



The scent diversity of deciduous and conifer tree species in a tree diversity experiment (IDENT - Freiburg) – Analysis of BVOC profiles using GC – IMS (Gas Chromatograph - Ion Mobility Spectroscopy)

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Biogenic volatile organic compounds (BVOCs) produced by plants serve mainly as defense against predators and protection against solar radiation but can contribute to the formation of ozone especially in urban areas. The composition of the emitted BVOCs varies according to plant species, biotic and abiotic effects on plants. One biotic effect is the diversity of plant communities.

We studied the BVOC profiles for the sun leaves of twelve boreal conifer and deciduous tree species using a Gas Chromatograph – Ion Mobility Spectrometer (GC - IMS). We determined the BVOC diversity and dissimilarities for different species mixtures planted on the experimental site IDENT (International Diversity Experiment Network with Trees) in Freiburg by calculating the Shannon index and performing a hierarchical cluster analysis. A total number of 98 BVOCs with a mean of 26 compounds per boreal tree species were found, showing a lower chemical diversity compared to tropical tree species. The main differences were discovered between conifer and deciduous trees. Conifer tree species emitted a higher diversity and a larger quantity of BVOCs, but less species-specific BVOCs. The different BVOC profiles of a species planted in different mixtures were partly similar to one another but never exactly the same. The observation was made that the scent diversity of a tree species may depend on the species composition of the mixture ($P < 0.1$). Contrary to our expectations, we found that the scent diversity was not higher in mixed cultures than in monocultures. We concluded that it may not be the species but the number of neighboring trees that could have an influence on BVOC diversity. In cities trees are standing alone but drought and salt stress may affect BVOC emissions as well as ozone absorption. This is currently being studied.