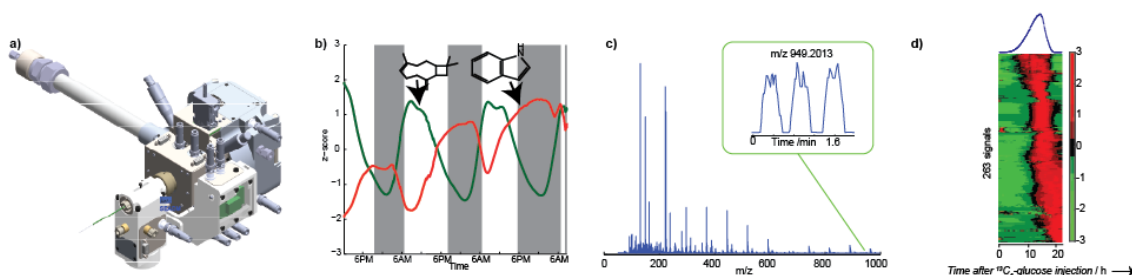


Olfaction of biologically relevant vapors

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The analysis of trace gases is of paramount importance in a wide range of applications. We have developed analytical instrumentation to address these needs. A secondary electrospray ionization source has been constructed and tested to detect vapors in metabolomics applications.^[1] *Ion source development:* Figure 1a shows the ion source developed in collaboration between ETH and an industrial partner. The geometry has been numerically optimized to analyze continuous gas flows as low as 0.5 L/min. *Plant emissions:* Figure 1 b shows two examples of real-time traces captured during monitoring of plant emissions during the course of three consecutive days.^[2] *Breath analysis:* Figure 1c shows a breath mass spectrum, whereby new species as high as m/z 949.2 were detected for the first time.^[3] *Yeast volatile metabolomics:* Figure 1d displays a heatmap showing 263 time-dependent signals detected in vivo during yeast growth. For reference, the ethanol signal is shown on the top. We conclude that commercial atmospheric pressure ionization mass spectrometers can be upgraded into sensitive real-time sniffers for a variety of applications.



[1] C. Barrios-Collado, G. Vidal-de-Miguel, P. Martinez-Lozano Sinues, *Sensors Actuators B: Chem.* **2016**, 223, 217; [2] C. Barrios-Collado, D. García-Gómez, R. Zenobi, G. Vidal-de-Miguel, A. J. Ibáñez, P. Martinez-Lozano Sinues, *Anal. Chem.* **2016**, 88, 2406, DOI: 10.1021/acs.analchem.5b04452; [3] M. T. Gaugg, D. Garcia Gomez, C. Barrios Collado, G. Vidal de Miguel, M. Kohler, R. Zenobi, P. Martinez-Lozano Sinues, *J. Breath Res.* **2016**, 10, 016010.