

I. Remote Breath Sampling : *Proof-of-principle* - Monoterpene washout

Myrto[®] is a herbal medicine compiled of Eucalyptus-, Lemon- and Myrtle- (oil) extracts in an acidoresistant capsule. The predominant active ingredients 1,8-cineole and d-limonene (both >25%) are resorbed into the blood stream via the small intestine. These monoterpenes are exhaled in the breath via gas exchange (alveolae | breath) in the lungs.

The resorption and washout of cineole and limonene are used as *proof-of-principle* for devices and sampling setups that monitor blood borne volatile organic compounds in breath^[1].

A participant swallowed a capsule of Gelomyrto[®] forte (300mg) and their exhaled end tidal breath was analysed at regular intervals over approx. 8 hours. The breath sampling apparatus is shown in Fig.1. 5ml of end tidal breath was injected into a G.A.S. gas chromatograph coupled to an ion-mobility-spectrometer (GC-IMS) via a Luer-adaptor within one minute of the sample being taken. Fig. 2 shows the washout profile over time of the IMS intensities of both monoterpenes before and after ingestion of the capsule. Both compounds were first detected in the breath approx. 1.5 hours after ingestion, following this the intensities decrease nearly logarithmically. Seven hours after ingestion both compounds were still clearly detectable. The time profile of cineol is in very good correspondence with published data^[1]. Literature on the washout profile of limonene is not available at this time.

Common VOC compounds found in human breath (e.g. short chained aldehydes, ketones and alcohols, acetonitrile) can also be detected and analysed in the same analysis run.

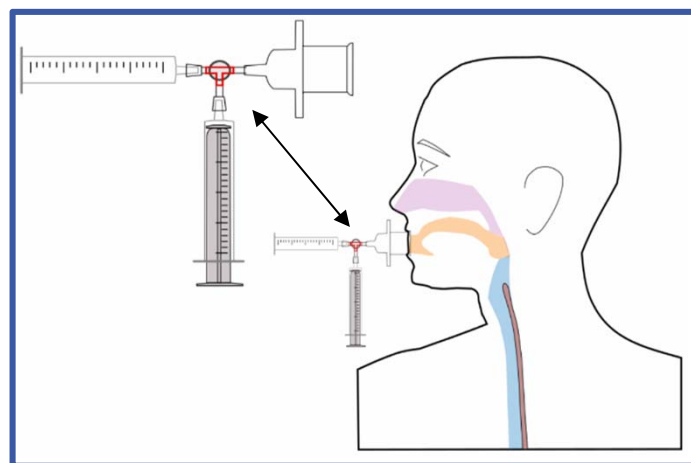


Fig.1: Breath Sampling: Participant exhales through an non re-breathing mouthpiece into a 10ml reservoir. 5ml of the end tidal breath is sampled into a conventional 5ml disposable syringe.

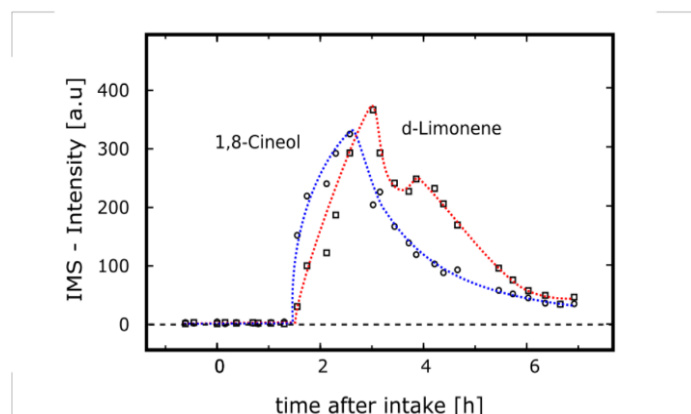


Fig.2: IMS signal intensity* of 1,8-Cineole and d-Limonene versus time after ingestion of a Gelomyrto[®] capsula (300mg)

* IMS signal intensity correlates to concentration logarithmically rather than linearly



Fig.3: GC-IMS equipped with Luer adaptor

Gelomyrto[®] is a Trade Mark of G. Pohl-Boskamp GmbH & Co. KG

[1] Beauchamp J1, Kirsch F, Buettner A., J Breath Res. 2010 Jun;4(2):026006. doi: 10.1088/1752-7155/4/2/026006. Epub 2010 Apr 22.

GC-IMS Setup:

Ion-Mobility-Spectrometer:

- GAS ³H-IMS TOF-design
- Driftgas: N₂

GC:

- 30m OV-201 type phase 1µm, d: 0.53mm
- Carrier gas: N₂
- Carrier gas flow ramp (150sec@3SCCM > linear ramp to 300sec/75SCCM > 75SCCM)
- runtime: 11min