PROCEEDINGS BOOK

Abstracts & Full Papers

5MESAP

The Fifth International Mediterranean Symposium on Medicinal and Aromatic Plants

April 24-26, 2019 / Cappadocia - TURKEY

Türkiye

www.mesmap.com

TURKISH AIRLINES
A STAR ALLIANCE MEMBER

Association of Medicinal and Aromatic Plants of Mediterranean
AMAPMED
2012

ORMAN GENEL MÜDÜRLÜĞÜ
OGM
1839

adsi
Austrian Drug Screening Institute

ORAL PRESENTATION

PHYTOCHEMICAL STUDY AND EVALUATION OF INHIBITORY POTENTIAL OF *ANGELICA PANCICII* VANDAS. ESSENTIAL OILS AND HEXANE EXTRACTS AGAINST ENZYMES INVOLVED IN ALZHEIMER DISEASE AND TYPE II DIABETES

Antoaneta Trendafilova[1], Suleyman Yur[2,3], Fatih Goger[2,3], Miroslav Rangelov[1], Milka Todorova[1], Ina Aneva[4], Temel Ozek[2,3], Gulmira Ozek[2]

[1] Institute of Organic Chemistry with Centre of Phytochemistry, Bulgarian Academy of Sciences, 1113 Sofia, Bulgaria, trendaf@orgchm.bas.bg
[2] Department of Pharmacognosy, Faculty of Pharmacy, Anadolu University, 26470 Eskişehir, Turkey
[3] Medicinal Plant, Drug and Scientific Research Center (AUBIBAM), Anadolu University, 26470 Eskişehir, Turkey
[4] Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, 1113 Sofia, Bulgaria

Objective: In the present work, the essential oils and hexane extracts obtained from roots, leaf and fruits of Balkan endemic species *Angelica pancicii* Vandas. were investigated for their chemical composition, free radical (DPPH$^{\bullet}$ and ABTS$^{+\bullet}$) scavenging potential and inhibitory effects against acetylcholinesterase and porcine pancreatic α-amylase.

Material and Methods: *A. pancicii* was collected from Rila Mountain, Bulgaria in 2016. Air-dried leaves, fruits and roots were separately used for analysis. Essential oils were obtained with Clevenger apparatus and analyzed by GC-FID/MS. Hexane extracts were obtained by Soxhlet extraction. The amount of the individual coumarins in different plant organs was determinated by HPLC-DAD method. Antioxidant effect was tested for their scavenging activity against DPPH and ABTS. Acetylcholinesterase inhibition was evaluated using Ellman's method. Antidiabetic potential was assessed *via* measurement of inhibition of α−amylase enzyme using KI/I_2 method.

Results: CG-FID/MS analyses of essential oils obtained from the different plant parts of *A. pancicii* resulted in the identification of 170 components. It has been found that essential oils differed significantly in their chemical composition. The fruit essential oil was rich in monoterpene hydrocarbons (84.3%), while sesquiterpenoids dominated in the leaf (64.0%) and the root (71.7%) oils. β-Phellandrene (69.1%), germacrene D (9.7%) and elemol (9.8%) were the main components in the fruit, leaf and root oils, respectively. Isoimperatorin, imperatorin, oxypeucedanin, oxypeucedanin hydrate, angeloylpangelin and umbelliprenin were isolated from hexane extract of the fruits and used for HPLC quantification. The main component in the fruits and roots was oxypeucedanin (326.7±1.3 and 261.9±1.5 mg/gDE, respectively). These extracts differed significantly in the content of oxypeucedanin hydrate, which was 15 times more in the roots than in the fruits. The leaves were poor in coumarins. The essential oils and extracts of *A. pancicii* demonstrated good anti-acetylcholinesterase activity (between 47.3 and 88.3 %). The leaf and fruit oils were the most active with values similar to that of the standard galantamin (88 %). The essential oils were poor scavengers of DPPH and ABTS radicals when compared with the hexane extracts. The highest TEAC values were obtained for leaf and root extracts (0.5 mM). The leaf extract exhibited also the best DPPH$^{\bullet}$ scavenging activity (IC_{50} 1.2±0.06 mg/ml). The studied samples demonstrated a weak inhibitory effect (Inh. % up to 31.9±1.1) towards α-amylase.

Conclusion: This is the first report on inhibitory potential of *A. pancicii* essential oils and hexane extracts against enzymes involved in Alzheimer disease and Type II diabetes. Our data indicated that the fruit and leaf essential oils from *A. pancicii* emerged as the sources of possible cholinesterase inhibitors and deserve future studies.

Acknowledgements: Authors thank to TUBITAK (Project No 116S021) and BAS (Bilateral project) for financial support.

Keywords: *Angelica pancicii* Vandas., essential oil, coumarins, DPPH and ABTS, α-amylase, acetylcholinesterase.

MESMAP-5 Final Proceedings Book

POSTER PRESENTATION

QUALITATIVE AND QUANTITATIVE DETERMINATION OF MONO- AND DICAFFEOYLQUINIC ACIDS IN *INULA* SPECIES FROM BULGARIA

Antoaneta Trendafilova[1], Miroslav Rangelov[1], Milka Todorova[1]

[1] *Institute of Organic Chemistry with Centre of Phytochemistry, Bulgarian Academy of Sciences, 1113 Sofia, Bulgaria; trendaf@orgchm.bas.bg*

Objective: Chlorogenic acid (CQA) and dicaffeoyl esters of quinic acid (DCQA) are widely distributed in Asteraceae family. These compounds are known to possess various biological activities - antioxidant, antiviral, antibacterial, anti-inflammatory activities and can reduce the relative risk of cardiovascular, diabetes type II and Alzheimer's diseases. The aim of this study was to compare HPTLC and HPLC methods for qualitative and quantitative analysis of CQA and four isomeric DCQA in the methanol extracts of six *Inula* species, growing in Bulgaria - *I. aschersoniana, I. conyza, I. ensifolia, I. oculus-christi, I. bifrons* and *I. germanica*.

Material and Methods: The aerial parts of the six *Inula* species were collected in full flowering stage from natural habitats in Bulgaria in 2016. Air-dried and powdered plant material was extracted with CH_3OH and the resulting extracts were further used for HPTLC and HPLC analyses. HPTLC was performed on HPTLC plates (Merck) on CAMAG system with toluene/ethyl acetate/formic acid/water (5:25:100:10:10, v/v/v/v) as mobile phase. Densitometric determination was performed at 325 nm. A gradient RP HPLC method was carried out at 325 nm.

Results: A preliminary HPTLC comparison of the methanol extracts with commercial standards showed presence of chlorogenic (CQA), 4,5-, 3,4-,1,5- and 3,5-dicaffeoylquinic acids (DCQA). On the HPTLC plate, phenolic acids were observed under 366 nm UV light as blue bands at R_f values of 0.26, 0.49, 0.50, 0.63 and 0.66, respectively,. Good separation was achieved for the main compounds CQA, 1,5- and 3,5- DCQA, which were further densitometrically determinated at 325 nm. Additionally, HPLC method was applied for quantitative determination of CQA and DCQA isomers. The amount of CQA varied from 14.27 to 29.94 mg/g DE and the highest amount was detected in the methanol extract of *I. ensifolia*. 1,5- and 3,5-DCQA were the most abundant dicaffeoyl esters of quinic acid, but differed in their quantity in different species (20.32 - 65.0 and 1.91 - 22.92 mg/g DE, respectively). The content of 4,5- and 3,4-DCQA was relatively low (3.38-9.88 and 0.30-5.11 mg/g DE, respectively). The methanol extract of *I. germanica* was characterized with high amount of 1,5-DCQA. Similarly, *I. conyza* methanol extract was also rich in 1,5-DCQA, but contained subsequent amounts of 3,5-DCQA. Methanol extracts of *I. ensifolia, I. aschersoniana, I. oculus-christi* and *I. bifrons* contained almost equal amounts of 1,5-DCQA and 3,5-DCQA. There was no statistically significant difference between the mean values for CQA and 1,5- and 3,5-DCQA in studied extracts measured by HPTLC and HPLC.

Conclusion: HPTLC was found to be effective for qualitative analysis, while HPLC was more accurate for quantitative analysis. A combination of the two methods may be useful in a quality control setting, as it would allow rapid qualitative analysis of herbal material while maintaining accurate quantification of extract composition.

Acknowledgements: This work was supported by the NSF, Ministry of Education and Science, Bulgaria, Project DN 09/11.

Key words: *Inula*, Asteraceae, phenolic acids, HPTLC, HPLC-PDA

MESMAP-5 Final Proceeding Book