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A. Garth Rand, Jianming Ye, Chris W. Brown, and Stephen V. Letcher. 2002. Optical Biosensors for Food Pathogen Detection. ***Food Technology*** *56(3): 32-39.*

The search for rapid, sensitive, inexpensive sensors for food pathogens is carried out in many laboratories. The key element of a successful biosensor is the ability to detect small concentrations of pathogens so that the time-consuming growth phase can be eliminated. Optical techniques have been widely studied and show great promise. Optical biosensors have advantages that include the small size and low cost of the components, inherent speed of measurement, ruggedness, and high specificity based on the use of antibodies or enzymes. This review article features NRI funded research at the University of Rhode Island, which describes the techniques that have been tried, devices developed, and the few commercial sensors available today. A fluorescent sensor is described that uses antibodies attached to magnetic microspheres to capture pathogens. These, in turn, capture secondary antibodies labeled with fluorescent dye. A magnet is then used to position these complexes in front of optical fibers that are used to detect the fluorescence. Another system that uses distributed capture followed by concentration for efficient sensing is based on membrane filtration and chemiluminescence. It has been used to detect *Staphyloccocus Aureus* at concentrations lower than those that cause food poisoning. Other optical sensors are based on the technologies of surface plasmon resonance and infrared absorption. A surface-enhanced infrared system is described that uses a thin film of gold clusters to magnify the absorption effect. This work will shorten the detection time for food-borne pathogens, allowing the food industry and regulatory and public health agencies to diagnose and prevent future cases of food-borne illness.

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