considered to have high antioxidant activity. Molecule 1 possesses less HOMO-energy (-5,71) and that is why it is stronger than molecule 2 in electron acceptance which means first molecule has less expressed antioxidant activity. The most important property of compounds expected to be an antioxidant is the energy gap between HOMO and LUMO orbitals. The energy gap of first pyrimidine structure is 4,35 eV, and the energy gap of second compound is 3,81 eV. Thus, we can conclude that N-(4,6-dimethylpyrimi-din-2-yl)-5-phenylisoxazole-3-carboxamide has stronger antioxidant properties in comparison with (4,6-dimethylpyrimidin-2-ylamino)(5-p-tolylisoxazol-3-yl)methanol.

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CHEMILUMINESCENT ACTIVITY OF RAT PERITONEAL MACROPHAGES

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The chemiluminescence of peritoneal macrophages is a method for quantification and analysis of various macromolecules involved in oxidative stress and pathological processes in the body and accompanied by releasing of active oxygen forms and highly reactive radicals what is important for diagnosis of diseases.

Keywords: chemiluminescence, peritoneal macrophages, rat, forbol-12-myristate-13-acetate.

The most common approaches of chemiluminescence assessment are enhanced chemiluminescence with a special substance (luminol) increased the signal as a result interactions with specific forms of free radical substrates or/and induced chemiluminescence caused by the action of inductors, f.e. forbol-12-myristate-13-acetate (PMA) triggered specific metabolic cascades to the synthesis of reactive oxygen species or organic free radicals [1, 2].

The spontaneous and induced chemiluminescence was investigated in peritoneal macrophage isolated from laboratory rats (n = 10, body weight 270– 320 g) on day 5 after intraperitoneal injection of 3,0 % thioglycol medium solution in total volume of 5 ml. The collected peritoneal exudate was centrifuged at 1500 rpm for 8 minutes, cell suspension was seeded in culture medium RPMI-1640 containing 10 % fetal bovine serum, 2 mM L-glutamine, 1 % antibiotic-antimycotic ("Gibco," UK) and cultivated 2 h at 37 °C and 5 % CO_2. Attached cells were scraped off Petri dishes and their luminol-depended functional activity was assessed in the presence or absence of PMA as stimulator.

It was shown that laboratory rats developed a pattern of acute aseptic inflammation on day 5 after intraperitoneal immunization with 3 % thioglycol medium. The peritoneal exudate contained 16,8 (15,7 ÷ 38,2) × 106 cells of which 24,0 (17,0 ÷ 26,0) % cells were macrophages with typical morphology and CD68+ phenotype. The dynamic of rat peritoneal macrophages chemiluminescence is characterized with 6 different periods which are presented in figure 1. The average value of spontaneous chemiluminescence was 47,4 ± 9,2 mV while luminol-dependent chemiluminescence elevated up to 398,9 ± 22,3 mV and it was established the significant increase of parameters after PMA application – 4399 ± 64 mV, indicating the enhance of stimulated functional activity in 93 times in peritoneal macrophage. The enhancement factor of intact peritoneal macrophages luminol-dependent chemiluminescence was 2,96 (2,06÷5,09) conventional units and the stimulation coefficient reflecting change of luminal-dependent chemiluminescence in the presence of PMA corresponded to 4,32(2,97÷9,70) conventional units.

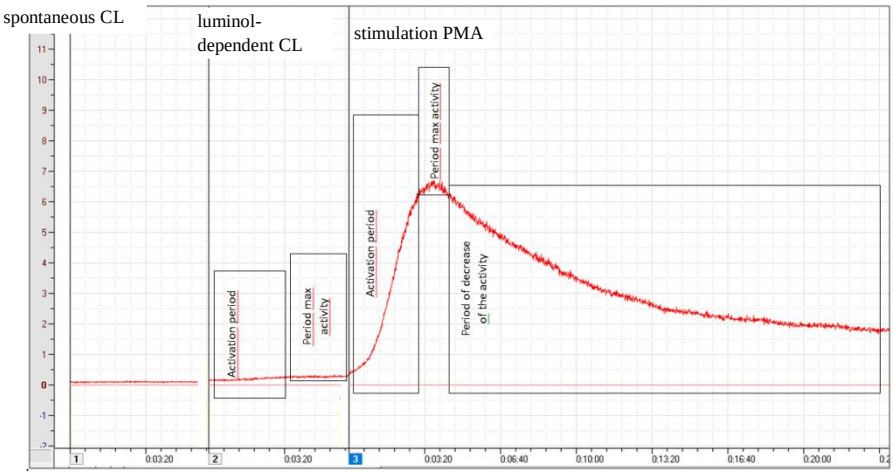

Fig. 1. − The chemiluminescence dynamic in rat peritoneal macrophages

Thus, chemiluminescence of monocytes/macrophages reflects the functional capability of cellular immune response, including phagocytosis and killing of microorganisms and represents an important tool for cell-based immunoassay, including investigation of respiratory burst.

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ANALYSIS OF CESIUM-137 ACCUMULATION IN VEGETABLES AND MILK IN MINSK REGION

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Recent research shows that in Minsk region from 1990 to 2018 the level of cesium-137 decreased in the following products: milk, potato, beet, carrot, tomato, cucumber and cabbage. The specific activity of 137Cs decreased unevenly separately for each product.

Keywords: cesium-137, vegetables, milk, Minsk region.

The relevance of the topic is due to the possibility of the migration of “Chernobyl’s” 137Cs along the food chains into the human body [1-4].

Purpose: to analyze the content of cesium-137 in vegetables and milk of Minsk region in 1990–2018 period.

The following products were studied: milk, potatoes, beets, carrots, cucumbers, tomatoes, cabbage. A comparative analysis of the statistical data on the content of cesium-137 for the period 1990-2018 was performed (Fig. 1).