STUDY OF THE FORMATION OF MICELLES AND THEIR STRUCTURE BY THE SPIN PROBE METHOD

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The aim. To study the surfactant solutions depending on the type and concentration of surfactants as well as their interaction with some excipients by spin probe method.

Materials and methods. Solutions of ionic and nonionic surfactants containing 4 spin probes differing in molecular structure and solubility were studied. Electronic paramagnetic resonance (EPR) spectra were obtained and their type and parameters were determined. The critical micelle concentration (CMC) was determined from the surface tension isotherm, and the rheological parameters were studied by rotational viscometry.

Results. The shape of the EPR spectra and the spectral parameters of the spin probes depended on both the surfactant concentration and the molecular structure and solubility of these spin probes. There was a concentration range in which associations with surfactants formed at surfactant concentrations below the CMC. At surfactant concentrations above the CMC and up to 1%, the structure of the surfactant micelles did not change. In the micelles, the surfactant modelling probes rotated rapidly about the long axis of the molecule and perpendicular to it, while they were fixed in the radial direction. The rotational diffusion of probes dissolved in water was much faster. The micelle cores formed by nonionic surfactant and P338 were more viscous compared to ionic surfactants. Surfactant micelles were anisotropic in viscosity, and different segments of the alkyl chains of surfactant modelling probes had different dynamic properties. The packing of molecules in the micelles was more ordered and compacted at the level of the fifth carbon atom. The interactions between surfactant and probe and between cationic surfactant and disodium edetate were determined from the parameters of the EPR spectra. The interaction between the changes in the parameters of the EPR spectra with increasing temperature, the P338 content in the solutions, and the sol-gel transition was revealed. Solubilization of lipophilic substances by P338 solutions increased due to the interaction of propylene glycol and P338.

Conclusions. The shape and parameters of the EPR spectra in real solutions and micellar solutions of surfactants were different and also depended on the structure and solubility of spin probes. Surfactant micelles were anisotropic in viscosity, and different segments of the alkyl chains of surfactant modelling probes had different dynamic properties. The packing of molecules in the micelles was more ordered and compacted at the level of the fifth carbon atom. The EPR spectra and/or their parameters changed due to the interaction between surfactant and probe, surfactant and other substances, or sol-gel transitions in P338 solutions.

Keywords: surfactant, poloxamer P338 (P338), solution, micelles, spin probe, EPR spectrum, spectrum parameters, viscosity

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CONSUMPTION ANALYSIS OF TWO-COMPONENT FIXED COMBINATIONS OF MEDICINES FOR ARTERIAL HYPERTENSION TREATMENT IN UKRAINE AS ONE OF THE STAGES FOR EVALUATION OF THEIR REIMBURSEMENT PROSPECTS

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The aim was to conduct a retrospective consumption analysis of 4 groups of single pill combinations for hypertension treatment and identify potential candidates for future inclusion in the reimbursement list in Ukraine, based on retrospective consumption patterns.

Materials and methods: The objects of the study were retail sales data in pharmaceutical market in Ukraine of four groups of single pill combinations used for arterial hypertension treatment. Data was provided by the marker research system “Pharmstandard” of the company of “Morion”. Analytic-comparative, systematic, logical, and mathematical-statistical methods were used.

Results: Single pill combinations of ACE inhibitors with diuretics were the most consumed among other combinations on
2018–2020. Retrospective evaluation of consumption patterns in period of 2018–2020 showed that combinations of captopril and hydrochlorothiazide (HCTD) 50 mg/25 mg, enalapril and HCTD 10 mg/25 mg, lisinopril and HCTD 10 mg/12.5 mg were the most consumed. Among ARB and diuretics combinations valsartan and HCTD (160 mg/12.5 mg and 80 mg/12.5 mg) and losartan and HCTD (50 mg/12.5 mg) were the most consumed among ARB and diuretics combinations. Within ACE inhibitors and calcium channel blockers (CCB) combinations the most consumed were lisinopril/amlodipine 10 mg/5 mg and a perindopril arginine/amlodipine 5 mg/5 mg. Valsartan and amiodipine holds the majority among ARC and CCB combinations, consumed in period of 2018–2020.

Conclusion: Apart from the single pill combinations, enlisted in the WHO Essential medicines list, eight more single pill combination were identified, based on retrospective consumption patterns, as potential candidates for further inclusion in the reimbursement list in Ukraine

Keywords: arterial hypertension, single pill combination, consumption patterns, reimbursement, pharmaceutical market

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DEVELOPMENT OF METHODS FOR THE STUDY OF DICYCLOMINE HYDROCHLORIDE IN COMBINATION WITH PARACETAMOL AS AN OBJECT OF FORENSIC-PHARMACEUTICAL EXAMINATION

p. 28–35

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The aim. Selection and development of methods for the tasks of forensic pharmaceutical examination as case materials suspected of falsification or non-medical use of dicyclomine hydrochloride in combination with paracetamol in the form of tablets.

Materials and methods. The study presents the developed methods of detection and identification of dicyclomine by TLC, IR spectroscopy and GC-MS, which were performed using reagents that meet the EP, USP and USPU requirements, Class A glassware and qualified devices.

Identification by IR spectroscopy was performed in the range from 500 to 4000 cm⁻¹ on the device “Nicolet 380 FT-IR Spectrometer by Thermo Fisher Scientific”.

TLC was performed on Sorbil plates for TLC-PET-H-UV and Sorbil plates for TLC-AF-UV (CJSC “Sorbopolymer”, Russia). The following systems were used as mobile phases: dioxane-chloroform-acetone-25 % ammonia solution (47.5:45:5:2.5); tolune-acetone-ethanol-25 % ammonia solution (45:45:7.5:2.5); ethyl acetate-n-butanol-25 % ammonia solution (17:2:1). The resulting chromatographic zones were detected by irradiation with UV light and further treatment with color reagents (30 % iron (III) chloride solution; Dragendorff’s reagent modified by Munier; Marquis reagent; Froehde reagent; Mandelin reagent; FPN reagent).

Analysis by gas chromatography with mass detection was performed using a gas chromatograph with a mass spectrometric detector GCMS-QP2020. Data were analyzed using the program: GCMSsolution, LabSolutions Insight (Shimadzu Corporation, Tokyo, Japan).

Results. For the first time, the conditions for the extraction of dicyclomine hydrochloride from aqueous solutions were studied and the optimal conditions for their isolation as an object of forensic pharmaceutical examination is defined. The method of detection of dicyclomine hydrochloride and paracetamol in the drug “Trigan-D” by the methods of thin-layer chromatography, gas-liquid chromatography and chromat-mass spectrometry was developed, and the detection limits of the substances under study were determined.

Conclusion. The developed methods for dicyclomine hydrochloride in the form of tablets with paracetamol meet the require-
ments of the current legislation of Ukraine and the Ministry of Justice of Ukraine. The data obtained prove the high sensitivity and reproducibility of the methods and prove the possibility of their introduction into the practice of forensic pharmaceutical examination.

**Keywords:** non-medical use, psychoactive substances, forensic pharmaceutical examination, detection of medicinal substances

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**MONITORING OF INDICATORS OF PHYSICAL AVAILABILITY AND SOCIO-ECONOMIC AFFORDABILITY OF METFORMIN HYDROCHLORIDE MEDICINES**

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The aim of the study was to monitor the physical availability and socio-economic affordability of metformin hydrochloride medicines, which are used for the treatment of type II diabetes mellitus.

Materials and methods. Medical and technological documentation on the standardization of medical care for patients with type II diabetes, data from the State Register of Medicinal Products of Ukraine, software complex “Apteka” of the company “Morion” and data from the pharmaceutical market research analytical company “Pharmstandard” of the company “Morion” were used as research materials to determine indicators of physical availability and socio-economic affordability of metformin HCL medicines for the treatment of type II diabetes. Documentary, analytical methods, the method of marketing research and the method of logical summarization of data were used during the research.

Results. According to the results of the analysis of the medical and technological documentation on the standardization of medical care for diabetes mellitus (DM) type II and the State Register of Medicines of Ukraine, a number of characteristics were formed for Metformin HCL pharmaceuticals, namely: tablets or film-coated tablets in a dose of 500 mg, which are manufactured: Ukrainian manufacturers (full cycle of production); Ukrainian manufacturers of tablets in bulk (primary and secondary packaging) and foreign manufacturers. The specified characteristics became the basis for the further selection of several metformin HCL medicines in terms of determining their indicators of physical availability and socio-economic affordability. When determining the physical availability of metformin HCL medications, it was established that Ukrainian-made pharmaceuticals (full production cycle) are presented in the wholesale chain of the pharmaceutical market in full. According to the socio-economic indicator of the solvency adequacy of payment capacity, among the metformin HCL pharmaceuticals, the most economically justified are the Ukrainian-made pharmaceuticals, which are made from tablets in bulk according to the full production cycle. Only 1 medicine was singled out among foreign-made ones, which has the lowest indicator of solvency adequacy for various categories of the population.

Conclusions. Monitoring of indicators of physical availability and socio-economic affordability of metformin HCL medicines showed that the most economically justified for able-bodied people and people of retirement age is the use of the Ukrainian-made pharmaceuticals (full cycle and production from tablets in bulk) for the treatment of type II DM.

Keywords: medicines, metformin, diabetes, physical availability, socio-economic affordability

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THE MORPHOLOGICAL ANALYSIS OF CRYSTALLINE METHADONE: A NOVEL COMBINATION OF MICROSCOPY TECHNIQUES

p. 44–52

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The aim: to evaluate combined microscopy techniques for determining the morphological and optical properties of methadone hydrochloride (MDN) crystals.

Materials and methods: MDN crystal formation was optimized using a closed container method and crystals were characterized using polarized light microscopy (PLM), scanning electron microscopy (SEM) and confocal microscopy (CM). SEM and CM were used to determine MDN crystal thickness and study its relationship with crystal retardation colours using the Michel-Levy Birefringence approach.

Results: Dimensions (mean±SD) of diamond shaped MDN crystals were confirmed using SEM and CM. Crystals were 46.4±15.2 Vs 32.0±8.3 μm long, 28.0±8.2 Vs 20.8±5.5 μm wide, and 6.62±2.9 Vs 9.6±4.6 μm thick, respectively. There were significant differences between SEM and CM thickness measurements (U=1283, p<0.05), as the SEM exhibited thinner diamond crystals. The combined use of PLM and Michel-Levy chart enabled the observation of a predominantly yellow coloured MDN crystal, mean thickness at (428 nm) mean retardation value.

Conclusion: The SEM was superior and successfully determined MDN crystal dimensions for the first time, whilst the CM results were affected by the Rhodamine dye staining process used for visualisation. The qualitative analysis of the crystallinity status of methadone hydrochloride optimally achieved using a combination of SEM and PLM techniques

Keywords: methadone, birefringence, Michel-Levy birefringence colour chart, recrystallization methods, retardation, 3-D imaging, confocal microscopy, SEM, polarized light microscopy

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EVALUATION OF THE STATE OF PHARMACEUTICAL SUPPLY OF PATIENTS WITH DEMENTIA WITH ALZHEIMER DISEASE IN UKRAINE IN ACCORDANCE WITH INTERNATIONAL RECOMMENDATIONS

p. 53–61

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The aim: to assess the state of pharmaceutical provision of patients with dementia in Alzheimer’s disease in Ukraine in accordance with international recommendations.

Materials and methods. In our studies, we used data from international guidelines, clinical protocols that regulate the organization of medical and pharmaceutical care for these patients in the USA, Australia, Japan, Germany, Great Britain, Finland, India, Kazakhstan, and Ukraine. The actual state of pharmaceutical provision of these patients in Ukraine was studied using a depersonalized database of medical prescriptions, which operates on a number of specialized healthcare institutions. In addition, data from the Morion information search system were used. We used general theoretical (historical, formal, graphic, hypothetical-deuctive, etc.) and applied (clinical-economic, organizational-economic, mathematical-statistical, etc.) research methods.

Results. It has been established that a consolidated opinion has been formed in the world scientific community regarding the possibility of effective use in the pathogenetic treatment of patients with dementia in Alzheimer’s disease of drugs from the groups N06DA Acetylcholinesterase inhibitors and N06DX-Others drugs for use in case of dementia. Thus, the pharmaceutical component of international recommendations, clinical protocols for the treatment of patients with dementia in Alzheimer’s disease contains four drugs used in pathogenetic therapy. These are N06DA02 Donepezil, N06DA03 Rivastigmine, N06DA04 Galantamine and N06DX01 Memantine. It has been reported that all the above drugs are included in the domestic clinical protocol for the treatment of patients with dementia in Alzheimer’s disease, the State Drug Formulary (with the exception of N06DA03 Rivastigmine), and the State Drug Registry. At the same time, all of them were absent from the National List of Essential Drugs, which has an important socio-economic and medical-pharmaceutical significance in the health care system. It was found that patients (200 people) received 2487 prescriptions (100.0 %), among which 9.41 % (234 prescriptions) were drugs used in pathogenetic treatment. There is a highly disproportionate nature of the distribution of prescriptions and consumption by international generic names of drugs. Thus, drugs N06DX01 Memantine accounted for 80.41 % (188 prescriptions) of all prescriptions in the group N06D Drugs for use in dementia, and the consumption rate was UAH 84420.20, which accounted for 91.48 % of the amount of expenses directed to patients with carrying out pathogenetic treatment. Significant dominance of drugs N06DX01 Memantine in the structure of prescriptions and consumption indicates the presence of severe, advanced forms of dementia in patients. This fact once again emphasizes the need for early detection and treatment of cognitive impairment, primarily for the rational use of limited health care resources. We have found that there are no prescriptions for N06D A04 Galantamine preparations, which are recommended by the relevant international recommendations in different countries of the world, as well as by the domestic clinical protocol for the pathogenetic treatment of mild and moderate forms of Alzheimer’s disease. At the same time, N06DA05 Ipidacrine preparations were used in the treatment of domestic patients, which are not presented in the pharmaceutical component of international recommendations and protocols governing the pathogenetic treatment of the above-mentioned groups of neuropsychiatric patients.

Conclusions. The peculiarities of the formation of the pharmaceutical component in the organization of the treatment process of patients with dementia in Alzheimer’s disease in Ukraine, established by us, allow further research on the development of rational ways of resource provision of neuropsychiatric patients.

Keywords: dementia, clinical and economic analysis, drug consumption, pharmaceutical provision of neuropsychiatric patients, Alzheimer’s disease

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USE OF ALGORITHM OF THE PREVENTION COMPLEX OF INFLAMMATORY PROCESSES IN THE ORAL CAVITY IN METABOLIC SYNDROME

p. 62–68

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The aim of the work was to evaluate in the experiment the effectiveness of the developed treatment-and-prophylactic complex for the prevention of periodontal tissue disorders under metabolic syndrome simulation.

Materials and methods: The study of biochemical and immunological changes in the blood serum, liver and gingival tissue was performed during simulation on the metabolic syndrome of alimentary genesis on Wistar rats, all animals were divided into 5 groups: 1) intact, 2) with simulated metabolic syndrome, 3) in a week after the start of MS simulation 5 times a week in the morning perorally administered a “Capillaroprotect” aqueous solution (bioflavonoid, antioxidant) produced by “Ekosvit Oil” (Ukraine) at a rate of 135 mg/kg, 4) under similar conditions receiving the preparation based on the dihydroquercetin, the dental elixir topically on gums with pathogenic microflora.

Results: Under conditions of experimental MS simulation with a diet rich in saturated fats and carbohydrate there are systemic disorders in the body: reduced nonspecific antimicrobial protection, increased microbial contamination, intensification of lipid peroxidation, the development of inflammation and hepatotoxicity. Prophylactic administration of the proposed dihydroquercetin preparation to animals in the process of simulation of MS significantly inhibits the established disorders, positively affecting the biochemical parameters of the blood serum, liver tissue, periodontium, reducing triglycerides, total cholesterol, glucose level, restoring the state of non-specific resistance, lipid metabolism, preventing inflammation and hepatosis, as well as contamination with pathogenic microflora.

Conclusions. The proposed treatment-and-prophylactic complex, which includes the dihydroquercetin preparation, used per os in combination with local therapy of periodontal tissues with a tooth elixir based on propolis and biologically active substances of plant origin adaptogens with ultraphonophoresis under induced metabolic syndrome significantly removed the negative effects of its most important components.

Keywords: metabolic syndrome, treatment-and-prophylactic complex, inflammation, cytokine status, periodontal tissues

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cals in the studied essential oils with the data of NIST02 mass spectral library. The quantification of substances in the raw materials was carried out in comparison with a standard sample of menthol.

**Results.** As a result, 72 compounds were detected and quantified. The total content of essential oil in V. longifolia L. flowers was 0.17% (39 components), the following compounds dominated: benzocacetdehyde – 8.05, squalene – 5.17, palmitic acid – 15.73, butyl phthalate – 7.18. The total content of essential oil in V. incana L. flowers was 0.15% (43 components), the following compounds prevailed: squalene 20.47, fatty acids, namely palmitic – 26.88, palmitoleic – 17.15, oleic – 11.61. The total content of the essential oil in V. spicata L. flowers was 0.11% (43 components), the following compounds dominated: squalene – 5.53, fatty acids: palmitic – 22.78, linoleic – 6.72, carbohydrates: heptacosan – 12.27, hexacosan – 7.45. Among the identified compounds, mono-, norseque-, sesque-, di- and triterpenoids, their oxidation products (aromatic compounds, aldehydes and alcohols, ketones), fatty acids, hydrocarbons and their derivatives were detected.

**Conclusions.** The chemical composition of essential oils from flowers of V. longifolia L., V. incana L. and V. spicata L. from Ukrainian flora was first studied by means of chromatography mass spectrometry. The yield of essential oil from V. longifolia L. flowers is higher (0.17%) compared to those from flowers of V. incana L. (0.15 %) and V. spicata L. (0.11 %). Among the identified compounds terpenoids, aromatic compounds, their oxidation products, fatty acids and their esters, hydrocarbons were detected. The study of biologically active substances in essential oils from Veronica species flowers expands the scientific data on the chemical composition of these species and gives background for the further development of medicinal products, their standardization and understanding of their pharmacological activity.

**Keywords:** essential oil, flowers, GC-MS analysis, V. longifolia L., V. incana L., V. spicata L.

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The thinness and sensitivity of the skin in the area under the eyes cause the skin in this area to easily show signs of aging. Hydrogel masks contain quite a lot of water, so during use this mask will moisturize the skin longer. A hydrogel eye mask containing yellow potato tuber water extract is used for the prevention of premature aging, especially under the eyes.

The purpose of this study was to determine whether hydrogel eye mask preparations containing water extract of yellow potato tubers can provide an anti-aging effect.

Material and methods: The yellow potato tuber water extract was screened for phytochemicals, then formulated into a hydrogel eye mask with a concentration of 0.25 %, 0.5 %, and 1 %. Evaluation of the hydrogel eye mask preparation includes organoleptic, weight, thickness, pH test, tensile test, swelling power, shrinkage, stability, cycling test, hedonic test, and anti-aging. Anti-aging parameters measured include moisture, pores, blemishes, and wrinkles. The treatment was carried out for four weeks by applying the mask twice a week.

Results: The results showed that all hydrogel eye mask formulations were stable during storage and cycling tests. All formulas meet pH values, shrinkage, elasticity, swellability, and irritation tests. The hedonic test on volunteers shows the most preferred concentration of 1 %. The results of the anti-aging effectiveness test of the best hydrogel eye mask preparation is a concentration of 1 % with an increase in humidity of 27 %, a decrease in pores of 35.8 %, blemishes of 40 %, and wrinkles of 37.6 %.

Conclusion: That the different concentrations of each formula showed different anti-aging activities and the best formula was 1 % with moisture values of 27 %, pore values of 35.8 %, blemishes of 40 %, and wrinkles values of 37.6 %, which indicated anti-aging activity.

Keywords: water extract, anti-aging, yellow potato tuber, hydrogel eye mask, solanum tuberosum L., pore, wrinkle, moisture, spot, shrinkage

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DEVELOPMENT OF THE SPECTROPHOTOMETRIC METHOD FOR THE DETERMINATION OF ATORVASTATIN IN TABLETS USING BROMOTHYMOL BLUE

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The aim of the work was to develop a simple, economic, fast, reliable, and eco-friendly spectrophotometric method for the determination of atorvastatin in tablets based on the reaction with bromothymol blue (BTB).

Material and methods. A double–beam Shimadzu UV-Visible spectrophotometer, with spectral bandwidth of 1 nm wavelength accuracy ±0.5 nm, Model –UV 1800 (Japan), Software UV-Probe 2.62 was used to measure absorbance of the resulting solution. Pharmacopeial standard sample of atorvastatin calcium and BTB were provided by Sigma-Aldrich (≥98 %, HPLC). The used dosage forms of atorvastatin: tablets Atorvastatin 10 mg and 20 mg.

Results and discussion. The method of spectrophotometric determination of the quantitative content of atorvastatin calcium based on its reaction with BTB in ethyl acetate medium has been developed. The stoichiometric ratios of the reactive components as 1:1 were obtained by the methods of continuous changes and the saturation method. Linearity regression equation was $y=0.0017x+0.0496$ and the obtained correlation coefficient was $R^2=0.9993$. The linear relationship was found between absorbance at λmax and concentration of medicines in the range 15.48–154.80 µg/mL. The LOD and LOQ values were calculated to be 4.85 µg/mL and 14.71 µg/mL respectively. Spectrophotometric method for the determination of atorvastatin in tablets using BTB was developed in accordance with GAC principles.

Conclusions. A simple, economic, fast, reliable and eco-friendly spectrophotometric method was developed for the determination of atorvastatin calcium in tablets based on the reaction with BTB and validated according to the standardized validation procedure by the standard method. It was proved that according to such validation characteristics as linearity, precision, accuracy, and robustness the proposed method met the requirements of SPhU.

Keywords: atorvastatin, bromothymol blue, statins, spectrophotometry, validation, quantitative determination, pharmaceutical analysis, tablets

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АНАТОАЦІЇ

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ДОСЛІДЖЕННЯ УТВОРЕННЯ МІЦЕЛ ТА ЇХ СТРУКТУРИ МЕТОДОМ СПІНОВИХ ЗОНДІВ (с. 4–18)

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Мета. Дослідити розчини ПАР методом спінових зондів зазначені від вмісту класу ПАР, а також їх взаємодії з деякими допоміжними речовинами.

Матеріал та методи. Розчини іонних і неіонних ПАР, в які вводили 4 спінові зонди, що різняться за молекулярною структурою і розчинністю. Отримували спектри електронного параходнівого резонансу (ЕПР), за спектром ЕПР визначали його тип та параметри, за ізотермом поверхневого натягу – критичну концентрацію міцелоутворення (ККМ), а реологічні параметри – методом ротаційної віскозиметрії.

Результати. Від вмісту ПАР залежать форма спектрів ЕПР і спектральні параметри спінових зондів, які також обумовлює їх молекулярна структура і розчинність. Існує область концентрацій ПАР, в якій асоціати ПАР утворюються до ККМ, а реологічні параметри – методом розчинної віскозиметрії.

Висновки. Розчини ПАР залежно від вмісту ПАР, класу ПАР, а також взаємодії з деякими допоміжними речовинами мають різні динамічні властивості. Більш впорядкованою та щільною є упаковка молекул в міцелах на рівні 5 атому вуглецю. За параметрами спектрів ЕПР виявлено взаємодію міцел ПАР і зондом, в інтервалах ПАР і динатрію едемату. Показано зв'язок між зміною параметрів спектрів ЕПР з ростом температури, від вмісту ПАР и золь→гель переходом. Взаємодія зондів Р338 в розчинах і золь→гель переходом. Взаємодія зондів Р338 в розчинах і золь→гель переходом. Взаємодія зондів Р338 в розчинах і золь→гель переходом. Взаємодія зондів Р338 в розчинах і золь→гель переходом. Взаємодія зондів Р338 в розчинах і золь→гель переходом. Взаємодія зондів Р338 в розчинах і золь→гель переходом. Взаємодія зондів Р338 в розчинах і золь→гель переходом. Взаємодія зондів Р338 в розчинах і золь→гель переходом. Взаємодія зондів Р338 в розчинах і золь→гель переходом.

Ключові слова: поверхнево-активна речовина (ПАР), полоксамер Р338 (Р338), розчин, міцел, спіновий зонд, спектр ЕПР, параметри спектрів, в'язкість

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АНАЛІЗ СПОЖИВАННЯ ДВОКОМПОНЕНТНИХ ФІКСОВАНИХ КОМБІНАЦІЙ ЛІКАРСЬКИХ ЗАСОБІВ ДЛЯ ЛІКУВАННЯ АРТЕРІАЛЬНОЇ ГІПЕРТЕНЗІЇ В УКРАЇНІ ЯК ОДИН З ЕТАПІВ ДЛЯ ОЦІНКИ ПЕРСПЕКТИВ ЇЇ РЕІМБУРСАЦІЇ (с. 19–25)

А. О. Гончар, Н. В. Шолойко

Мета: провести ретроспективне дослідження споживання 4 груп комбінованих лікарських засобів та визначити їх структуру, з урахування діючих речовин та їх доз, за медіаною часткою споживання, наступні фіксовані дози комбінованих ЛЗ для лікування АГ в Україні в 2018–2020 роках. Подальший аналіз структури споживання комбінованих ЛЗ, які підлягають реімбурсації, для подальшого проведення клініко-економічних досліджень щодо їх використання в контексті розширення переліку ЛЗ, які підлягають реімбурсації.

Матеріали та методи: об’єктами дослідження були дані роздрібних продажів за період 2018–2020 років на фармацевтичному ринку України чотирьох груп комбінованих антигіпертензивних лікарських засобів. Дані були надані системою вивчення рынку України чотирьох груп комбінованих антигіпертензивних лікарських засобів.
дозволило визначити в всередині кожній досліджуваній групі ті фіксовані дози, які мають найбільш значення медіани частки споживання за три роки. Саме це припускаю проводити подальших клініко-економічних досліджень щодо їх використання в контексті обов'язкового питання щодо розширення ними переліку комбінованих ЛЗ для лікування АГ, які підлягають реімбурсації в Україні.

**Ключові слова:** артеріальна гіпертензія, комбіновані лікарські засоби, структура споживання, реімбурсація, фармацевтичний ринок.

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**РОЗРОБКА МЕТОДИ ДОСЛІДЖЕННЯ ДИЦИКЛОМІНУ ГІДРОХЛОРИДУ В КОМБІНАЦІЇ З ПАРАЦЕТАМОЛОМ У ФОРМІ ТАБЛЕТОК ЯК ОБ’ЄКТУ СУДОВО-ФАРМАЦЕВТИЧНОЇ ЕКСПЕРТИЗИ**

(с. 28–35)

О. В. Бевз, І. В. Сич, А. І. Федосов, О. О. Віслоус, І. А. Сич, О. В. Криваневич, Н. П. Кобzar, Л. О. Перехода

**Мета.** Підбір та розробка методів для завдань судово-фармацевтичної експертизи матеріалів справ з підозрою на фальсифікацію чи немедичного використання дицикломіну в комбінації з парацетамолом в формі таблеток.

**Матеріали та методи.** У дослідженні представлено розроблені методи виявлення та ідентифікації дицикломіну методами ТИХ, Ч-спектроскопії та ГХ-МС, які проводили з використанням реактивів, що відповідають вимогам EP, USP та USPU, послугу класу А та кваліфікованих приладів.

Ідентифікацію методом Ч-спектроскопії проводили в діапазоні від 500 до 4000 см⁻¹ на приладі “Nicolet 380 FT-IR Spectrometer by Thermo Fisher Scientific “.

ТИХ проводили на пластинках Сорбфіл ПТСХ-П-УФ та Сорбфіл ПТСХ-АФ-А-УФ (ЗАТ “Сорбполімер”, Росія). В якості рухомих фаз використовували системи: діоксан-хлороформ-ацетон-25 % розчин аміаку (47,5:45:5:2,5); толуол-ацетон-етанол-25 % розчин аміаку (45:5:7.5:2.5); етилацетат-метанол-25 % розчин аміаку (17:2:1). Утворені хроматографічні зони виявляли опроміненням УФ-світлом і подальшою обробкою реактивами (30 % розчин ферум Драгендорфа, модифікований Мясцов; реактив Маркіза; реактив Фреде; реактив Манделіна; реактив ФПН). Аналіз методом газової хроматографії з мас-детектором проводили за допомогою газового хроматографа з масспектрометричним детектором GCMS-QP2020. Дани аналізували за допомогою програми: GCMSsolution, LabSolutionsInsight (Shimadzu Corporation, Токіо, Японія).

**Результати.** Вперше вивчено умови екстракції дицикломіну гідрохлориду з водних розчинів та визначено оптимальні умови їх ізолювання як об’єкта судової експертизи. Розроблено методи виявлення дицикломіну гідрохлориду та парацетамолу в препараті “Триган-Д” методами тонкошарової хроматографії, газо-рідинної хроматографії та хроматомас-спектрометрії, визначено межі виявлення досліджуваних речовин.

**Висновок.** Розроблені методи визначення дицикломіну гідрохлориду в формі таблеток з парацетамолом відповідають вимогам чинного законодавства України та Міністерства юстиції України. Отримані дані доводять високу чутливість і відтворюваність методів і доводять можливість їх впровадження в практику судової експертизи.

**Ключові слова:** немедичне використання, психоактивні речовини, судово-фармацевтична експертиза, виявлення лікарських речовин.

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**МОНІТОРИНГ ПОКАЗНИКІВ ФІЗИЧНОЇ ТА СОЦІАЛЬНО-ЕКОНОМІЧНОЇ ДОСТУПНОСТІ ЛІКАРСЬКИХ ЗАСОБІВ МЕТОФОРМІНУ ГІДРОХЛОРИДУ**

(с. 36–43)

О. О. Ринченко, Д. В. Ляткін, І. М. Подольський, А. В. Волкова, І. М. Владимирова

**Метою дослідження** стало проведення моніторингу показників фізичної та соціально-економічної доступності лікарських засобів (ЛЗ) метформіну гідрохлориду, які використовуються для лікування цукрового діабету ІІ типу.

**Матеріали та методи.** В цьому дослідженні використано медико-технологічну документацію щодо стандартизації надання медичної допомоги пацієнтам при цукровому діабеті (ЦД) ІІ типу, дані Державного реєстру лікарських засобів України, програмного комплексу «Аптека» компанії «Моріон» та дані аналітичної компанії дослідження фармацевтичного ринку «Фармстандарт» та компанії «Моріон» для визначення показників фізичної та соціально-економічної доступності ЛЗ метформіну гідрохлориду для лікування цукрового діабету ІІ типу. Під час дослідження були використані документальний, аналітичний методи, метод картистикового дослідження та метод логічного узагальнення даних.

**Результати.** За результатами аналізу медико-технологічної документації зі стандартизації медичної допомоги при ЦД-ІІ типу та Державного реєстру лікарських засобів України сформовано ряд характеристик для ЛЗ метформіну гідрохлориду, а саме: ЛЗ у формі таблеток або таблеток вкритих плівковою оболонкою у дозі 500 мг, які виготовляються: українськими виробниками.
(повний цикл виробництва); українськими виробництвами із таблеток in bulk (первинне та вторинне пакування) та іноземними виробництвами. Задачі характеристики стали підставою для подальшого вибору ряду ЛЗ метформіну в/х щодо визначення їх показників фізичної та соціально-економічної доступності. При визначенні фізичної доступності ЛЗ метформіну в/х встановлено, що препарати українського виробництва (повний цикл виробництва) представлені на отриманий ланць фармацевтичного ринку у повному обсязі. За соціально-економічним показником доступності платоспроможності серед ЛЗ метформіну в/х наибільш економічно обґрунтованим є ЛЗ українського виробництва, що встановлюється із таблеток in bulk за повним циклом виробництва. Серед ЛЗ іноземного виробництва виділено лише 1 ЛЗ, який має найнижчий показник доступності платоспроможності для різних категорій населення.

Висновки. Моніторинг показників фізичної та соціально-економічної доступності ЛЗ метформіну в/х, показав, що найбільш економічно обґрунтовані для працездатних осіб та осіб пенсійного віку є застосування для лікування ЦД II типу ЛЗ українського виробництва (повний цикл та виготовлення із таблеток in bulk).

Ключові слова: лікарські засоби, метформін, цукровий діабет, фізична доступність, соціально-економічна доступність

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МОРФОЛОГІЧНИЙ АНАЛІЗ КРИСТАЛІЧНОГО МЕТАДОНУ: НОВА КОМБІНАЦІЯ МЕТОДІВ МІКРОСКОПІЇ (с. 44–52)

Noor R. Al-Hasani, Paul G. Royall, Neil Rayment, Kim Wolff

Мета. Оцінити комбіновані методи мікроскопії для визначення морфологічних та оптичних властивостей кристалів метадону гідрохлориду.

Матеріали та методи. Формування кристалів МДН було оптимізовано за допомогою методу закритого контейнера, а форма кристалів охарактеризована за допомогою скануючої електронної мікроскопії (SEM) та конфокальної мікроскопії (CM). Кристали МДН були використані для визначення товщини кристалів методами поляризованого світлового мікроскопа (PLM) та конфокальної мікроскопії.

Результати. Розміри кристалів МДН у формі ромба були підтверджено за допомогою SEM та CM. Кристали МДН переважно жовтого кольору із середньою товщиною при середньому значенні сповільнення (428 нм). Висновки. SEM появив себе як кращий метод і вперше успішно визначив розміри кристалів МДН, тоді як на результати CM вплину процес фарбування родаміном, який використовувався для візуалізації. Якісний аналіз стану кристалічності показав більш тонкі алмазні кристали. Спільне використання PLM та діаграми Мішеля-Леві дозволило спостерігати кристали з використанням кольорових сповільнень.

Ключові слова: метод мікроскопії, комбіновані методи, метадон, подвійне променезаломлення, діаграма подвійного променезаломлення Мішеля-Леві

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ОЦІНКА СТАНУ ФАРМАЦЕВТИЧНОГО ЗАБЕЗПЕЧЕННЯ ХВОРИХ З ДЕМЕНЦІЄЮ ПРИ ХВОРОБІ АЛЬЦГЕЙМЕРА В УКРАЇНІ У ВІДПОВІДНІСТІ ДО МІЖНАРОДНИХ РЕКОМЕНДАЦІЙ

М. С. Федотова, Л. О. Гала, А. М. Лебедин, Л. С. Сімонян, О. В. Геруш, Г. М. Юрченко, А. О. Паламар, Н. В. Шолойко, М. І. Велика

Мета. провести оцінку стану фармацевтичного забезпечення пацієнтів з деменцією при хворобі Альцгеймера в Україні у відповідності до міжнародних рекомендацій.

Матеріали та методи. Під час проведення досліджень використовували міжнародні рекомендації, клінічні протоколи, які регулюють питання організації надання медичної та фармацевтичної допомоги хворим з деменцією при хворобі Альцгеймера у США, Австралії, Японії, Німеччині, Великобританії, Фінляндії, Індії, Казахстані та в Україні. Фактичний стан фармацевтичного забезпечення цих хворих в Україні досліджувався з використанням деперсоніфікованої бази лікарських призначення, яка функціонувала у деяких спеціалізованих закладах охорони здоров'я. Крім цього, використовувалися дані інформаційно-пошукової системи «Моріон». Використовувалися загальнонормативні (історичний, формальний, графічний, гіпотетико-дедуктивний і т. ін.) та прикладні (клініко-економічні, організаційно-економічні, математико-статистичні тощо) методи досліджень.

Результати дослідження. Встановлено, що у структурі наукової спільноти сформувалася консолідована думка стосовно можливості ефективного використання у патогенетичному лікуванні хворих з деменцією при хворобі Альцгеймера препаратів із групи N06DA йнші антицефалогінометеритаза та N06DX-інші засоби для застосування у разі деменції. Так, фармацевтична складова
лікування, а також захищені речовини адаптогенів рослинного походження з ультрафонофорезом при відтвореному метаболічному синдромі, активних речовин адаптогенів рослинного походження у вигляді аплікацій по 0,5 мл на щура на тампоні, у продовж 5–7 хвилин, під час проведення моделювання МС з другого тиждня використовували препарат на основі дигідрокверцетину, зубний еліксир місцево на основі прополісу і біологічно активних речовин адаптогенів рослинного походження з ультрафонофорезом при відтвореному метаболічному синдромі.

Висновки. Встановлені особливості у формуванні фармацевтичної складової лікувального процесу хворих з деменцією при хворобі Альцгеймера в Україні дозволяють у подальшому проводити дослідження в сполученні з розробкою рациональних шляхів ресурсного забезпечення психоневрологічних пацієнтів.

Висновки

Використання алгоритму профілактичного комплексу при запальних процесах ротової порожнини за умов метаболічного синдрому (с. 62–68). Л. С. Кравченко, О. Л. Апельханс, А. Є. Поликов, Л. М. Унгурян, О. В. Пасєчник, М. В. Розуменко, Я. І. Іванова, В. О. Розуменко

Метою роботи була оцінка в експериментальні ефективності розробленого лікувально-профілактичного комплексу для профілацитичного лікування тяжких форм деменції при хворобі Альцгеймера.

Матеріали та методи. Досліджені біохімічні та імунологічні зміни у сироватці крові, печінки та тканинах пародонту хворих, які були включено до числа пацієнтів, які брали участь у даному експерименті. Загальна кількість пацієнтів становила 90 осіб, з яких 50 були хворими з деменцією при хворобі Альцгеймера.

Результати. У хворих з деменцією при хворобі Альцгеймера відмітнено підвищення рівня тригліцеридів, загального холестерину, глюкози, відновлюючи стан неспецифічної резистентності, ліпідного обміну, рівень тахінотоксинозу, зниження рівня тіліозину, зміни в концентрації білків, зменшення рівня кальцію.

Ключові слова: деменція, клініко-економічний аналіз, споживання ліків, фармацевтичне забезпечення психоневрологічних хворих, хвороби Альцгеймера.

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Ключові слова: деменція, клініко-економічний аналіз, споживання ліків, фармацевтичне забезпечення психоневрологічних хворих, хвороби Альцгеймера.
Виду рода Вероника (Veronica L.) родини Подорожниковые (Plantaginaceae Juss.) флоры Украины згрупованы у 8 секциях. Фитохимические исследования вторичных метаболитов рода Veronica L. наиболее связаны с вивечением фенольных соединений и их производных, так как терпеноиды этих видов межде не вивечены. В настоящее время профили L. longifolia L., L. incana L. и L. spicata L. флоры Украины впервые изучены.

#### Мета
Метою цього дослідження було порівняльне дослідження хімічного складу ефірних олій квіток V. longifolia L., L. incana L. та L. spicata L. флори України за методом ГХ-МС.

#### Матеріали та методи.
Об'єкти дослідження — квітки видів секції Pseudolimoniamum W.D.J. Koch: в. довголистої (Veronica longifolia L.), в. сивої (Veronica incana L.) та в. колоскової (Veronica spicata L.), заготовлені у ботанічному саду Харківського національного університету ім. В. Н. Каразіна. Дослідження терпеноїдів проводили методом хромато-мас-спектрометрії на хроматографі 6890N MSD/DS Agilent Technologies (USA) з мас-спектрометричним детектором 5973N. Компоненти ефірних олій визначали за результатами порівняння індексів утримання, мас-спектрів хімічних речовин, отриманих в процесі хроматографування, які входять до складу досліджуваної суміші, з даними бібліотеки мас-спектрів NIST02. Кількісне визначення вмісту речовин у сировині проводили в порівнянні зі стандартним зразком ментолу.

#### Результати.
У результаті дослідження виявлено і встановлено вміст 72 соєдив. Загальний вміст ефірної олії в квітках V. longifolia L. становив 0,17 % (39 компонентів), у якому переважали такі соєдиви: бензоатцетальдегід – 8,05, сквален – 5,17, пальмітинова кислота – 15,73, бутилфталат – 7,18. Загальний вміст ефірної олії в квітках L. incana L. становив 0,15 % (43 компоненти), в якій переважали такі соєдиви: сквален 20,47, жирні кислоти, а саме пальмітинова – 26,88, пальмітолеїнова – 17,15, олеїнова – 11,64. Загальний вміст ефірної олії в квітках L. spicata L. становив 0,11 % (34 компоненти), в якому переважали такі соєдиви: сквален – 5,53, жирні кислоти: пальмітинова – 22,78, лінолева – 6,72, углеводи: лецитин – 12,27, геокарнозин – 7,45. Серед ідентифікованих поліферментних соєдив – моно-, норсескві-, дис-, ти- та тритерпеноїдів, продукти їх окиснення (ароматичні соєдиви, альдегіди та спирти, кетони), жирні кислоти, углеводи та похідні соєдив цих класів.

#### Висновки.
Вперше методом хромато-мас-спектрометрії досліджено хімічний склад ефірних олій квіток V. longifolia L., L. incana L. та L. spicata L. флори України. Найдосліджена квітка L. longifolia L. (0,17 %) та L. spicata L. (0,11 %). Серед ідентифікованих поліферментних соєдив переважали такі сполуки: сквален 20,47, жирні кислоти, а саме пальмітинова – 26,88, пальмітолеїнова – 17,15, олеїнова – 11,64. Загальний вміст ефірної олії в квітках L. incana L. становив 0,15 % (43 компоненти), в якій переважали такі соєдиви: сквален 20,47, жирні кислоти, а саме пальмітинова – 26,88, пальмітолеїнова – 17,15, олеїнова – 11,64. Загальний вміст ефірної олії в квітках L. spicata L. становив 0,11 % (34 компоненти), в якому переважали такі соєдиви: сквален – 5,53, жирні кислоти: пальмітинова – 22,78, лінолева – 6,72, углеводи: лецитин – 12,27, геокарнозин – 7,45. Серед ідентифікованих поліферментних соєдив – моно-, норсескві-, дис-, ти- та тритерпеноїдів, продукти їх окиснення (ароматичні соєдиви, альдегіди та спирти, кетони), жирні кислоти, углеводи та похідні соєдив цих класів.

#### Ключові слова.
ефірна олія, квітки, хромато-мас-спектрометрія, V. longifolia L., L. incana L., L. spicata L.
Результати: результати показали, що всі формуль гідрогелевих масок для очей були стабільними під час зберігання та циклічних випробувань. Усі формуль відповідають значенням pH, випробуванням на усадку, еластичність, набухання та подразнення. Гедонічний тест на добровольців показав, що найбільш ефективною концентрацією є 1 % рівень. Результати тесту на антиноксон ефективність найкращого складу гідрогелевої маски для очей: концентрація екстракту 1 % забезпечувала підвищення вологості на 27 %, зменшення пор на 35.8 %, зменшення плям на 40 % і зморшок на 37.6 %.

Висновки: різні концентрації формул масок показали різну ефективність проти старіння, і найкращою формулою був 1 % склад, що забезпечує підвищення вологості на 27 %, зменшення кількості плям на 40 % і зморшок на 37.6 %, що вказує на високу ефективність уповільнення старіння.

Ключові слова: водний екстракт, засіб проти старіння, бульба картоплі, гідрогелева маска під очі, solanum tuberosum L., пори, зморшки, вологість, плями, усадка

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