

# Rapid, one-step, ultra-sensitive detection of food poisoning bacteria and biothreats

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A new mosquito-sized biosensor can detect amazingly small amounts of disease-causing *E. coli* bacteria in food in a single-step process that takes only minutes, compared to hours required with conventional tests for that common food poisoning agent, researchers in Philadelphia are reporting.

The sensor also can quickly detect proteins important in medical diagnostic testing and very low levels of biothreats such as anthrax, according to the study, published in the current (April 1) edition of *ACS' Analytical Chemistry*.

In the study, Raj Mutharasan and colleagues point out that rapid measurements of very low concentrations of pathogens and proteins could have wide application in medical diagnostic testing, monitoring for biothreat agents, detecting contaminated food products and other areas. Existing tests for low-level pathogens, however, take time because they require a step to boost the concentration of microbes in a sample. No direct test currently exists for low-levels of proteins, the report adds.

The study describes use of the biosensor to detect *E. coli* in ground beef and other materials at some of the lowest concentrations ever reported. At the heart of the new biosensor is a vibrating cantilever, with a tiny beam supported at one end and coated with antibodies at its other, free-moving end. The antibodies are specific to the material being detected, such as *E. coli*, anthrax or proteins that are biomarkers for disease. When that antigen is present in a sample flowing through the biosensor,

it binds to the cantilever and alters the frequency of vibration in a way that can be detected electronically.

Source: ACS

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