

ABSTRACT&REFERENCES

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INVESTIGATION OF FOOD SUPPLEMENTS WITH PRESERVATIVE E211 (SODIUM BENZOATE) USING THIN-LAYER CHROMATOGRAPHY

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Sodium benzoate is often chosen for the manufacture of liquid food supplements as preservative due to its antimicrobial effect against a large number of microorganisms. Permissible sodium benzoate amount in liquid food supplements is up to 2000 mg/l.

Methods. For investigation six liquid food supplements, containing sodium benzoate were randomly chosen. Analysis was performed using CAMAG Twin Chamber, TLC Silica Gel 60 F254 glass plates, solvent system (chloroform – ethanol 9:1) and the UV-light (254 nm) for visualization.

Results. Methods for visualisation and solvent system were selected using the reference solutions. Sodium benzoate was identified by $R_f=0.76$, it's quantity was determined by calibration. Validated methodics was adapted for identification of sodium benzoate in liquid food supplements. The amount of sodium benzoate in all investigated objects was analysed and did not exceed the permissible amount.

Conclusions. Selected methodics are suitable for qualitative and quantitative evaluation of sodium benzoate in liquid food supplements

Keywords: thin-layer chromatography, food supplements, sodium benzoate, qualitative and quantitative determination

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PHARMACOECONOMIC ANALYSIS OF THE USE OF RAMIPRIL AND CANDESARTAN IN PATIENTS WITH ARTERIAL HYPERTENSION

p. 8-13

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Arterial hypertension (AH) is the most common cardiovascular disease in the world and is the cause of disability of the population of the developed countries of the world. A feature of hypertension pharmacotherapy is a lifelong intake of medications. Indicators of economic evaluation of the effectiveness of different methods of treatment contribute to the selection of pharmacotherapy, which will provide the patient with the highest effectiveness of treatment, taking into account the financial capabilities of a particular patient. The main objectives of antihypertensive therapy is to achieve the target level of blood pressure (BP), the protection of target organs and a positive impact on risk factors for cardiovascular complications. The "cost-effectiveness" method makes it possible to compare costs with the same therapeutic effectiveness, which was the purpose of our study.

Materials and methods. 100 protocols of medical cards of inpatients were studied. Two groups of patients were isolated: the first group for the treatment of AH received candesartan, and the second group – ramipril. The parameters were taken into account: achievement of target blood pressure, as well as possible complications of drug therapy – hypotension, cough, angioedema. To assess the cost of treatment against the background of the use of ramipril and candesartan, a "cost-effectiveness" pharmaco-economic analysis was carried out.

Results of the study. Using the "cost-effectiveness" method, an analysis of ramipril and candesartan was carried out. The minimum, average and maximum costs of a single, daily, and course dose were calculated and the cost of BP normalization was calculated. The data obtained by us indicate a lower cost of treatment with ramipril. Analysis of the effectiveness of the drugs showed that ramipril is more effective in achieving the target blood pressure, but the percentage of side effects among which heart failure and cough were significantly higher. The data obtained indicate a high therapeutic efficacy of candesartan and ramipril, which allows us to draw conclusions.

Conclusions. The most effective in achieving target BP was ramipril than candesartan. Analysis of the efficacy of drugs has established that ramipril has side effects and causes cough and heart failure, and candesartan can cause angioedema and hypotension. In analyzing the direct costs of treating hypertension, based on current standards of medical care for patients with AH, it was found that the least expensive is the treatment with ramipril. The analysis "cost-effectiveness", showed that ramipril possesses the greatest pharmaco-economic advantage

Keywords: Arterial hypertension, candesartan, ramipril, pharmaco-economic analysis, antihypertensive drugs, cost-effectiveness

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INFLUENCE OF EXTRACT OF PEACH ORDINARY (PERSICA VULGARIS) LEAVES ON THE STATE OF THYMIC-LYMPHATIC ELEMENT OF THE IMMUNE SYSTEM OF RATS IN CONDITIONS OF CHRONIC IMMOBILIZATION STRESS

p. 13-18

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The aim – study of the influence of thick extract of peach ordinary (*Persica vulgaris*) leaves (TEPL) on the state of thymic-lymphatic element of the immune system of rats in conditions of chronic immobilization stress.

Materials and methods. The model of chronic immobilization stress was reproduced for 18 days by daily four hour immobilization of rats in tight box. Investigated TEPL, which was obtained at the Department of Chemistry of Natural Compounds of National University of Pharmacy from peach leaves of the *Salve* variety harvested in Tajikistan was administered intragastrically in a conditionally effective dose of 100 mg/kg. Reference drug the syrup «Immuno-Ton» was used in a dose of 3 ml/kg. The state of thymic-lymphatic element of the immune system in conditions of chronic immobilization stress was determined

after the euthanasia of animals under mild inhalation anesthesia by the results of the study of the coefficients of thymus and spleen mass and histological studies on micropreparations, which were prepared according to the generally accepted method. To assess the nature of the effect of the TEPL on the condition of the organs of the rat thymic-lymphatic system under chronic immobilization stress conditions, a comparison was made with intact control and control pathology.

Results. It was determined that chronic immobilization stress had suppressive effect on the thymic-lymphatic element of the immune system. An increase in the width of the marginal zone of lymphoid follicles and muft and the number of perivascular lymphatic clusters 1.2 times ($p < 0.05$) compared with control pathology, reduction of signs of stressful hypoxia - the number of structures of white pulp with spasm of the central arteries was noted in the spleen. Reducing the degree of change from the third to fourth phase to the first phase of the accident transformation is set in the thymus, which is confirmed by an increase in the mass of the thymus mass by 2.7 % in comparison with the control pathology.

Conclusions. The ability of TEPL to restore impaired activity of organs of thymic-lymphatic element of the immune system has been proved. It is likely, that polyphenolic compounds of TEPL exhibit antioxidant properties, enhancing the activity of the antioxidant system, and polysaccharides exhibit immunostimulative properties, the result of which is a stressprotective action. The effectiveness of TEPL was not inferior to the reference drug «Immuno-Ton»

Keywords: thick extract peach ordinary leaves, chronic immobilization stress, thymus, spleen, stress-protective effect

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SYNTHESIS, PHYSICAL AND CHEMICAL PROPERTIES AND ANXIOLYTIC ACTIVITY OF 2-((4-(R-ARYLIDENAMINO)-5-METHYL-4H-1,2,4-TRIAZOLE-3-YL)THIO)ACETIC ACIDS AND THEIR SALTS

p. 19-25

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It is estimated that 50% of all molecules of medicinal products used in drug therapy are administered as salts. This fact indicates that formation of a medicinal substance salt is an important stage in the development of a medicinal remedy.

Therefore, we believe that the combinatorial synthesis of organic and inorganic salts of derivatives of 1,2,4-triazole has not only theoretical but also practical significance.

The aim of the work is to synthesize and establish the structure of new 2-((4-(R-arylidenamino)-5-methyl-4H-1,2,4-triazole-3-yl)thio)acetic acids and their salts, where R is 2H, 4-dimethylaminobenzyliden, 2-hydroxybenzyliden, 4-hydroxybenzyliden, 4-nitrobenzyliden and their anxiolytic activity.

Materials and methods of research. The physical and chemical properties of the obtained compounds were examined according to the methods presented in the State Pharmacopoeia of Ukraine. The melting temperature was determined on an automatic melting device OptiMelt Stanford Research Systems MPA100 (US production). The elemental composition of the compounds was installed on the elemental analyzer Elementar Vario EL cube (CHNS) (standard – sulfanilamide). Chromatographic mass spectral studies were performed on a gas-liquid chromatograph Agilent 1260 Infinity HPLC equipped with an Agilent 6120 mass spectrometer (ionization in an electrical spray (ESI), 1H NMR spectra were recorded on a Mercury 400 spectrometer, DMSO-D6 solvent, internal standard – tetramethylsilane.

Anxiogenic and anxiolytic activities of the studied compounds in the S. Pellow test.

Research results. 4-(R-arylidenamino)-5-methyl-4H-1,2,4-triazole-3-thiols were taken as initial materials, where R was 2H, 4-dimethylaminobenzyliden, 2-hydroxybenzyliden, 4-hydroxybenzyliden, 4-nitrobenzyliden.

Synthesis of 4-(R-arylidenamino)-5-methyl-4H-1,2,4-triazole-3-thiols, where R was 4-dimethylaminobenzyliden, 2-hydroxybenzyliden, 4-hydroxybenzyliden, 4-nitrobenzyliden, was conducted by adding aromatic aldehyde (4-dimethylaminobenzaldehyde, 2-hydroxybenzaldehyde, 4-hydroxybenzaldehyde, 4-nitrobenzaldehyde) to 4-amino-5-methyl-4H-1,2,4-triazole-3-thiol in acetate acid and heated to dissolution of sediment.

The preparation of 2-((4-(R-arylidenamino)-5-methyl-4H-1,2,4-triazole-3-yl)thio)acetic acids was carried out by adding an aromatic aldehyde to an equivalent amount of 2-((4-amino)-5-methyl-4H-1,2,4-triazole-3-yl)thio)acetic acid in acetic acid medium when heated.

Conclusions. A series of new 2-((4-(R-arylidenamino)-5-methyl-4H-1,2,4-triazole-3-yl)thio)acetic acids were synthesized. The structure of synthesized compounds was established using modern physical and chemical methods of analysis. Some physical and chemical properties of the obtained substances were researched

Keywords: 1,2,4-triazole, 1H NMR, synthesis, heterocyclic compounds

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IDENTIFICATION AND COMPONENT ANALYSIS OF TRITERPENOIDS IN *MONARDA FISTULOSA* L. AND *OCIMUM AMERICANUM* L. (Lamiaceae) AERIAL PARTS

p. 26-31

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Despite the progress in the creation of synthetic drugs, herbal medicines do not lose their relevance nowadays. Triterpenoids are quite common in the plant world and exhibit a wide range of biological activity. Medicinal plants of the Lamiaceae family can accumulate mainly pentacyclic triterpenoids which demonstrate the anti-inflammatory, antioxidant, hepatoprotective, anticancer and antimicrobial properties. Nowadays a number of new, poorly-studied species of the family have been introduced in Ukraine, including Monarda fistulosa L. and Ocimum americanum L.

The aim of this study was to identify the triterpenoids and to analyze the contents of their components in ethanolic extracts of M. fistulosa and O. americanum (Lamiaceae) aerial parts under the condition of their farming in West Podillya (Ukraine).

Methods: foam test, sedimentation and color reaction were used to determine the presence of triterpenoids in plant material; high-performance liquid chromatography (HPLC) method was used to determine their components' content; determination was carried out on a liquid chromatograph Shimadzu LC 20 Prominence.

Results. The presence of triterpenoids in M. fistulosa and O. americanum ethanolic extracts was proved by the reactions of identification and HPLC. Effective extraction of triterpene compounds from the investigated plants was achieved using 96 % and 70 % ethanol. The comparative HPLC-analysis showed significant differences in content of ursolic, euscaphic, tormentic and oleanolic acids, betulin and lupeol in the aerial parts of investigated species. The most abundant components of M. fistulosa and O. americanum herbs were the ursolic and euscaphic acids.

Conclusions: It was identified the presence and evaluated the contents of 6 triterpenoids in M. fistulosa and O. americanum aerial parts. The obtained data can be used in the planning of pharmacological studies and in the chemotaxonomy of Lamiaceae family.

Keywords: Lamiaceae; Monarda fistulosa; Ocimum americanum; HPLC; triterpenoids; aerial part, ethanolic extract.

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PHYTOCHEMICAL AND PHARMACOLOGICAL STUDY OF POLYSACCHARIDE COMPLEXES OF *PRUNUS DOMESTICA* FRUIT

p. 32-37

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Aim. The aim of our research was fractionation of polysaccharide complexes from fresh plum fruits, comparative study content of neutral sugars in it, element composition of plum fruit and investigation of influence of fibers and water soluble polysaccharide complex (WSPC) on histostructure of rats liver in conditions of ethanol intoxication

Methods. The elemental composition was determined with atomic emission spectrophotometer ISE 3500 (Thermo Scientific, USA). The content of polysaccharide fractions as fibers, WSPC and pectin was determined by Gravimetry. The comparative study of monosaccharides content in obtained fractions was carried out with picric acid method on a Hewlett Packard 8453 spectrophotometer at a wave-

length of 463 nm in a cuvette with a layer thickness of 10 mm.

Investigation of the influence of fibers and water soluble polysaccharide complex (WSPC) of plum fruit on histostructure of rat liver was carried out on the model of ethanol intoxication.

Results. As a result of the study element composition were determined. Potassium has the most content in fruits – 2000 µg/100 g. Content of heavy metals in the plum fruit does not exceed the norms established by the State Pharmacopoeia of Ukraine. Three polysaccharide fractions, as fibers WSPC and pectines, were obtained from the fresh plum fruits. The most content of neutral sugars were determined in the WSPS – 61.52±1.47 %. Their content in other complexes was: in fibers – 59.23±1.15 %, pectin – 22.85±0.55 %.

It was confirmed that simultaneous administration of alcohol with the fibers of plum fruits in a dose of 200 mg / kg prevents the development of fatty dystrophy of the liver parenchyma, in contrast to the similar scheme of the administration of the WSPC of plum fruit in the same dose or drug comparison silibor at a dose of 30 mg/kg.

Conclusions. Considering results of phitochemical and pharmacological research we can assume that the plum fruit fiber is promising for further study in order to create a new effective and safe drugs for use in medical practice

Key words: plum, extract, polysaccharides, elements, histostructure, rats liver, ethanol intoxication

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DYNAMICS OF EXCEPTION OF ORGANIC ACIDS FROM MIXTURE OF MEDICAL VEGETABLE RAW MATERIAL

p. 37-42

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Aim. Obtaining the mathematical equations for calculating the size of the parts to which different morphological organs of medicinal plants are to be chopped in order to achieve a required degree of extraction of biologically active compounds when they are extracted simultaneously.

Methods. Looking at the increasing trends of the level of psychopathological disorders, it is expedient to develop and introduce into medical practice sedatives which is based on complex phytopolyextracts, obtained from medicinal vegetable raw materials permitted for medical use. Modern data about the chemical ingredients, pharmacological effect, application in world medical practice allow us to positively evaluate the trends of using the medicinal vegetable raw materials for the preparation of phytopolyextracts of sedative medicinal. Growing requirements for the quality of medicinal products of plant origin are a prerequisite for the development of advanced methodologies for the production of phytopolyextracts.

Result. The results of research into the development of a methodology for the analytical calculation of the particle size of plant raw materials of various morphological organs to simultaneously achieve a given degree of extraction of organic acids and other biologically active substances during joint extraction are presented.

Conclusions. The obtained mathematical equations describe the dynamics of extraction of organic acids from medicinal vegetable raw materials. Solving the system of obtained mathematical equations allows to calculate the size to which the vegetable raw materials of different morphological organs should be grinded in order to simultaneously achieve a given degree of extraction with joint extraction the mixture of medicinal vegetable raw materials.

The obtained results represent the benefits from research of joint extraction of medicinal vegetable raw materials to obtain natural biologically active substances for the manufacture of multicomponent phytopreparations

Keywords: *phytopolyextracts, medicinal vegetable raw materials, organic acids, dynamics of extraction of biologically active substances*

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