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Cell Phone Integrated Paper Microfluidic Device for Colorimetric Multiplexed Detection of Analytical Targets

A new high-throughput, non-invasive biochemical assay rapidly measures ADME drug metabolism enzymes using proteins extracted from extracellular vesicles in blood or urine.

Researchers at Purdue University have developed a new paper-based microfluidic device to measure multiplexed targets that is compatible with a mobile phone application for fast readout. The device can be used to detect analytes such as in infectious diseases, food safety, and environmental pollution applications. Challenges remain in manufacturing current paper-based microfluidic assays as they are often difficult to replicate with precision. Purdue researchers meet this need by fine-tuning Î¼-PAD paper substrates, commonly used in applications such as glucose monitoring, with uniform colorimetric sensors through unique a UV ink screen-printing technique. These papers produce a rapid color change in the presence of analyte of interest. In testing with mercury and arsenic as model targets in food items, the low-cost, versatile microfluidic device reliably indicates analyte presence with high sensitivity and accuracy and the mobile phone software program created by Purdue researchers captures results with excellent limit of detection and specificity.

Advantages:

-Reliable

-Fast Readout

-Low-Cost

-Versatile

-Portable

Potential Applications:

-Infectious Disease Testing

Technology ID

2020-STAN-68920

Category

Agriculture, Nutrition, & AgTech/Food Safety & Traceability
Biotechnology & Life Sciences/Biomarker Discovery & Diagnostics
GreenTech/Environmental Remediation & Pollution Control
Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation
Pharmaceuticals/Research Tools & Assays

Authors

Jan Allebach
George Tsu-Chih Chiu
Lixby S Diaz
Lia Stanciu-Gregory
Min Zhao

Further information

Joe Kasper
JRKasper@prf.org

Nathan Smith
nesmith@prf.org

View online

-Food Safety

-Verification

-Environmental Pollution Detection

Technology Validation: Testing with Hg and As analytes and finding LOD as well as conducting specificity analysis with cell phones for verification

TRL: 2

Intellectual Property:

Provisional-Gov. Funding, 2020-01-28, United States | Utility-Gov. Funding, 2021-01-28, United States

Keywords: paper-based microfluidic device, multiplexed targets, mobile phone application, fast readout, infectious disease testing, food safety, environmental pollution detection, colorimetric sensors, UV ink screen-printing, low-cost diagnostic