Differential Ion Mobility Spectrometry for Detection of Metabolites in Exhaled Breath

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Introduction

The content of a couple of volatile substances in exhaled breath is well known for several decades. Exhaled VOCs may give diagnostic information about different diseases of lung and airways. The differential ion mobility spectrometry is a new method in this field, originally developed for detection of dangerous substances in safety engineering.

Methods

For measurement of volatile metabolites in exhaled breath was used an differential mobility spectrometer (DMS) from SIONEX. The internal radiation source was selected for free border of application. A special breath-fractionation unit was developed for pre-analysis of breath due to correction of temperature and humidity.

Results

DMS was connected with a multicapillary column and an unit for pre-absorption of humidity and pollutants.
In healthy controls were performed single breath tests for pattern recognition due to environmental and nourish-caused specifications. Nutrition derived VOCs were detected and characterized.
Furthermore were measured breath pattern in patients with airway diseases like Asthma, COPD and infections.

Discussion

It was shown that characteristic breath pattern were detected in healthy and patients with lung diseases.
The intra-individual reproducibility was satisfactory. Fractionation of exhaled breath was helpful in exclusion of environmental pollutants and nourish-caused VOCs from mouth cavity.
The DMS may be a good alternative to GS-MS and traditional IMS by price but with comparable detection limits.