

Evaluation of phytochemical composition and cytotoxic activity of wild grown and cultivated *Daphne mezereum* extracts: potential of cultivation of the species

Background. *Daphne mezereum* is a perennial, deciduous shrub that belongs to the *Thymelaeaceae* family. Based on Latvian ethnobotanical knowledge as well as current practices, *D. mezereum* has been used for digestive and skin problems, especially for toothache and tooth extraction. The content of biologically active components in plants is significantly affected by growing conditions, year, and genotype. It is important to analyse plant phytochemicals to find the best cultivation conditions for commercial purposes.

Aim. The aim of this study was to investigate the phytochemical composition and cytotoxic activity of extracts of *D. mezereum* collected in Latvia to analyse the domestication potential of wild populations of *D. mezereum* in organic farming.

Methods. Plant parts for chemical analysis and plantlets for field trials were collected from three wild-grown *D. mezereum* populations DAF01 (Rāmuļi), DAF02 (Jaunalūksne), and DAF10 (Dzērbenes distr.). Plantlets in 2019 were planted in an organically certified experimental field. Due to the very slow development of *D. mezereum* under field conditions, it was possible to collect the sample for chemical analysis only from the one-field-grown population. The ethanol and methanol extracts were prepared from twigs, fruits, leaves, roots and bark of wild-grown and cultivated specimens. LC–MS methods were used to determine the phytochemical composition and terpenoid content in *D. mezereum* extracts. The cytotoxic activity of *D. mezereum* extract was determined in myoblast (C2C12), fibroblast (3T3), and neuroblast (Neuro-2a) cell lines using the MTT assay.

Results. The main compounds identified in *D. mezereum* extracts were terpenoids, coumarin and flavonoid derivatives, and a slight amount of flavones. Gniditrin, daphnetoxin, and exocariatoxin were the dominant terpenoids in *D. mezereum* extracts. The content of terpenoids in *D. mezereum* twigs and bark was significantly higher than that in fruits, leaves and roots. According to the cytotoxic activity results (IC₅₀), *D. mezereum* extract was more effective in the Neuro-2a (68.7 ± 1.6 µg/mL) than in the C2C12 (139.3 ± 1.14 µg/mL) and 3T3 (140.8 ± 1.17 µg/mL) cell lines.

Conclusion. Although commercial cultivation of tested populations of *D. mezereum* is not promising due to the slow adaptation and development of plants, both wild-grown and cultivated *D. mezereum* are rich sources of diterpenoid constituents and possess selective toxicity to different cell types.

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