biology and life sciences forum

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Proceeding Paper

Content of Sterols in *In Vitro* Propagated *Chamerion angustifolium* (L.) Holub Plants †

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† Presented at the 2nd International Electronic Conference on Plant Sciences—10th Anniversary of Journal Plants, 1–15 December 2021; Available online: https://iecps2021.sciforum.net/.

Abstract: *Chamerion angustifolium* (L.) Holub (syn. *Epilobium angustifolium* L., Onagraceae family) is a medicinal plant used as a component of drugs, nutraceuticals and cosmetic products. *Ch. angustifolium* extracts have shown: anti-androgenic, anti-tumor, anti-inflammatory, analgesic, antioxidant and antimicrobial activities. *C. angustifolium* herb contains: ellagitannins, flavonoids and phenolic acids, triterpenes and fatty acids. Campesterol, cholesterol, stigmasterol and *β*-sitosterol and its derivatives have been identified in plants. Phytosterols are synthesized and accumulated in plant in vitro cultures, in this way *in vitro* cultures could be a an alternative source for the production of phytosterols. The aim of this study was to determine the content of campesterol, *β*-sitosterol and stigmasterol in *Ch. angustifolium* plants cultivated *in vitro*. The plants (shoots) grown *in vitro* were subjected to the HPLC-DAD analysis. The mean content of campesterol, stigmasterol and *β*-sitosterol was: 216.06±82.74 mg/100 g, 464.93±69.56 mg/100 g, 156.08±49.13 mg/100 g, respectively. The investigated genotypes differed in sterols content, particularly in *β*-sitosterol content: 69.79 – 222.49 mg/100 g DW. In this study, the effect of genotype on sterols accumulation under *in vitro* conditions was shown.

Keywords: *Epilobium angustifolium*; HPLC-DAD; *in vitro* cultures; campesterol; *β*-sitosterol; stigmasterol

Citation: Dreger, M.; Gryszczyńska, A.; Szalata, M. Content of Sterols in *In Vitro* Propagated *Chamerion angustifolium* (L.) Holub Plants. **2021**, *1*, x. https://doi.org/10.3390/xxxxx

Academic Editor: Giedre Samuoliene

Published: 1 December 2021

Chamerion angustifolium (L.) Holub (syn. *Epilobium angustifolium* L., Onagraceae family) plants are utilized as a component of drugs, nutraceuticals and cosmetic products. The European Medicines Agency [1] approved *E. angustifolium* in traditional herbal medicinal products for treatment and alleviating symptoms related to Benign Prostatic Hyperplasia (BPH). Plants are a rich source of ellagitannins, flavonoids and phenolic acids, the herb also contains steroids, triterpenes and fatty acids [2]. Campesterol, cholesterol, stigmasterol and *β*-sitosterol and its derivatives have been identified in plants. Considering, the growing demand for a raw material rich in these compounds, a new alternative source of phytosterols such as *in vitro* cultures should be considered.

The aim of this study was to determine the content of campesterol, *β*-sitosterol and stigmasterol in *Ch. angustifolium* plants cultivated *in vitro*. The plants after five weeks of culture on ½ MS [3] medium supplemented with indole-3-acetic acid indoleacetic acid (IAA; 0.5 mg/L), vitamin C (0.1 g/L), sucrose (15 g/L) and agar (8.5 g/L) were subjected to the HPLC-DAD analysis. Additionally, the analysis of phytosterols in the plants regenerated under in vitro conditions and planted in field was performed.

Plant harvested from field cultivation significantly differ in the composition and in the content of sterols. Results of HPLC-DAD analysis have shown that stigmasterol was a

dominant compound (382.60–577.77 mg/100 DW) in the plants grown *in vitro*. Among the tested genotypes, significant variation in the sterol content was found. In contrast to *in vitro* cultures, plants harvested from field synthesized mainly *β*-sitosterol (103.05 mg/100 g DW), whereas campesterol and stigmasterol were less abundant. Plants cultivated under *in vitro* conditions contained more sterols than plants grown in field. Therefore, it can be conclude that:

1.) *in vitro* cultures of *Ch. angustifolium* are rich source of phytosterols and
2.) genotype had a significant influence on the accumulation of phytosterols under *in vitro* conditions.

Funding:: This work was funded by the Polish National Centre of Research and Development grant No. PBS2/A8/23/2013.

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