Researchers in many fields must characterize the emission and evolution of target volatile organic compounds (VOCs) during fast biological, chemical or industrial processes. Such measurements require online monitoring methods with large dynamic range and high time resolution.

The Vocus PTR-TOF is able to simultaneously measure large numbers of VOCs with ultra-low limits of detection, fast time response, and high mass resolving power. To demonstrate its ability to monitor dynamic changes in a complex VOC mixture, human breath was directly measured throughout the ingestion of a Ricola™ herb cough drop. The 13 herbs in these cough drops each have their own aroma compounds at concentrations spanning many orders of magnitude.

The figure at right shows the evolution of select VOCs during the consumption of the cough drop. Data were saved at a rate of 3 mass spectra/sec to capture rapid changes in VOCs related to herb aroma and metabolism. 1 pptv fluctuations of menthyl acetate were captured at sub-second resolution. Simultaneously, the instrument captured rapid changes in C_{10}H_{16} monoterpenes, which had concentrations that were 5 to 6 orders of magnitude greater than menthyl acetate.

The ultra-low limits of detection of the Vocus PTR-TOF enable the monitoring of sub-second changes in VOCs ranging from ppt to ppm concentrations.