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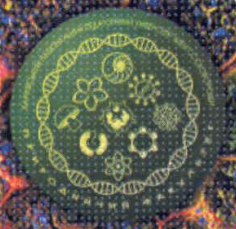

Харківський національний педагогічний університет імені Г.С.Сковороди, природничий факультет

Akademia Pomorska w Słupsku, Instytut Biologii i Ochrony Środowiska

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ПРИРОДНИЧА НАУКА І ОСВІТА: СУЧАСНИЙ СТАН І ПЕРСПЕКТИВИ РОЗВИТКУ

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ТЕЗИ ДОПОВІДЕЙ

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dough was gently washed and rinsed in water 5 times in a container of appropriate volume (while washing, the dough was constantly outturned, broken and crumpled). Wash water temperature was 20 ° C. Turbid water from the tank for washing gluten was drained through a thick silk sieve, so as not to lose pieces of the washed gluten. The pieces of gluten remaining on the sieve were attached to the washed sample. With each act of washing, the sample of gluten became more elastic and cohesive. Gluten washing was performed until the wash water was clear. The washed gluten was squeezed out between the palms several times (the palms were wiped out with a dry cloth each time). After the lump of gluten was beginning to stick to the hands, it was weighed on the scales and the result was recorded. After that, the process of washing, pressing and weighing gluten was repeated. If the result of re-weighing coincided with the first one to within 0.1 g, it meant that the gluten was washed properly. If the results did not match, the washing was repeated again.

The proof of good gluten washing was the test for iodine. 2-3 drops of water were squeezed from the washed gluten and a drop of iodine solution was added to them. The absence of blue color suggested that the gluten was completely washed off from starch. The weight of the gluten, which was weighed (in grams), was multiplied by 4. The obtained result corresponded to the mass fraction of the raw gluten contained in the flour.

Five different sorts of flour were investigated: whole grain flour, 1st sort flour, 2nd sort flour, higher sort flour and grit flour. The results are represented in the table 1.

Table 1

Percentage contents of gluten in flours

Sort of flour	Percentage contents of gluten
Whole grain flour	37.6±2.2
1st sort flour	28.4±2.9
2nd sort flour	33.5±3.0
Higher sort flour	26.4±2.7
Grit flour	36.4±3.8

As the results show, whole grain flour has the highest quantity of gluten and is the most valuable for nutrition purposes. The whole method can be recommended to perform at the conditions of school chemical laboratory.

Forsyuk O.R., Kratenko R.I.

DETERMINATION OF BLOOD CATALASE AS AN INDICATORY ENZYME OF OXIDATIVE STRESS

H.S. Skovoroda's Kharkiv National Pedagogical University, Kharkiv

Forsyuk O.R., Kratenko R.I.DETERMINATION OF BLOOD CATALASE AS AN INDICATORY ENZYME OF OXIDATIVE STRESS. Blood catalase belongs to so-called "antioxidative system", i.e. a complex of substances neutralizing free radicals and compounds yielding the latter. The research objective was to determine the activity of blood catalase in students of different groups. The first group was the control one and had non-smoker students at the beginning of their semester. The second group included medium and heavy (0.5 -1 cigarette packet a day) smokers at the

beginning of their semester. The third group involved the students of the first group, but at the period of their winter session. The forth group had the students of the second group at the period of their winter session, respectively. The determination of blood catalase activity was performed by Bach and Zubkova method, based on titration of hydrogen peroxide, remaining unsplit after the action of the enzyme, by potassium permanganate in acidic medium. The results revealed the significant increase in the activity of blood catalase in students of the second group compared with the first. The third group of students was found to have the elevation of this index too, although not so pronounced as the second group. The students of the forth group displayed decreased activity of blood catalase.

Key words: *blood catalase, indicatory enzyme, oxidative stress.*

Enzyme catalase is a heme-containing chromoprotein, which catalyzes the reaction of hydrogen peroxide breakdown. It is a common enzyme for nearly all living organisms exposed to oxygen. In human organism, this enzyme is found in all tissues and body fluids, but it is especially abundant in the stroma of the red blood cells and the liver. The biological role of catalase is the neutralization of hydrogen peroxide, an extremely reactive end product of some oxido-reductive processes. The enzyme belongs to so-called "antioxidative system", i.e. a complex of substances neutralizing free radicals and compounds yielding the latter. Blood catalase activity is proven to get changed due to stress, intoxications; drug, alcohol and nicotine abuse, obesity, pathologic processes, so it enters the group of blood indicatory enzymes in human body. Mice genetically engineered to lack catalase are initially phenotypically normal, however, they increase the likelihood of developing obesity, fatty liver, and type 2 diabetes. The research objective was to determine the activity of blood catalase in students of different groups. The first group was the control one and had non-smoker students at the beginning of their semester. The second group included medium and heavy (0.5 -1 cigarette packet a day) smokers at the beginning of their semester. The third group involved the students of the first group, but at the period of their winter session. The forth group had the students of the second group at the period of their winter session, respectively.

The determination of blood catalase activity was performed by Bach and Zubkova method, based on titration of hydrogen peroxide, remaining unsplit after the action of the enzyme, by potassium permanganate in acidic medium. Fresh blood was diluted with distilled water 1000 times. To have it done, 20-30 ml of distilled H_2O was poured into a 100 ml volumetric flask and 0.1 ml of blood was carefully added using a micropipette to the water. The micropipette was washed several times with an upper layer of water, collecting and discharging it into the flask. Then distilled water was added to the mark in the volumetric flask and the contents were mixed. 1 ml of the obtained solution contained 1 μl of blood. 7 ml of distilled water and 1 ml of blood solution were poured in two conical flasks (experimental and control). To inactivate catalase, 3 ml of 10% sulfuric acid solution was poured in the control flask. Then, in both flasks, 10 ml of 0.1% hydrogen peroxide solution was added, prepared in phosphate buffer (pH = 7.0). The contents were mixed and the flask was left for 30 minutes at room temperature, then the action of the enzyme was stopped in the experimental flask by adding 3 ml of 10% solution of H_2SO_4. The contents of the flasks were titrated from a burette with a 0.01 N solution of potassium permanganate until the appearance of non-vanishing pink color.

The results revealed the significant increase in the activity of blood catalase in students of the second group compared with the first. This may be explained by activation of antioxidant system at the response to intoxication stress by nicotine, which initiates the production of free radicals. The third group of students was found to have the elevation of this index too, although not so pronounced as the second group. This may be explained by activation of antioxidant system at the response to emotional stress, the students experience, during their examination session. The students of the forth group displayed decreased activity of blood catalase. We connect this fact with the combination of two factors affecting the organism of young people, i.e. chemical intoxication stress, evoked by nicotine action, and emotional stress, caused by preparation to and taking their credit tests and examinations. As a result their organism produces much more free radicals and free forms of oxygen which exhaust at least some links of antioxidant system. Being an erythrocyte protein, blood catalase should be the primary target to the harmful action of free radicals.

Thus, blood catalase can be referred as an indicatory enzyme, showing the activity of different factors of emotional and chemical intoxication stress in the human organism.

Kurhaluk Natalia

THERAPEUTIC EFFECTS OF MELATONIN ON THE PREVENTION OF LYSOSOMAL DESTRUCTION AND OXIDATIVE STRESS IN TISSUES OF MICE EXPOSED TO ACUTE ETHANOL INTOXICATION

Pomeranian University in Slupsk, Poland
e-mail: natalia.kurhaluk@apsl.edu.pl

Kurhaluk Natalia THERAPEUTIC EFFECTS OF MELATONIN ON THE PREVENTION OF LYSOSOMAL DESTRUCTION AND OXIDATIVE STRESS IN TISSUES OF MICE EXPOSED TO ACUTE ETHANOL INTOXICATION. Oxidative stress induced by acute ethanol intoxication leads to structural and functional impairment that is more prominent in kidneys than in liver. The increased LPO and decreased total antioxidant status suggest damage in intracellular membranes integrity, which can potentially result in irreversible tissue damage. Melatonin prevents lysosomal destruction in liver tissue and, to a greater extent, in the kidney during ethanol intoxication by limiting the increased activity of lysosomal enzymes and the resulting oxidative stress.

Key words: *melatonin, acute ethanol intoxication alanyl aminopeptidase, leucyl aminopeptidase, β-N-acetylglucosaminidase, acid phosphatase, β-glucuronidase, β-galactosidase, β-glucosidase, oxidative stress, lipid peroxidation.*

Lysosomes are involved in digestion of intra- and extracellular material, plasma membrane repair, cholesterol homeostasis, and cell death modes such as apoptosis or necrosis, Ca^{2+} homeostasis, and immune response [1]. Lysosomes take part in the onset and course of many diseases, including lysosomal storage disorders, cancer, cardiovascular diseases, and alcohol toxicity [2]. Lysosomal enzymes are often used to estimate the interrelationship between intensified inflammation states caused by alcohol abuse, oxidative stress, and tissue damage. For example, lysosomal enzymes may be used as markers differentiating alcohol-related pancreatitis from other forms of acute