6th International Congress of Aromatic and Medicinal Plants

CIPAM 2016

www.cipam2016.com

29 May -1 June

Vila Galé Hotel

Coimbra | Portugal



Book of Abstracts

· U C ·

P65. Effect of in vitro culture on the content of biologically active sesquiterpene lactones in *Inula britannica* shoots

Trendafilova A[1]; Todorova M[1]; Ivanova V[1]; Antonova D[1]; Dimitrov D[2]; Wolfram E[3]; Danova K[1]

[1]*Institute of Organic Chemistry with Center of Phytochemistry, Bulgarian Academy of Sciences, Acad. G. Bonchev str., bl. 9, 1113 Sofia, Bulgaria;* [2]*National Museum of Natural History, Bulgarian Academy of Sciences, Tzar Osvoboditel str. 1, 1000 Sofia, Bulgaria;* [3]*Zurich University of Applied Sciences, Institute of Chemistry and Biotechnology, Phytopharmacy and Natural Products, Wädenswil, Switzerland*

trendaf@orgchm.bas.bg

Keywords: *I. britannica, sesquiterpene lactones, in vitro culture, biotechnological delivery, phytopharmaceuticals*

Inula britannica is widely distributed in Western Europeand Turkey, extending eastward to China through Iran and Pakistan [1,2]. The plant known as 'Xuan Fu Hua', British yellow head, or meadow fleabane is an important plant species used in Traditional Chinese Medicine (TCM) and Kampo Medicines. Its decoction is utilized as antibacterial, carminative, diuretic, laxative, stomach, tonic remedies, and for treating asthma, hepatitis and tumours [3]. Major bioactive secondary metabolites in *I. britannica* are sesquiterpene lactones [3].

Recently, it has been found that *in vitro* cultivated *I. britannica* produced sesquiterpene lactones characteristic of the intact plant [4]. These results prompted us to study the effect of culture medium composition on the biosynthetic capacity of the plant *in vitro*.

For optimization of sesquiterpene lactone production vitamin supplementation (Murashige and Skoog and Gamborg), as well as plant growth regulators (benzyl adenine and 1-Naphthalene acetic acid) were modified in overall 10 treatments. Plant extracts were obtained from air-dried and ground plant material by extraction with chloroform. The quantity of the main sesquiterpene lactones in the studied extracts was determined by GC/MS. Based on the obtained results up-scale of sesquiterpene production by cultivation of the plant in liquid culture bioreactor system is under development.

Acknowledgments: The authors are grateful for the financial support provided by the Swiss National Science Foundation in the Framework in the Bulgarian-Swiss Research Programme (BSRP, grant No. IZEBZO_142989; DO2-1153).

1. Ali SI et al. (1992) Flora of Pakistan–Astereaceae. Karachi Univ., Karachi Printing Press, Pakistan, V. 210, p. 71.
2. BallPWandTutinTG (1976) GenusInulaL. In: FloraEuropaea (Tutin TG et al., Eds), Cambridge Univ. Press, Cambridge, UK, Vol. 4, 133–136.
3. Khan AL et al.(2010) Secondary metabolites from *Inula britannica* L. and their biological activities, Molecules, 15, 1562–1577and literature cited therein.
4. Todorova M et al. (2014) Potential of *I. britannica* for biotechnological production of biologically active sesquiterpene lactones, 8th CMAPSEEC, Durres, Albania

P92. LC/MS and 1H NMR-based analysis of furanocoumarins in two *Heracleum* species

Trendafilova A[1]; Jadranin M[2]; Godjevac D[2]; Andjelkovic B[3]; Todorova M[1]; Aneva I[4]; Zhelev P[5]

[1]*Institute of Organic Chemistry with Center of Phytochemistry, Bulgarian Academy of Sciences, Acad. G. Bonchev str., bl. 9, 1113 Sofia, Bulgaria;* [2]*Institute of Chemistry, technology and Metallurgy, University of Belgrade, Studentski Trg 12-16, 11000 Belgrade, Serbia;* [3]*Faculty of Chemistry, University of Belgrade, Studentski Trg 12-16, 11000 Belgrade, Serbia;* [4]*Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, 2 Gagarin str., 1113 Sofia, Bulgaria;* [5]*University of Forestry, 10 Kliment Ohridsky Blvd., Sofia 1756, Bulgaria*

trendaf@orgchm.bas.bg

Keywords: *H. verticullatum, H. sibiricum, fruits, leaves, furanocoumarins*

Heracleum sibiricum L. (syn. *H. sphondylium* subsp. *sibiricum* (L.) Simonk) and *Heracleum verticillatum* Pančić (syn. *H. sphondylium* subsp. *verticillatum* (Pančić) Brummitt) are recognized as subspecies of *H. sphondylium* [1]. *H. verticillatum* is a Balkan endemic species, while *H. sibiricum* L. is widely distributed in Europe. Both species are medicinal plants and their roots are used as decoction as diaphoretic and epileptic remedy in Bulgarian folk medicine [2]. Literature survey showed that furanocoumarins are the main biologically active compounds in *H. sibiricum* [3]. There are not data regarding chemical constituents of *H. verticillatum*.

In order to obtain new data for *H. verticullatum* and to get more insight into the taxonomy of the genus, the metabolomic study of the *H. sibiricum* and *H. verticillatum* fruits and leaves has been undertaken. The plant material was extracted with hexane and the resulting extracts were analyzed by ^{1}H NMR and LC/MS-TOF. The obtained results showed qualitative similarity in the content of the main components in *H. sibiricum* and *H. verticillatum*.

1. Assyov B and Petrova A (2012) Conspectus of the Bulgarian vascular flora. Bulgarian Biodiversity Foundation, Sofia.
2. Davidov D and Yavashev A (1939) In: Achtarov B (ed.) Court Printing Press, Sofia, p. 280 (in Bulgarian).
3. Bogucka-Kocka A (1999) Acta Poloniae Pharmaceutica - Drug Research, 56 : 399-402.