

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



МАТЕРІАЛИ

**104-ї підсумкової науково-практичної конференції
з міжнародною участю
професорсько-викладацького персоналу
БУКОВИНСЬКОГО ДЕРЖАВНОГО МЕДИЧНОГО УНІВЕРСИТЕТУ
06, 08, 13 лютого 2023 року**

Конференція внесена до Реєстру заходів безперервного професійного розвитку,
які проводитимуться у 2023 році №5500074

Чернівці – 2023

commonly found in dry grasslands and sandy or stony places from Eurasian areas. It is known in the traditional medicine for its use in cases of biliary and respiratory tract diseases (Dudova 2018).

The aim of the study. Thus, the aim of this study was to validate the chromatographic method for detection of phenols.

Materials and methods. Aerial parts of the *Antennaria dioica* Gaertn were harvested in Western Ukraine, region (48 13 23.2 N, 25 11 42.0 E), during a mass flowering period in 2019. The raw materials were then dried, crushed and stored according to the general Good Agricultural and Collection Practice (GACP) requirements (WHO 2003). Plants were authenticated by Professor Svitlana Marchyshyn, Department of Pharmacognosy with Medical Botany, Ivan Horbachevsky Ternopil National Medical University, Ternopil, Ukraine. A voucher specimen No. 189. is kept in department herbarium for future record.

Results. The chromatographic method was validated by evaluating linearity range, precision, repeatability, accuracy, LOD and LOQ. The linearity of the method was evaluated by studying its ability to obtain an analyte response linearly proportional to its concentration in a given range. To determine that parameter, calibration curves were generated by injection in triplicate of standard solutions at six concentration levels and their correlation coefficients were calculated. The linearity of HPLC-DAD method was effective, since R² were in the range of 0.997–0.999. The precision of the method was evaluated by injecting three times the same sample spiked with three levels of concentration (covering the specific range for each compound) during three consequent days. Repeatability was calculated by analysing three times the same sample. Both parameters were evaluated by RSDs that were in the range of 0.38% – 2.79% for inter-day precision and were from 0.39% to 1.92 for intra-day precision. The accuracy of HPLC-DAD method was evaluated by the recovery test. In this way, three samples, previously analyzed, were spiked at three concentration levels of the target compounds and were injected by triplicate. The recoveries of all compounds ranged between 97.12% and 106.10%.

Conclusions. The method was validated in terms of linearity, precision, repeatability, accuracy, LOD and LOQ. HPLC-DAD assay of phenols found that *A. dioica* represent important sources of bioactive compounds with a wide range of pharmacological activities. Two flavones were identified – luteolin, apigenin; flavonol – quercetin and three its glycosides – rutin, hyperoside and isoquercitrin; coumarin and umbelliferone – hydroxycoumarin; five hydroxycinnamic acids – chlorogenic, caffeic, *p*-coumaric, *trans*-ferulic and rosmarinic acid in *A. dioica* herb. The quantitative detection showed that the main hydroxycinnamic acids were rosmarinic and chlorogenic acids, their contents were $944.1 \pm 0.22 \mu\text{g/g}$ and $793.5 \pm 0.19 \mu\text{g/g}$, respectively. Regarding flavonoids, the largest amounts were of isoquercitrin ($164.5 \pm 0.17 \mu\text{g/g}$) and luteolin ($126.4 \pm 0.18 \mu\text{g/g}$).

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MORPHOLOGICAL CHANGES OF KIDNEY TISSUE WHEN USING HEPAVAL IN ISCHEMIA-REPERFUSION ACUTE KIDNEY INJURY

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Introduction. Ischemia-reperfusion injury, which is usually caused by trauma, sepsis, kidney transplantation, exposure to toxic substances, primarily affects the structure and function of the cells of the tubular epithelium, which is accompanied by microcirculation dysfunction, the development of hypoxia, oxidative stress and inflammatory reactions, which further leads to necrosis and apoptosis of nephrocytes. The pharmacotherapy of I/R AKI includes agents capable of preventing the occurrence of irreversible morphofunctional changes, as well as exhibiting antioxidant and anti-inflammatory activity. A hepatoprotector with antioxidant and detoxifying properties – Hepaval, became the drug of choice for the correction of morphological changes in I/R AKI.

The aim of the study was to examine morphological changes of kidney tissues at the correction with exogenous glutathione (Hehaval) in the experimental model of I/R AKI.

Material and methods. Research was conducted on 21 mature non-linear white rats weighting 130-180 g, randomly divided into 3 groups (n = 7): I group – control (pseudooperated animals), II group – modeling of ischemia-reperfusion kidney injury, III group –administration of Hehaval (Hepaval, Valartyn Pharma, Ukraine) at a dose of 30 mg/kg. prior to I/R AKI modeling. Histological examination was conducted by hematoxylin and eosin staining of kidney tissue sections.

Results. The analysis of kidney histosections of rats in the pathology group allowed us to establish significant morphopathological changes in the structure of the kidneys in the form of necrosis and dystrophy. In the kidneys of animals of the model pathology group, changes cover 89.1% of tubular epithelium cells, 10.4% of them are in the state of coagulation necrosis, and the rest are nephrocytes with signs of dystrophic changes of various damage degrees. Thus, 75% of epitheliocytes are characterized by dystrophy in the form of hydropic swelling, and 3.7% of cells are with signs of hydropic vacuolization. Pronounced changes are also present in the medulla renalis, where the expansion of the lumens of the collecting tubules is revealed, while 6.7% are filled with hyaline cylinders. There are areas with haemorrhages. In the Hepaval group, the histostructure of the kidneys approached to the control group. There were no practically necrotized epitheliocytes, and the number of affected nephrocytes was 64.2%, among which 60.3% of cells were in the state of hydropic swelling, and 3.9% - with signs of hydropic vacuolization. The collecting tubules of the medulla renalis are slightly expanded, and single hyaline cylinders are found.

Conclusions. The results of the study confirm the presence of nephroprotective activity in Hepaval in ischemia-reperfusion kidney injury, which, accordingly, was verified by the data of histological studies, giving a background for further research of its nephroprotective potential in conditions of AKI of different etiology.

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PROSPECTS FOR THE USE OF PHYTOPREPARATIONS IN THE TREATMENT OF TYPE 2 DIABETES

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Introduction. Diabetes mellitus type 2 is a chronic endocrine disease characterized by persistently elevated blood glucose levels and impaired insulin tolerance. Diabetes mellitus type 2 counts for 90-95% of all reported cases of diabetes. Given the global pandemic situation, patients with diabetes should be diagnosed and treated as soon as possible, as the risk of developing COVID-19 in such patients is much higher. This risk can be reduced, but not completely eliminated, by maintaining good glycemic control and treating diabetes on time and correctly.

The aim of the research is to determine the future of phytodrugs and the rational combination of medicinal plants in phytodrugs used in the treatment of type 2 diabetes.

Materials and methods. The extracts of *Taraxacum officinale* roots and rhizomes and *Inula helenium* rhizomes were used in the study. Arphasetin, a registered and permitted medicinal herbal preparation with evidenced sugar-reducing activity, was used as a comparison drug.

Results. In contrast to synthetic drugs, phytodrugs have a mild physiological effect on the body, the effect of which develops gradually but steadily, without any side effects and contraindications, have relatively low toxicity and high efficiency due to a complex of natural biologically active substances, which allows safe administration and long-term use of phytodrugs for type 2 diabetes prevention and treatment. A number of plants with hypoglycemic action can be used for diabetes treatment and as an adjunct to maintenance therapy. As a result of the presence of stevioside, *Stevia rebaudiana* has a beneficial effect on patients with type 2 diabetes. The pharmaceutical market is represented by the following drugs: "Stevia leaves," "Stevia extract," "Stevia syrup," and "Stevioside," which are used as hypoglycemics, sedatives, tonics, and weight