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«БУКОВИНСЬКИЙ ДЕРЖАВНИЙ МЕДИЧНИЙ УНІВЕРСИТЕТ»

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Матеріали 101 – ї підсумкової наукової конференції професорсько-викладацького персоналу вищого державного навчального закладу України «Буковинський державний медичний університет» (м. Чернівці, 10, 12, 17 лютого 2020 р.) – Чернівці: Медуніверситет, 2020. – 488 с. іл.

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У збірнику представлені матеріали 101 – ї підсумкової наукової конференції професорсько-викладацького персоналу вищого державного навчального закладу України «Буковинський державний медичний університет» (м.Чернівці, 10, 12, 17 лютого 2020 р.) із стилістикою та орфографією у авторській редакції. Публікації присвячені актуальним проблемам фундаментальної, теоретичної та клінічної медицини.

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Using 2D diagram and this equation we can theoretically predict PL properties of the $AgInS_2$ QDs and we can choose the composition of reaction mixture and synthesize Ag-In-S/ZnS quantum dots with estimated peak position.

Table

The composition of 15 reaction mixtures of triangle ABC for the synthesis of Ag-In-S nanoparticles and corresponding λ_{exp} values of the PL peak position

Sample number	Percent composition, %			Volume, ml			λ_{exp}
	x2	x3	x1	$AgNO_3$	$InCl_3$	Na_2S	
1	1	0	0	0,675	1,350	0,675	672
2	0,75	0	0,25	0,574	1,552	0,573	677
3	0,5	0	0,5	0,472	1,755	0,472	650
4	0,25	0	0,75	0,371	1,957	0,371	637
5	0	0	1	0,270	2,160	0,270	742
6	0	0,25	0,75	0,270	1,957	0,472	596
7	0	0,5	0,5	0,270	1,755	0,675	600
8	0	0,75	0,25	0,270	1,552	0,877	582
9	0	1	0	0,270	1,350	1,080	597
10	0,25	0,75	0	0,371	1,350	0,978	613
11	0,5	0,5	0	0,472	1,350	0,877	624
12	0,75	0,25	0	0,573	1,350	0,776	639
13	0,5	0,25	0,25	0,472	1,552	0,675	628
14	0,25	0,25	0,5	0,371	1,755	0,573	612
15	0,25	0,5	0,25	0,371	1,552	0,776	612

Velyka A. Ya

OXIDATIVE MODIFICATION OF PROTEINS UNDER WATER AND SALT STRESS ASSOCIATED WITH THE $HgCl_2$ NEPHROPATHY

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Mercury chloride is a xenobiotic with a wide range of toxicity which affects various organs and systems, but the kidney is among those suffering the most of this kind of intoxication. That is why it is important to carry out wide investigations of its toxicity mechanism, effect on different organs and tissues, and changes caused by this toxic agent alone or in combination with other aggravating or mitigating conditions.

The kidney is a vital organ of human and animals, which is responsible for maintenance of the water-electrolyte balance, acid-base and osmotic homeostasis. This organ is capable of providing highly selective excretion of water and various ions to maintain the stable content of the internal biological liquids. There is a dynamic balance between pro- and antioxidants in the tissues and organs of living organism, which can be disturbed by oxidative stresses and shifted towards more active formation of the free radicals. They contribute to oxidation of the macromolecules resulting in some disorders in the cell membranes structure and functioning.

Our experiments were conducted on white nonlinear male adult rats with weight 180±10 g. The animals were kept in the vivarium at stable temperature and illumination and subdivided into eight groups. The water and salt stress were delivered via the metal endogastric probe 2 hours before euthanasia. The euthanasia was realized by decapitation under brief ether narcosis according to the European Convention for the Protection of Vertebrate Animals used for Experimental and other Scientific Purposes (ETC 123). The kidneys were taken out of the decapitated rats as soon as possible, dried by the filter paper and separated into three parts: cortex, medullar and papilla. Then the 5 % supernatant solution was prepared from renal tissue using the 50 mM tris-HCl buffer solution (pH=7.4) containing 0.1 % solution of Trilon B by centrifugation at 900 g for 10 min. All these operations were performed at the temperature below 4 ^{0}C. Afterwards, the free radical oxidation conditions for lipids and proteins were determined in the post-nuclear supernatants by the content of TBA-RP and the oxide-modified proteins products (OMP-P). The R/B coefficient

representing a ratio between the red (R, acidic proteins) and blue (B, basic proteins) cytoplasm staining was used to characterize a degree of the oxidative modification of proteins. A content of TBA-RP in the morning samples of kidney tissues changes under both water and salt stress while contents of OMP-P remain almost unchanged. Regardless of the sampling time, both types of the stress cause moderate changes in the depth of oxidative modification of proteins. Injection of mercury chloride followed by water and/or salt stress results in activation of the free-radical oxidation of proteins because of damage to the cell membranes. A value of the oxide proteins modification index can bring important information related to pathogenesis and histology of the kidney tissues. In general, it can be concluded that only moderate and reversible morphological changes were found in the kidney tissues underwent 5 % water and 3 % salt stress while no morphological changes were found in the tissues after 0.75 % salt stress. These morphological changes are in good agreement with histochemical data of the oxidative modification of proteins.

Classical necrotic nephrosis has been found in the animals after the mercury chloride intoxication. The nephrosis symptoms were more severe at 8 pm comparing to those at 8 am. Besides, the nephrosis symptoms were relieved by the water stress while 3 % salt stress caused worsening of the kidney tissue injury especially in case of the 8 pm results. No significant changes in the nephrosis symptoms were found after an additional 0.75 % salt load. These results are also in good agreement with the histochemical data related to oxidative modification of proteins. Therefore, it can be concluded that the water stress can provide some relieving effect on the mercury chloride nephrosis while the salt stress results in further aggravation of its symptoms.

Winkler I. A.

GAS-CHROMATOGRAPHY RESPONSES OF '646' AND '647' SOLVENTS AT FORENSIC ANALYSIS OF BLOOD FOR ALCOHOL CONTENT

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Determination of alcohols is a routine part of forensic investigations. Using gas chromatography (GC), the alcohols contents can be determined up to the tenth of pro mille. According to the officially approved lab method, the sample that may consist of some traces of alcohols should be treated with trichloroacetic acid and then with the solution of potassium nitrite. As a result, nitrous acid is formed and then it interacts with the alcohols immediately after formation, transforming them into the corresponding nitrite ethers. All these reactions should be performed in a tightly capped vessel to keep the just-formed alkyl nitrites inside. The ethers are highly volatile so, they evaporate actively and a probe taken from the gas section of the vessel will contain a mixture of the ethers composed by the alcohols present in the sample. Being injected into a GC, they will manifest themselves by the corresponding analytical peaks.

There are multicomponent organic solvents available on market under commercial brand names "646" and "647." These mixtures are used widely in the construction and repair practices for cleaning surfaces before painting and/or for thinning paints. Insufficient ventilation of the working area or failure to keep the necessary time pause between the completion of the painting works and the beginning of regular usage of the just-painted items or rooms may cause inhalation of the solvent components followed by more or less severe intoxication. Such accidents are reported regularly in many countries. It is necessary to clarify how these solvents can manifest themselves in the samples during the regular identification of alcohols and, in case any components actually provide some GC responses, which of them do they correspond to. In order to investigate this issue, the regular mixture of eight alcohols (from methanol to amyl alcohol) has been used to obtain the reference chromatogram and then some amount of each solvent was added to the mixture. The chromatograms obtained after 'poisoning' of the mixture with the solvents has been compared with the reference one for identification of possible changes and/or extra peaks present at the former records. No extra peaks appeared in the chromatograms but some obvious changes were registered for analytical responses of all low molecular (methanol-propanol) alcohols (Table).