

**МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ  
БУКОВИНСЬКИЙ ДЕРЖАВНИЙ МЕДИЧНИЙ УНІВЕРСИТЕТ»**



## **МАТЕРІАЛИ**

**105-ї підсумкової науково-практичної конференції  
з міжнародною участю  
професорсько-викладацького персоналу  
БУКОВИНСЬКОГО ДЕРЖАВНОГО МЕДИЧНОГО УНІВЕРСИТЕТУ  
присвяченої 80-річчю БДМУ  
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Матеріали підсумкової 105-ї науково-практичної конференції з міжнародною участю професорсько-викладацького персоналу Буковинського державного медичного університету, присвяченої 80-річчю БДМУ (м. Чернівці, 05, 07, 12 лютого 2024 р.) – Чернівці: Медуніверситет, 2024. – 477 с. іл.

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У збірнику представлені матеріали 105-ї підсумкової науково-практичної конференції з міжнародною участю професорсько-викладацького персоналу Буковинського державного медичного університету, присвяченої 80-річчю БДМУ (м. Чернівці, 05, 07, 12 лютого 2024 р.) із стилістикою та орфографією у авторській редакції. Публікації присвячені актуальним проблемам фундаментальної, теоретичної та клінічної медицини.

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rate (GFR) was estimated by the clearance of endogenous creatinine, which was calculated according to the formula:  $C_{cr} = U_{cr} \cdot V/P_{cr}$ , where  $U_{cr}$  and  $P_{cr}$  are the concentrations of creatinine in urine and plasma, respectively.

**Results.** The studies showed that under conditions of spontaneous diuresis and water loading, there was 13% increase in the value of diuresis itself compared to the control. There was observed 50% increase in the rate of glomerular filtration in rats against the background of water loading compared to the control. With salt loading, there was 26% increase in GFR relative to control by 30%, respectively. At the same time, with water loading, the index of water reabsorption remained within the normal range, and the concentration of creatinine in urine slightly decreased. No changes were observed in the excretion of potassium ions with urine compared with the control against the background of water loading. There were no significant changes in protein concentration, which indicated that water loading didn't cause significant disturbances in the function of the renal glomerular apparatus. Under salt loading, changes in the excretory function of the kidneys were somewhat pronounced, which manifested itself in an increase in diuresis by about 1.1 times compared to the control. Diuresis increased due to an increase in the rate of glomerular filtration, which increased by 1.2 times, due to an increase in the clearance of endogenous creatinine during salt loading. The concentration and excretion of potassium ions increased significantly compared to the control only at salt loading by 1.4 times. Salt loading also increased protein concentration by 2.5 times.

**Conclusions.** Water loading was found to lead to an increase in diuresis as a result of an increase in GFR. The increase in the concentration and excretion of sodium was primarily a consequence of a decrease in its tubular reabsorption. Although at the same time, considering the changes in creatinine excretion and in the calculations of tubular filtration in animals administered with sodium chloride, there was also an increase in tubular filtration with a simultaneous increase in filtration charge of sodium.

**Winkler I.A.**

## **COAL-BASED MINERAL MIXTURES AS DECONTAMINATION AGENTS FOR LOW-TONNAGE WASTEWATER DISCHARGES**

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**Introduction.** A significant part of the total water contamination comes from various low-capacity sources such as isolated local drainage systems, car filling, washing and service stations, and other objects not connected to the centralized sewage system. The impact of each such facility may not be serious as it does not produce a significant amount of pollution, but when several of them discharge their waste/drainage water into the same small river or stream, the cumulative effect can be devastating. Small rivers bring pollutions to the larger rivers they merge with and, as the transport network develops, this problem becomes more and more acute.

**The aim of the study.** To check the efficiency of a 4:1 mixture of coal sludge and technical pyrocarbon to be used as an adsorbent in the decontamination of low-scale wastewater discharges from small car filling/washing/service facilities.

**Materials and methods.** The investigation was done with the surface water samples taken from a small river of Kalichanka near its confluence with a larger river of Prut and from the Prut within the city limits of Chernivtsi, Ukraine. All the samples were taken in the dry weather from the surface water in such a way as to avoid their additional pollution with the river mud and other similar materials. The sludge with an ash content of 43.1 % and a moisture content of 15.3 % obtained after refining the "T" brand coal was used as a mosaic surface (hydrophilic/hydrophobic areas) component, and technical pyrocarbon with an ash content of 28 % and a moisture content of 1.6 % obtained after pyrolysis of mixed polymer waste was used as a hydrophobic component of the adsorption composition. The component's (sludge/pyrocarbon) mass content in the mixture was 4:1.

**Results.** Results of the flow decontamination of water are shown in the Table below. They embrace only the first three liters because no changes in the water absorbance and COD were determined after passing three liters through the filtration cartridge. It can be seen that this water cleaning method is effective in the elimination of petrochemical water pollution agents. COD decreases by eight times, and absorbance drops by six times. It means that about 85 % of the petrochemical pollution is extracted from treated wastewater.

Table.

Effectiveness of wastewater treatment by the coal sludge/pyrocarbon cartridges

Adsorbing mixture	Absorbance				COD, mg O <sub>2</sub> /L			
	Raw water	1 L	2 L	3 L	Raw water	1 L	2 L	3 L
Coal sludge/pyrocarbon	1.2	0.2	0.21	0.21	3250	420	440	450

The water decontamination performance of the cartridges slightly degrades as wastewater passes through – mostly in the context of COD. However, within the amount of water used in this investigation, this degradation is not crucial and does not exceed 10 % of the initial water cleaning effectiveness. The suspended particle elimination ratio remains almost stable. This parameter depends mostly on the mechanical fixation of the suspended pollution inside the adsorbent layer, which has a much higher filtration capacity than its adsorption capacity, which is important for the elimination of dissolved petrochemicals.

**Conclusion.** A 4:1 mixture of the “T” brand coal refining sludge and technical pyrocarbon proved its effectiveness in the decontamination of wastewater from petrochemical pollutants and mixed mechanical suspensions. Up to 85 % of petrochemicals can be extracted from the aqueous phase by filtration of the regular car filling/service station’s wastewater through a cartridge filled with this mixture. The water decontamination performance of a cartridge filled with 4 kg of adsorbing mixture should remain sufficient for at least one month. Then the waste adsorbent can be utilized by adding to the solid coal-based fuel mixtures for thermal power stations or other similar facilities.

**Yuzkova V.D.**

## DIFFERENT APPROACHES TO ANIONS CLASSIFICATION IN QUALITATIVE ANALYSIS

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**Introduction.** Commonly used in Ukraine classification of anions into analytical groups is based on solubility of their Ag<sup>+</sup> and Ba<sup>2+</sup> salts (the 1<sup>st</sup> group – anions whose Ba<sup>2+</sup> salts are insoluble, the 2<sup>nd</sup> - Ag<sup>+</sup> salts are insoluble, and the 3<sup>rd</sup> group – Ba<sup>2+</sup> and Ag<sup>+</sup> salts are soluble).

**The aim of the study.** Investigate classifications of anions used in the countries bordering with Ukraine, find the most popular classifications in the world and approaches they are based on.

**Material and methods.** Literature search, data extraction, analysis and systematisation.

**Results.** Different countries have various generally accepted approaches to anions classifications and the one used in Ukraine can hardly be considered as the most common.

18 countries have been chosen for the research – all neighbouring countries of Ukraine and some other countries throughout the world. It was found that Slovakia, Moldova, Russian Federation, Belarus were found to use completely the same classification as Ukraine does. Polish classification is somewhat similar to ours as it’s also based on their behaviour against Ag<sup>+</sup> and Ba<sup>2+</sup> salts, but the number of groups is significantly bigger – 7 groups are distinguished. Romanian chemists divide anions into 6 groups and classification is based on solubility of their Ag<sup>+</sup> and Ba<sup>2+</sup> salts as well.

In Hungary, Turkey, Qatar anions are divided into 4 groups: 1<sup>st</sup> group contains anions of unstable or/and volatile acids (CO<sub>3</sub><sup>2-</sup>, SO<sub>3</sub><sup>2-</sup>, S<sub>2</sub>O<sub>3</sub><sup>2-</sup>, S<sup>2-</sup>, SiO<sub>3</sub><sup>2-</sup>, ClO<sup>-</sup>), group reagent is HCl; 2<sup>nd</sup> group includes anions producing insoluble salts with Ba<sup>2+</sup> (SO<sub>4</sub><sup>2-</sup>, PO<sub>4</sub><sup>3-</sup>, BO<sub>3</sub><sup>3-</sup>, F<sup>-</sup>, BrO<sub>3</sub><sup>-</sup>, IO<sub>3</sub><sup>-</sup>); 3<sup>rd</sup> group anions are Cl<sup>-</sup>, Br<sup>-</sup>, I<sup>-</sup>, CN<sup>-</sup>, SCN<sup>-</sup>, precipitated by Ag<sup>+</sup>, and 4<sup>th</sup> group comprises NO<sub>2</sub><sup>-</sup>, NO<sub>3</sub><sup>-</sup>,