

Detection of melamine in milk using nanopillar filters and Raman spectroscopy

Durucan, Onur; Rindzevicius, Tomas; Schmidt, Michael Stenbæk; Matteucci, Marco; Boisen, Anja

Published in:

Book of Abstracts, Sustain 2017

Publication date:

2017

Document Version

Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):

Durucan, O., Rindzevicius, T., Schmidt, M. S., Matteucci, M., & Boisen, A. (2017). Detection of melamine in milk using nanopillar filters and Raman spectroscopy. In Book of Abstracts, Sustain 2017 [F-8] Technical University of Denmark (DTU).

DTU Library

Technical Information Center of Denmark

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Detection of melamine in milk using nanopillar filters and Raman spectroscopy

Onur Durucan*¹, Tomas Rindzevicius¹, Michael Stenbæk Schmidt¹, Marco Matteucci¹, Anja Boisen¹

¹: Department of Micro- and Nanotechnology, Technical University of Denmark, Kongens Lyngby, DK-2800, Denmark

*onurd@nanotech.dtu.dk

We present a simple, robust, and automated method for detecting trace amounts of melamine in milk using nanostructured surface enhanced Raman spectroscopy (SERS) substrates integrated in centrifugal microfluidic platform [1]. Fast and facile extraction of the food adulterant (melamine) from milk on a SERS substrate was demonstrated down to 10 ppm within 10 minutes. The unique characteristic of the detection method is a “filter paper/chromatographic” effect which combines centrifugal forces and wetting properties of the SERS substrate to remove lipids and larger particles and leave a purified area for melamine detection. The work addresses issues related to SERS-based detection of analytes in complex media, which is important for realizing next generation SERS platforms applicable for a fast and affordable while at the same time sensitive sensors within food safety.

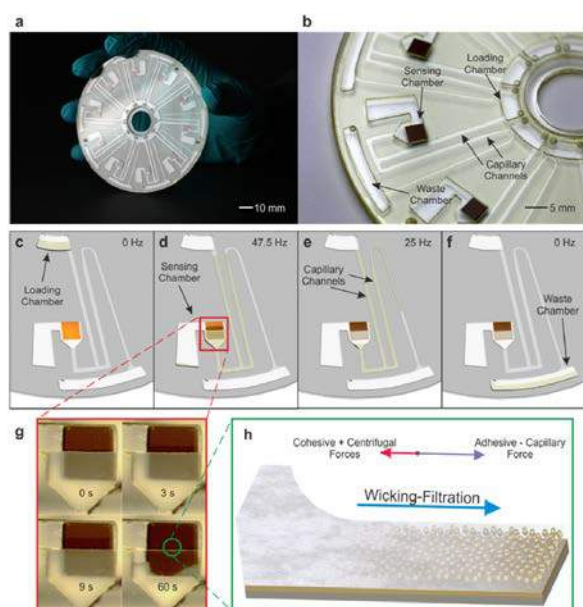


Figure 1. (a,b) Photographs of fabricated microfluidic disc. (c,d,e,f) Schematic illustration of the three-step filtration procedure: (c) the sample is injected, the disc is at rest; (d) the rotation frequency of the disc is 47.5 Hz, the sample under the action of centrifugal force is transferred to the sensing chamber and partially covered the SERS substrate; (e,f) the sample removal process with the help of pneumatic chamber and capillary channels under 25 Hz rotational frequency. (g) Real-time image series recorded during the filtration stage (d), the wet area is gradually increased and covered the whole chip in 60 s through the capillary wicking effect. (h) Illustrative drawing of capillary based wicking-filtration phenomenon on AuNP structures at the immersion boundary. [1]

[1] O. Durucan, T. Rindzevicius, M. S. Schmidt, M. Matteucci, A. Boisen, *Nanopillar Filters for Surface-Enhanced Raman Spectroscopy*, ACS Sensors, 2, 10, 1400-1404, 2017