Single-Step Porous Polymer Monoliths for DNA Extraction

ID: 2018-014

Executive Statement:

An innovative single-step process for creating porous polymer monoliths designed for efficient DNA extraction, targeting antibiotic resistance genes.

Technology Overview:

This technology outlines a novel approach to DNA extraction, focusing on the rapid diagnosis of antibiotic resistance in sepsis cases. It employs a single-step photopolymerization process to create porous polymer monoliths within microfluidic channels, specifically designed for sequence-specific DNA capture. This method targets the Klebsiella pneumoniae carbapenemase (KPC) gene, demonstrating a significant improvement in binding capacity and efficiency over traditional methods.

Key Advantages:

- Single-step photopolymerization process simplifies production
- Threefold increase in DNA binding capacity
- Enhanced capture efficiency at elevated temperatures
- Effective in extracting DNA linked to antibiotic resistance genes
- Potential for integration into optofluidic systems for advanced detection

Problems Addressed:

- Complexity and inefficiency of traditional DNA extraction methods
- Low capture efficiency of DNA at room temperature
- Difficulty in rapidly diagnosing antibiotic-resistant bacterial infections

Market Applications:

- Clinical diagnostics for infectious diseases
- Rapid sepsis diagnostics through DNA extraction and analysis
- Antibiotic resistance monitoring and research
- Integration into lab-on-a-chip devices for point-of-care testing