Can your iPhone check if your food is safe? - Nanosensors for rapid detection of food pathogens

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Abstract:

Rapid and accurate detection of food and waterborne pathogens is important because millions of people suffer from food poisoning every year, resulting in hospitalization and death. The Center for Disease Control has estimated that 48 million people suffer from food-borne pathogens every year, leading approximately to 128,000 hospitalizations and 3,000 deaths. Pathogen contamination can lead to a variety of serious illnesses, and are often the reason behind recalls of consumer products. Current methods of pathogen detection are time consuming, expensive, and often require specialized training. Hence early detection of bacterial pathogen is difficult. Contaminated products may pass through the screening process undetected. False positive that a food item is contaminated may also result in unnecessary recall of the item and a negative impact on the economy. *E. coli*, being one of the most widely used indicators for fecal contamination, is a rational choice for determining the safety of food. The virulence of different bacterial pathogens has been found to correlate with their binding affinity for mannose and other complex carbohydrates. We have developed nano-structured sensor/membranes with the capabilities for rapid, ultrasensitive, and highly selective detection of E.coli and other pathogens. Our low-cost biosensor relies on the high affinity of mannose for the FimH lectin of *E. coli* type 1 pili. This talk will explore how the pattern of lines on our nano-structured membranes could be analyzed visually and with mobile phones to indicate positive results for the presence of pathogens in food and water samples.

Biography: Dr. Sadik is Professor of Chemistry & Director, Center for Advanced Sensors & Environmental Systems at State University of New York at Binghamton (SUNY-Binghamton). She completed her Ph.D. in Chemistry from the University of Wollongong in Australia and did her postdoctoral research at the US Environmental Protection Agency (US-EPA). Dr. Sadik has held appointments at Harvard University, Cornell University and Naval Research Laboratories. Her research areas include surface chemistry, sensors, and new measurement approaches and their application to solving problems in biological system, energy and the environment. Sadik holds five U.S. patents for her work on biosensors, which have been licensed for commercial products. Sadik is currently the principal investigator of a joint NSF/Bill & Melinda Gates Foundation-funded project that focuses on developing field-based biosensor technology for smallholder farmers. This project addresses the detection and remediation of Colletotrichum gloesporioides, a pathogenic fungus found on many fruit and vegetable crops including yams, tomatoes, oranges, and bananas. Dr Sadik's work will drive changes in many areas, including early diagnosis of cancer, food safety, global health and sustainable agriculture. Her work has repeatedly received recognition as having real impact and significant value for society. Dr. Sadik is a fellow of the Royal Society of Chemistry, Fellow of the American Institute for Medical and Biological Engineering (AIMBE), NSF Discovery Corps Senior Fellow and the recipient of Harvard University's Distinguished Radcliffe Fellowship. Dr. Sadik has received numerous awards including SUNY Chancellor's Award for Scholarship & Creative Activities, Chancellor's Award for Outstanding Inventor, *Dean's Distinguished Lecturer* and NRC COBASE fellowship. She chaired the inaugural "Gordon Conference on Environmental Nanotechnology in 2011 and has served as the nanotechnology editor for the RSC Journal of Environmental Science Processes and Impact. As the President and co-founder of the Sustainable Nanotechnology Organization-SNO (www.susnano.org), Sadik is promoting the responsible growth of nanotechnology around the world through research, education and outreach. Sadik is the co-author of over 165 publications and has given over 350 invited lectures and conference contributions world-wide. Sadik has been selected as a Jefferson Science Fellow (JSF) for 2017-2018 (https://careers.state.gov/work/fellowships/jefferson-science). Sadik is recognized for her research innovation (**https://en.wikipedia.org/wiki/Omowunmi_Sadik**) and sustainable nanotechnology