

COMPARISON OF EXHALED BREATH ANALYSIS WITH ION MOBILITY SPECTROMETRY (MCC/IMS) BETWEEN HEALTHY SUBJECTS AND LUNG CANCER PATIENTS AT DIFFERENT SITES.

Michael Westhoff^{1,2}, Jakob Scheuble³, Patrick Littterst¹, Jörg Ingo Baumbach³

¹ Department of Pneumology, Sleep and Respiratory Medicine, Hemer Lung Clinic, D-58675 Hemer, Germany

² Witten/Herdecke University, D- 58455 Witten, Germany

³ B. Braun Melsungen AG, Branch Dortmund, Center of Competence Breath Analysis, BioMedizinZentrum Dortmund, D-44227 Dortmund, Germany

Introduction:

Exhaled breath analysis is considered as a potential carrier of information in relation to pulmonary disease. Its broader application needs information about comparability of test results at different sites.

Material and methods:

Exhaled breath analysis of 533 lung cancer patients and 213 healthy controls at 4 different sites by using ion mobility spectrometry [Bio-Scout® - B&S Analytik GmbH, Dortmund, Germany]. Patients with lung cancer (stage I - IV and at any age) were compared to healthy subjects.

Results:

The comparison of 533 breath samples from 533 lung cancer patients with 1229 breath samples from 213 healthy persons showed 3 significantly discriminating peaks (P20 - Dimethyl disulfide [624-92-0], P23 - Camphene [79-92-5], P31 - Acetophenone [98-86-2]) allowing the discrimination of both groups with an accuracy of 0,880 (P20), 0,891 (P23) and 0,871 (P31). P 20 (Dimethyl disulfide) and another Peak P 4 - 1,3-Dimethylbenzene [108-38-3] showed a significant difference in intensity between the control groups at two sites, which indicates them as site-specific analytes.

Conclusion:

Healthy persons and lung cancer patients can be discriminated by breath analysis with a high accuracy, even when breath analyses are carried out at different sites, in order to reach a high number of breath samples and analytes, which is necessary to overcome the $n < p$ problem step by step. However, discriminating analytes need to be separated into disease-specific and site-specific ones.