

Simultaneous Multifiber Solid-Phase Microextraction (Simulti-SPME)

Tech ID # GMU 11-037

Patent No. 19,476,813

Description of Technology:

The diagnostic potential and health implications of volatile organic compounds (VOCs) present in the human metabolome has begun to receive considerable attention. VOCs can be used as biomarkers of infectious diseases, metabolic disorders, genetic abnormalities and other kinds of disease, including schizophrenia, liver damage, and cancer. VOCs can be extracted and analyzed from human fecal samples as well as person's breath and biological fluids. Other applications for VOC analysis include investigations involving food, feedstock, environmental samples, soil, water and construction materials etc.

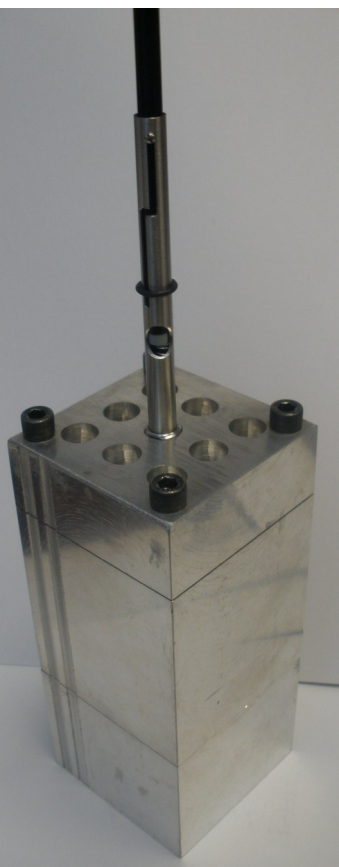
Early VOC metabolomics investigations utilized a single SPME fiber chemistry for analyte extraction and analysis, and as such were limited in scope and suffered from slow throughput. However, researchers at GMU have developed an apparatus and method for the collection and analysis of a chemically diverse array of analytes from samples using several solid-phase micro-extraction (SPME) fibers at a time. The apparatus and technique, known as simultaneous multifiber solid-phase microextraction, or simulti-SPME, can simultaneously use up to nine different commercially available SPME fibers, permitting the global metabolomic profiling of VOCs when coupled with gas chromatography. Hence, a more comprehensive metabolome is obtained in the fraction of time that would be required using a conventional approach.

Primary Investigator:

Dr. Robin Couch is an assistant-professor in the Department of Chemistry and Biochemistry at George Mason University and focuses his research on the human microbiome and Alzheimer's Disease.

Advantages:

- ◆ High throughput analysis of samples using up to nine adsorbent fibers simultaneously
- ◆ Small headspace design minimizes the required sample size (crucial for samples available in low abundance)
- ◆ Sealed chamber design prevents loss of VOCs while extraction is performed
- ◆ Amenable to a wide variety of samples, including biological and environmental
- ◆ Applications include Metabolomics, quality control/assurance, environmental monitoring, food sampling, and more.



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