

Comparison of Terpene Composition in Engelmann Spruce (*Picea engelmannii*) Using Hydrodistillation, SPME and PLE

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Terpenes emitted by conifer trees are generally determined by analysing plant extracts or essential oils, prepared from foliage and cones using steam distillation. The application of these procedures limits experiments to cut plant materials. Recently headspace techniques have been adopted to examine terpene emission by living plants. This paper deals with the application of solid-phase micro-extraction (SPME) for the analysis of terpenes emitted by conifers foliage of Engelmann spruce (*Picea engelmannii*), including its seedlings. The compositions of SPME extracts obtained for destroyed and non-destroyed old and juvenile spruce needles were compared with the compositions of essential oils and pressurised liquid extraction (PLE) extracts corresponding to the same plant materials. No substantial differences have been found in the qualitative terpene composition estimated by analysing essential oil and PLE and SPME extracts from non-destroyed old and juvenile foliage. The disintegration of spruce needles results in the formation of a significant amount of myrcene in the case of the old conifer foliage and non-terpenoid compounds in the case of juvenile conifer foliage. This phenomenon can be attributed to enzymatic reactions occurring in the destroyed plant cells.

Key words: Terpenes, Engelmann Spruce, Solid-Phase Micro-Extraction