

complex and expensive equipment, provisions for the use of solvents, sample preparation techniques require a lot of work and personal skills at the highest level. Spectral methods stand out in drug analysis due to their multiple advantages: they are less expensive, simple and fast.

**Aim of the study.** Evaluation of spectral methods in the analysis of nonsteroidal anti-inflammatory drugs.

**Material and methods.** Electronic databases: Medline, Cochrane, Embase and Springer were accessed using "spectral methods", "analysis of non-steroidal anti-inflammatory drugs". The search was also conducted using print profile magazines. In total, 48 bibliographic sources were reviewed.

**Results.** It should be noted that recent bibliographic sources regarding the spectral analysis methods of non-steroidal anti-inflammatory drugs have not been attested. According to literature data, 2 simple and sensitive UV-Vis spectrophotometric methods were developed for the quantitative estimation of celecoxib in capsules. Also, 2 simple, fast, accurate and economical UV-Vis spectrophotometric methods were developed for the dosage of valdecoxib, tizanidine and rofecoxib in pharmaceutical forms. According to literature sources, 2 extractive photolorimetric methods have been developed for the dosage of etoricoxib from tablets, which are based on the reaction with bromocresol in the solvent: chloroform. 4 UV-Vis spectrophotometric methods were developed for the simultaneous estimation of paracetamol and aceclofenac in tablets. Also, 2 UV-Vis spectrophotometric methods were developed for the quantitative estimation of aceclofenac in tablets. Several UV-Vis spectrophotometric methods have been developed and validated for the dosage of diclofenac in the form of salts (sodium, potassium) from monocomponent and combined pharmaceutical forms.

**Conclusions.** Spectral methods are widely applied in the analysis of non-steroidal anti-inflammatory drugs, especially for quantitative determination, being sensitive, simple, fast and cost-effective.

**Key words:** nonsteroidal anti-inflammatory drugs, spectral methods.

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## APLICAREA SPECTROSCOPIEI DE MASĂ ÎN ANALIZA ULEIULUI VOLATIL DE BUSUIOC

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**Introducere.** Compoziția chimică a uleiului volatil de busuioc este foarte variată, fiind depistate peste 200 de componente chimice din mai multe regiuni ale lumii. Cele mai semnificative componente chimice prezente în uleiul de busuioc s-au dovedit a fi: hidrocarburi monoterpenice, monoterpen oxidate, hidrocarburi sesquiterpene, sesquiterpen oxidate, triterpen, flavanoid, compuși aromatici etc. Uleiul de busuioc, datorită compoziției chimice pe care îl conține este pe larg utilizat în practica medicală, cele mai importante acțiuni terapeutice fiind: antiproliferative, anticancerigene, antidispeptice, antiinflamatoare, antioxidante, antiulcer, antivirale, insecticide și extern la vindecarea rănilor. Deoarece compoziția chimică diferă de la o regiune la alta, de condițiile climatice, precum și de multitudinea de componente chimice care pot fi prezente în uleiul volatil de busuioc, devine dificilă depistarea lor și determinarea cantitativă.

**Scopul lucrării.** Utilizarea metodei spectroscopice de masă pentru analiza uleiului volatil de busuioc.

**Material și metode.** Ulei volatil de busuioc (Sigma Aldrich), spectrometru de masă, solvenți și reagenți în corespundere cu Farmacopeea Europeană.

**Rezultate.** În general, variațiile conținutului de ulei volatil de busuioc care sunt influențate de regiunile geografice ar putea fi corelate cu condiții agroclimatice variabile și/sau diferite tehnici agricole și metode de cultivare a plantelor. Pentru a determina componentele chimice prezente în proba de ulei volatil de busuioc a fost analizat spectrul de masă obținut. În urma rezultatelor obținute s-a determinat că

monoterpenele oxigenate au fost principalii compuși, urmate de hidrocarburile sesquiterpene. Astfel, cele mai importante componente ale uleiului esențial de la busuioc au fost: linalol, 1,8-cineol, eugenol și cinamat de metil. Diferențele care pot apărea privind compoziția chimică a uleiurilor volatile de busuioc pot fi datorate condițiilor de mediu, dar și factorilor genetici, diferitelor chemotipuri și stării nutriționale a plantelor.

**Concluzii.** Spectroscopia de masă este o metodă simplă, sensibilă și foarte comodă pentru analiza uleiului volatil de busuioc.

**Cuvinte cheie:** ulei volatil de busuioc, spectroscopia de masă.

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## APPLICATION OF MASS SPECTROSCOPY IN THE ANALYSIS OF VOLATILE OIL OF BASIL

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**Introduction.** The chemical composition of basil volatile oil is very varied, with more than 200 chemical components found in several regions of the world. The most significant chemical components present in basil oil were found to be: monoterpene hydrocarbons, oxygenated monoterpenes, sesquiterpene hydrocarbons, oxygenated sesquiterpenes, triterpenes, flavonoids, aromatic compounds, etc. Basil oil, due to the chemical compounds it contains, is widely used in medical

practice, the most important therapeutic actions being: antiproliferative, anticancer, antidyspeptic, antiinflammatory, antioxidant, antiulcer, antiviral, insecticidal and externally for wound healing. Since the chemical composition differs from one region to another, from the climatic conditions, as well as from the multitude of chemical components that can be present in the essential oil of basil, it becomes difficult to detect them and to determine them quantitatively.

**Aim of the study.** Use of the mass spectroscopic method for the analysis of basil volatile oil.

**Material and methods.** Essential oil of basil (Sigma Aldrich), mass spectrometer, solvents and reagents according to the European Pharmacopoeia.

**Results.** In general, variations in basil volatile oil content that are influenced by geographic regions could be correlated with variable agroclimatic conditions and/or different agricultural techniques and plant cultivation methods. In order to determine the chemical components present in the basil volatile oil sample, the obtained mass spectrum was analyzed. Following the obtained results, it was determined that oxygenated monoterpenes were the main compounds, followed by sesquiterpene hydrocarbons. Thus, the most important components of basil essential oil were: linalool, 1,8-cineole, eugenol and methyl cinnamate. The differences that may appear regarding the chemical composition of basil volatile oils may be due to environmental conditions, but also to genetic factors, different chemotypes and the nutritional status of the plants.

**Conclusions.** Mass spectroscopy is a simple, sensitive and very convenient method for the analysis of basil volatile oil.

**Key words:** volatile basil oil, mass spectroscopy.

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