Device and Method for Accurate Sample Injection in Analytical Chemistry

Tech ID: 30290 / UC Case 2017-234-0

SUMMARY
Researchers in the UCLA Departments of Bioengineering and Medical and Molecular Pharmacology and the UCSF Department of Bioengineering and Therapeutic Sciences have developed a novel microvalve injector for capillary electrophoresis (CE) that improves injection repeatability and consistency.

BACKGROUND
Capillary electrophoresis (CE) is a chemical separation technique used to separate, identify, and quantify analytes. Unlike high-performance liquid chromatography (HPLC), CE can be miniaturized into microfluidic chips, where it can be used to analyze synthesized radioactive tracers. Additionally, as compared to HPLC, CE has a higher efficiency, higher resolution, and lower sample and reagent consumption rate. Despite the advantages of CE, its use is not as widespread as that of HPLC because CE has inferior sample injection reproducibility and repeatability.

INNOVATION
Researchers in the UCLA Departments of Bioengineering and Medical and Molecular Pharmacology and the UCSF Department of Bioengineering and Therapeutic Sciences have developed a novel microvalve injector for capillary electrophoresis (CE) that improves injection repeatability and consistency. The injector eliminates known biases in both electrokinetic and hydrodynamic injections and is straightforward to implement with standard microfluidic fabrication techniques. The injector has numerous CE-based applications, ranging from sample purity analysis to integration into fully-inclusive lab-on-a-chip platforms, and can potentially be used with other analytical techniques and instruments.

APPLICATIONS
- Pharmaceutical and radiopharmaceutical purity analysis
- Detection of disease biomarkers
- Environmental pollutant monitoring
- Could be integrated into lab-on-a-chip systems

ADVANTAGES
- Allows for highly repeatable sample injection
- Straightforward implementation
- Miniaturized platform and automated system
- Lower sample and reagent consumption

RELATED MATERIALS

PATENT STATUS

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<tr>
<th>Country</th>
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<td>United States Of America</td>
<td>Published Application</td>
<td>2020004151</td>
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<td>3523048</td>
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ADDITIONAL TECHNOLOGIES BY THESE INVENTORS
- Device and Method for Microscale Chemical Reactions
- Microscale Device and Method for Purification of Radiopharmaceuticals
- Novel Method of Radiofluorination
- Accurate and Rapid Micromixer for Integrated Microfluidic Devices
- Digital Microfluidic Platform for Radiochemistry
- Method for Concentration and Formulation of Radiopharmaceuticals
- Disposable World-to-Chip Interface for Digital Microfluidics