Матеріали міжнародної науково-практичної internet-конференції

ТЕОРЕТИЧНІ ТА ПРАКТИЧНІ АСПЕКТИ ДОСЛІДЖЕННЯ ЛІКАРСЬКИХ РОСЛИН

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НАЦІОНАЛЬНИЙ ФАРМАЦЕВТИЧНИЙ УНІВЕРСИТЕТ
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MINISTRY OF HEALTH OF UKRAINE
NATIONAL UNIVERSITY OF PHARMACY
DEPARTMENT OF BOTANY

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THEORETICAL AND PRACTICAL ASPECTS OF THE RESEARCH OF MEDICINAL PLANTS

Матеріали IV Міжнародної науково-практичної internet-конференції
Материалы IV Международной научно-практической internet-конференции
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Збірник містить матеріали IV міжнародної науково-практичної internet-конференції студентів, магістрантів, аспірантів, викладачів, науковців та практиків.

Напрямками конференції є: підготовка спеціалістів для фармацевтичної галузі; біохімія рослин; питання термінології та систематики рослин; ресурсознавство, культивування, інтродукція, збереження та відновлення біорізноманіття рослин; пошук та вивчення перспективних лікарських рослин; контроль якості лікарської рослинної сировини; технологія та контроль якості лікарських рослинних засобів, домішок до харчових продуктів, парфумерно-косметичних засобів; фармакологічні дослідження біологічно активних речовин, лікарських рослинних засобів; фармацевтичне правознавство; фармакоекономічні дослідження; ветеринарна фармація; інформаційні технології у фармації

Для широкого кола науковців, магістрантів, аспірантів, докторантів, викладачів фармацевтичних та медичних закладів вищої освіти, співробітників фармацевтичних підприємств, фармацевтичних фірм.

Матеріали подаються мовою оригіналу.

За достовірність матеріалів відповідальність несуть автори.

Ten free amino acids were identified in the fireweed aerial part, however, only four compounds of this class were detected in rhizomes. This difference seems to be caused by beginning of dormant period in underground part. *L*-alanine and *L*-phenylalanine were dominant amino acids in both samples. The high *L*-proline content was also noted in fireweed aerial part.

The *low*-molecular-weight organic acids were represented as mono-, di- and tricarboxylic acids. Citric acid prevailed in both plant raw materials. Furthermore, glyceric acid was dominant in the aerial part and lactic acid prevailed in rhizomes. Also, pipecolic acid was identified in above and underground part. This compound is produced in plants during the degradation of *L*-lysine as a part of plant systemic acquired resistance in response to a microbial pathogen attack or as a precursor in the biosynthesis of other specialized piperidine derivatives, including indolizidine alkaloids [2].

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ADMET study of 2-[4-aryl-2-phenyliminothiazol-3-yl]-ethanol derivatives

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Actuality of theme. The presence of thiazole moiety in biologically active compounds of natural origin such tiazofurin, abafungin, ritonavir, and sulfathiazole, as well as thiamine, mycothiazole and cystothiazole etc. [1]. Thiazoles also established many different biological properties such as antitubercular, antihypertensive, antimicrobial [2], antiviral [3], anti-inflammatory [4]. Thus, many researchers have become interested in the synthesis of molecules containing more than one thiazole moiety [5-9].

Pre-experimental methods *in silico* are widely used to optimize the search for new biologically active compounds. Appreciation of the importance of ADMET properties has led to their consideration in early stage drug development, leading to a significant reduction in the number of compounds that failed in clinical trials due to poor ADMET properties. The interaction between pharmacokinetics, toxicity, and potency is crucial for effective drugs. The pharmacokinetic profile of a compound defines its absorption, distribution, metabolism, and excretion (ADME) properties. While optimal binding properties of a new drug to the therapeutic target are crucial, ensuring that it can reach the target site in sufficient concentrations to produce the physiological effect safely is essential for the introduction into the clinic[10-11].

The aim of our work was search for compounds with favorable ADMET parameters among the 2-[4-aryl-2-phenyliminothiazol-3-yl]-ethanol derivatives using pre-experimental methods *in*

silico by prediction of ADMET parameters for new 2-[4-aryl-2-phenyliminothiazol-3-yl]-ethanol derivatives.

Materials and methods: 2-[4-aryl-2-phenyliminothiazol-3-yl]-ethanol derivatives (Figure) were synthesized at the Department of Medical Chemistry early.

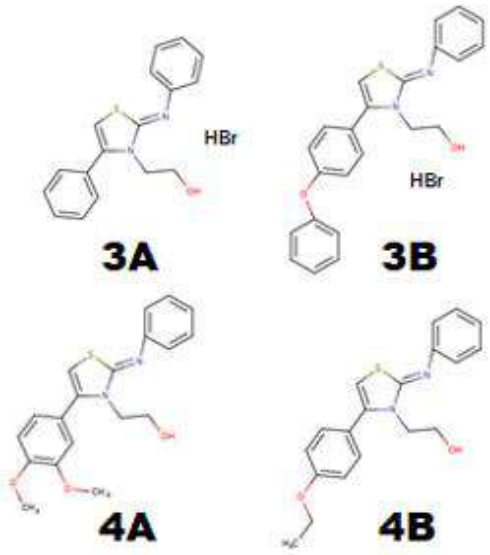

Figure 1. Chemical structure of 2-[4-aryl-2-phenyliminothiazol-3-yl]-ethanol derivatives

The structure and purity of the compounds obtained were confirmed by ^{1}H NMR spectroscopy, thin layer chromatography and qualitative reactions.

Computer prognosis of ADMET-parameters of the tested compounds was performed by structural formula of molecule using the pkCSM approach - a free software product [11].

Results and Discussion: According to the results of the prediction, the tested 1,3-thiazole derivatives have favorable absorption parameters: all substances have high intestinal absorption (more than 97%) and are able to penetrate the skin. The distribution parameters show that all compounds except compound **4A** cross the blood-brain barrier (BBB permeability parameters are in the range of 0.49-0.259, and CNS permeability is in the range of (-1.355) - (-2.334)). Most drugs in plasma will exist in equilibrium between the incoherent state or the serum proteins connected with. The effectiveness of this drug may be affected by the degree to which it binds proteins in the blood, because the more bound it is, the less effectively it can cross membrane cells or diffuse, for all compounds this parameter is in the range of 0.095-0.246 (highest in compound **3B**, and the lowest in **4B**). The volume of distribution (VDss (human)) of drugs to some extent characterizes the degree of penetration of drugs from blood plasma and extracellular fluid into tissues and the creation of a drug depot in the organs. According to the results of the forecast, all compounds have a low value of the volume of distribution, their parameters are in the range -0.046 - (-0.263), so we can conclude that the compounds are likely to penetrate poorly into organs and tissues.

All compounds are able to be metabolized in the liver, as they are likely inhibitors or substrates of isoforms of the cytochrome P-450 system. The parameter of the total clearance of the compounds is in the range of 0.556-0.079. Renal substrate OCT 2 plays an important role in the dislocation and renal clearance of drugs and endogenous compounds. According to a computer prediction, compounds **4A** and **4B** are likely to be substrates of OCT2 and therefore excreted by the kidneys. According to the toxicological prognosis, skin sensitization is unlikely to be caused by any substance, and compound **3A** is likely to be hepatotoxic. According to the prediction of the parameters of hERG I inhibitor and hERG II inhibitor, compounds **3A** and **3B** are likely to show cardiotoxicity by 50%.

Conclusion: All synthesized compounds have favorable ADMET parameters, except for compound **4A**, which is probably moderately distributed in the brain and does not cross the blood-brain barrier. The obtained data indicate the prospects for further study of the tested substances by experimental methods.

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Arnica as a promising raw material for the creation of homeopathic dosage forms

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Asteraceae is one of the largest flowering plant family containing about 1600 genera and more than 23 000 species and 13 subfamilies. The plants of this family grow as annual and perennial herbs and shrubs, vines or trees in forests to high-altitude grasslands. Medicinally important compounds for curing various ailments are found in some genera, e.g. species of Arnica, CentaureagranatensisBoiss., Conyzabonariensis and Seneciodoronicum, which are reported for the treatment of variety of diseases.

Arnica montana (Asteraceae) is a high-altitude perennial plant indigenous to mountain slopes in Europe, northern Asia, Siberia and America also known as fall-kraut, leopard's bane, sneezewort and mountain tobacco and had proved to be an important medicinal plant. This plant is used since centuries in homoeopathic system of medicine for the treatment about 60 different pathological conditions. The flowers of the plant show greater medicinal value and are used as antiphlogistic, inotropic, antibiotic, anti-inflammatory, immunomodulatory, antiplatelet, uterotonic, antirheumatic and analgesic in febrile conditions. Both oral administration of flowers in the form of fresh plant