

Direct Impact Spark Ionization (DISI) Mass Spectrometry (MS) for Identification of Microbes

Technology Summary

Generating reproducible mass spectra from bacterial samples at atmospheric pressure is challenging. **FDA/NCTR inventors designed a rapid mass spectrometry device using direct impact spark ionization source for identification of microbial analytes using spectral pattern recognition.**

The device's design includes a rapid mass spectrometer suitable for analyzing microbiological samples that was previously used to analyze low volatility organic compounds. The device uses a solid needle for electrode discharge. It includes a gear plate that introduces stainless steel pins carrying bacterial samples. The pins also act as counter electrodes that are targeted by controlled arcs. The small custom-made glass cylinder is meant to shut out oxygen and prevent the introduction of ambient moisture into the analyte is unique from other DISI devices. Studies revealed enormous peak intensity and spectral information with normal ionization mode on the same instrument. This device can be used for pathogen determination in clinical settings, QA/QC (drugs, food or cosmetic ingredients), along with continuous monitoring of (airborne) Biological Warfare Agents.

Potential Commercial Applications

- Pathogen detection,
- QA/QC (of drugs, food or cosmetic ingredients),
- Continuous monitoring of (airborne) Biological Warfare Agents.

Competitive Advantages

- Rapid, specific, sensitive and reproducible identification of microbiological analytes
- Systematic acquisition of reproducible spectra among the same bacterial species
- Whole cell analysis of food-borne pathogens is rapid, safer and micro-reliable
- Characteristic mass spectra obtained and reproduced for food-borne pathogens
- Unique DISI device with gas cylinder chamber

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Intellectual Property:

United States Patent No. [8,704,169](#) issued 04.22.2014

Product Area: Pathogen detection, biodefense, airborne detection CBRN, Quality control/assurance

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