Exploration of Microplasma Probe Desorption/Ionization Mass Spectrometry (MPPDI-MS) for Biologically Related Analysis

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Mikroplasma; Ionisation; biologische Probe; Exploration; biologische Analyse; rostfreier Stahl; Phospholipide; Aminosäuren; Lösungsmittel; Keton; Aldehyd; medizinische Diagnose; Glimmentladung; Massenspektrometrie; Ionenquelle

MICROPLASMA; IONISATION-PROCESS; BIOLOGICAL-SAMPLES; PROSPECTING; BIOLOGICAL-ANALYSIS; CORROSION-RESISTANT-STEEL; PHOSPHOLIPID; AMINO-ACIDS; SOLVENTS; KETONES; ALDEHYDES; CLINICAL-DIAGNOSTICS; GLOW-DISCHARGES; MASS-SPECTROMETRY; ION-SOURCES

Abstract
To expand the applications of glow discharge microplasma into biological analysis, an innovative ambient ion source for mass spectrometry, microplasma probe desorption/ionization mass spectrometry (MPPDI-MS), has been developed and demonstrated. Electrodes and a sampling tube were creatively combined using a stainless steel syringe needle, and efficient methods of introduction for biological samples in solid, liquid, and gaseous phases like phospholipid and amino acids were specially designed. Based on the active species generated by glow discharge plasma, simplified protonated spectra were obtained without extra solvent spray assistance. The method is easy to operate and versatile and especially has the ability to distinguish the isomeric compounds of ketone and aldehyde. Quantitative results of this method for different biological samples in different phases were also performed well. It was proved that with further improvement, this sensitive and selective analysis using MPPDI-MS with minimal invasiveness will be an ingenious tool in disease diagnosis and single-cell detections in the future.

Autor
Zhao, Zhongjun; Wang, Bo; Duan, YiXiang

Institution
Sichuan University, Chengdu, CN

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