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Colorado State University

Electromagnetically Vibrated Solid-Phase Microextraction Device for Trace Analysis of Organic Compounds

Solid-Phase Microextraction (SPME) is a useful analytical technique for solvent-free sample preparation in the extraction of organic compounds from a diverse array of sample matrices. SPME streamlines sample preparation, combining sampling, isolation, and enrichment into a single step. However, the rapidity of the technique is constrained by the speed at which sorption of organic compounds between SPME fibre and the sample matrix reaches equilibrium. This process, which can take anywhere from 30 minutes to 30 days, can be hastened by extraction techniques such as magnetic stirring, fibre insertion/retraction, mechanical vibration, and sonication. Yet, these techniques are not without their drawbacks—in particular, the need to maintain consistent, reproducible conditions throughout the analytical process.

To address these issues, researchers at Colorado State University and the Korean Institute of Construction Technology have developed an electromagnetically vibrated SPME device for trace analysis of organic compounds. Since the electromagnetically vibrated SPME uses a constant and controlled frequency induced by a pulsed direct current or alternating current, the electromagnetically vibrated SPME device allows equilibrium to be achieved more rapidly and increases the precision and efficiency of the extraction process. Potential applications include environmental monitoring, as well as in detecting drugs and drug metabolites in biological fluids.

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Patent Information
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Inventor Information
Kenneth Reardon
Jin Chul Joo
Joseph F. Wilmetti
Charles D. Shackelford

Features and Benefits

- Fast and efficient way of extracting organic compounds from flowing aqueous solutions.
- Increased speed in reaching sorption equilibrium when compared to other SPME techniques.
- Increased precision from uniform, reproducible sample preparation conditions.

Contact Information:
Dian Kammeyer
Phone: 970.491.7100
Email: dian.kammeyer@colostate.edu
www.csurf.org/tto