



ACTRIS-Inter-laboratory comparison of VOCs in Europe: measurements of synthetic mixture and ambient air from pressurized cylinders

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For the analysis of volatile organic compounds (VOCs) in a synthetic mixture and in ambient air a comparison study between 19 European laboratories (see affiliations) running 21 research facilities was performed during 2012. The participating laboratories performed five measurements of a synthetic mixture (VOC in nitrogen) and of ambient air (VOCs in urban air) from high pressure cylinders. Reported VOCs include: 14 alkanes, 12 alkenes, 2 alkynes, 1 cyclic alkane, and 5 aromatics.

For the synthetic mixture, most laboratories reported VOC concentrations in a range close to the reference value ($\pm 10\text{-}15\%$), which was defined as the error weighted average of measurements previously performed by three selected laboratories (Empa-Duebendorf, DWD-Hohenpeissenberg, KIT-Garmisch-Partenkirchen). The compound with the largest difference between reported and reference value was n-hexane with a difference exceeding 300% for one laboratory.

For ambient air, the range of concentrations measured by the laboratories was considerably larger. Whereas measurements were close to the reference values for alkanes (e.g. propane) ($\pm 10\text{-}15\%$), alkenes (e.g. cis-butene) and alkynes (e.g. ethyne) led to the largest differences between reported concentrations and reference values (up to 900%).

Further investigations related to the measurement techniques applied by the participating laboratories and the elaboration of possible improvements will be shown. This will contribute to the preparation of a measurement guideline to be used for quantifying VOCs in air.