

Massaspectrometer / PTR-TOFMS

<https://search.labfacilities.wur.nl/SearchDetail.aspx?deviceid=91e46b35-09d4-47ff-933c-8ef472230eca>

Brand

Ionicon

Type

Qi-TOF-V101-1.7.10



Contact

Alex Koot (alex.koot@wur.nl)

Organisation

Rikilt

Department

BU Authenticity & Bioassays

Description

PTR-TOF-MS: on line volatile detection

Proton Transfer Reaction – Quadrupole ion Time Of Flight (PTR-QiTOF) is a technique to measure volatiles by their masses. The measurements are on line, very fast, very precise and with a very good sensitivity. The technology can be applied in amongst others in food, taste, aroma, safety and health related research.

Advantages

- Samples for the PTR-QiTOF do not need any prior preparation.
- Analysis can be performed within seconds
- Changes can be measured on line (so effects of enzyme activities can be analysed by dynamic profiling)
- Compared to PTR-MS the soft ionization and dedicated software better support the actual identification of the measured masses
- The instrument and software are relatively easy to use

Technology

Due to the soft ionization technology where by proton transfer from H_3O^+ , all compounds with a higher proton affinity (PA) than water are ionized. Common constituents of air, such as nitrogen (N_2), oxygen (O_2), argon (Ar), carbon dioxide (CO_2) etc. have lower PAs than water (H_2O) and are therefore not detected. This results in low, real-time detection limit for trace compounds and due to precisely controlled ion source and drift tube parameters, absolute quantification of volatile concentrations is possible.

Visit the IONICON website for more information about the instrument.

Technical Details

The PTR-QiTOF specifications are:

- PTR-TOF-MS mass spectrometer from Ionicon featuring a Quadrupole ion guide: the PTR-QiTOF
- Mass resolution: > 6000 (up to 10,000) m/ m (FWHM)
- Sensitivity

- m/z 79 > 1000 (up to 2500) cps/ppbv; LoD < 10 pptv (60 sec)
- m/z 181 > 2000 (up to 4500) cps/ppbv; LoD < 1 pptv (60 sec)
- Response time: < 100 ms
- Pulse frequency: up to 200 kHz
- Mass range: 1-10,000 amu
- Linearity range: 1 pptv - 0.5 ppmv
- Adjustable flow: 50 - 1000 sccm
- Inlet system (Different/Multiplexing inlet systems available on request):

- 1.2 m long inlet hose - with inert (PEEK) capillary
- Inlet system heating: 40-180°C (104-356°F)
- Reaction chamber heating range: 40 - 120°C (104 - 248°F)
- Certified mouth piece to perform breath analysis is available

Applications

Examples of application areas are:

- Analysing food & flavour e.g. product development, study fermentation processes, oral cavity aroma release, routine quality control
- Authentication of food products e.g. typicality, geographical origin, farmers cheese, organic or conventional, food fraud
- Risk analysis e.g. explosives, chemical warfare agents, toxic industrial compounds, hormones, pesticides, pollution, animal housing quality
- Biological research e.g. analysing crop health, plant pathogen interactions, communication between organisms, pheromones
- Screening breeding population e.g. for flavour, defence or other quality traits
- Biomarker analysis for human health and disease e.g. exhaled breath analysis, urine, faecal, from research to routine diagnostics

Complementary Techniques

Computer equipment and software is available and experience is developed to support the analysis of different type of analysis on the data generated.