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Salmonella Escherichia and *Listeria* (SEL) agar light scattering sensor for rapid multipathogen detection

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Aim: To investigate the use of a light scattering sensor, BARDOT (BActerial Rapid Detection using Optical scattering Technology) coupled with a multi-pathogen selective medium, SEL (*Salmonella, Escherichia,* and *Listeria*) for concurrent detection of the three major foodborne pathogens in a single assay.

Methods and Results: BARDOT was used to detect and distinguish the three major pathogens, *Salmonella enterica*, Shiga-toxin producing *Escherichia coli* (STEC) and *Listeria monocytogenes* on colony scatter signature patterns on SEL agar (SELA). Multiple strains of three test pathogens were grown on SELA, and BARDOT was used to generate colony scatter image libraries for inclusive (SEL-Library) and exclusive (non-SEL Library) bacterial group. These pathogens were further differentiated using the SEL scatter image library. The BARDOT sensor successfully detected and differentiated Salmonella, STEC, and Listeria on SELA with high classification accuracy 92-98%, 91-98%, and 83-98% PPV, respectively; whereas the non-target strains showed only 0-13% PPV. BARDOT identified colonies were further confirmed by multiplex PCR targeting *inl*B gene *of L. monocytogenes, stx2* of STEC and sefA of *S. Enteritidis.*

Conclusions: The results show that BARDOT coupled with SELA can efficiently detect and differentiate the presence of three pathogens.

Significance and Impact of the Study: This innovative SELA-BARDOT detection platform can reduce turn-around-time and economic burden on food industries by offering a label-free, non-invasive on-plate multi-pathogen screening technology for reducing microbial food safety and public health concerns.

Biography

Maha Usama Abdelhaseib received her bachelor of veterinary medicine degree (BVSc) from Egypt, completed her Master dergee in Food Hygiene at 2009 Egypt and her PhD as Visiting scholar in the Food Science departement at Purdue University IN USA in 2014, Right after, she has started her postdoctoral studies at Purdue University in 2016. She is Lecturer at Food Hgiene departement Assiut University, Egypt. She is motivated researcher working in the core and interdisciplinary area of molecular microbiology, pathogen detection, biosensors, food microbiology and safety.

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