

RESEARCH ON VOLATILE ORGANIC COMPOUNDS USING THERMAL DESORPTION WITH GAS CHROMATOGRAPHY

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Volatile organic compounds (VOCs) are chemical compounds constantly surrounding us in our everyday environments. Exposure to a high concentration of those compounds could cause concerning health and environmental problems. Their study and constant monitoring are important for air quality control, both indoors and outdoors. In addition to that, the study of their emissions from food can be useful to determine possible fraud or contamination. Moreover, the study of VOCs emitted from human breath could be used as a tool for disease diagnosis.

During our research, we studied the currently available devices for VOCs collection, and developed our own cheap, easy to use, and reliable system. Self-modified LDPE bags were selected as the perfect device for the purpose of human breath VOCs collection.

Thermal desorption coupled to gas chromatography mass spectrometry (TD/GC-MS) system was the methodology used for the analysis and identification of the collected VOCs.

Human breath samples were collected and analysed to understand the VOCs profile and its variations depending on several factors, like smoking or food habits, exposure to fragrances or traffic contamination, practise of sports or even presence of a disease.

An innovative calibration method was created for quantification of toxic compounds present in breath, coming from food ingestion.

The same developed system for human breath was employed for the collection of VOCs from food emissions. The study of food VOCs was successfully achieved for the discrimination of different species of peanuts and coffee blends.

To finalise our research, air samples from several environments were analysed to study the diverse VOCs profiles. Different sources, especially from fossil fuels, vegetation and fragrances, can give a distinctive VOCs pattern for recognition of specific locations. In addition, people exposed to those locations could modify their VOCs breath profile.