

# **F** FOOD & BEVERAGE TECHNOLOGY REVIEW

FOOD SAFETY  
**EDITION**



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TECHNOLOGY REVIEW



# Lightsense Technology

## A Game Changer in Pathogen Detection

**W**ith the rise of food processing industries and extended, worldwide food transport chains, foodborne diseases have become a pressing concern. Tracking pathogens appearing in the worldwide distribution systems has become challenging. Failure to detect pathogens at the source can cause extensive harm and the scope of the problem grows daily.

Even where food processing plants use the latest techniques available, they are not always efficient in quickly screening for various pathogens. A new generation of optical detection tools is raising expectations for more accurate and efficient screening. Recent advances in science and development of new, advanced analytical techniques give even more reasons for optimism. By rethinking how these new tools can be applied across food supply chains, a new era of public safety is emerging. Spectroscopic tools have been used for some time to sort or grade the quality of foods, including looking for residual pesticides, but have not been systematically applied for pathogen detection. Early detection of pathogenic bacteria or viral contaminants could dramatically enhance the safety of the food supply, and thereby save lives.

Addressing these compelling challenges is the Arizona-based Lightsense Technology with its path-breaking new optical instruments and techniques, including Enhanced Photodetection Spectroscopy (EPS), which is revolutionizing pathogen detection.

Lightsense offers lightweight, handheld, multi-spectral technology for a range of applications, with a particular emphasis on critical issues of public health, including detection of pathogens to safeguard the food supply and for detection of illicit drugs, in particular fentanyl, for law enforcement. As the first-ever multi-spectral platform in the market, the extraordinary sensitivity, small size and ease of use, of the Lightsense EPS technology is a game-changer, and is expected to become a critical tool for pathogen detection. This will help safeguard the food supply, from processing plants to markets and restaurants. "We believe we can create enormous value in safeguarding the food supply by detecting and identifying pathogens at the source early in the supply chain," says Wade Poteet, Ph.D., CTO of Lightsense Technology.

Unlike typical spectrometers, where only one type of data is recorded, EPS combines data from multiple spectroscopies and applies data fusion and analysis using machine learning techniques. Multiple types of spectral information input effectively add additional "dimensions" of information, and results in far greater sensitivity. The received output can then be compared with information stored in the cloud for pattern matching with past known samples (via machine learning).

Be it E. coli or Listeria, or Salmonella, EPS can accurately detect bacteria in various food samples.

This sophisticated new technique allows for detecting viruses and/or bacteria at relatively low levels, greatly enhancing the safety of food production. EPS can often accurately identify a virus or bacteria in a complex solution containing a wide range of different organic molecules, and can perform the screening in under a minute, not hours or days.

Lightsense is developing a "total solution" to the problem of food pathogens, and plans to roll out a disinfection/pathogen-eradication device in the near future that will work hand-in-hand with pathogen detection. "Certain livestock and fish processing examples are some of the initial areas in which we plan to apply our technology," says Bruce Berkoff, CMO of Lightsense Technology.

In addition to addressing problems in food safety, Lightsense has recently launched a series of multi-spectral devices for detection of illicit drugs and aimed at the law enforcement market. Its evolving portfolio includes a small handheld portable Methamphetamine detector, to be followed soon by one for Fentanyl, both of which can be of great value to law enforcement in the current opioid crisis. Lightsense has also shown that the EPS technique can detect and identify viruses, including the Coronavirus, in human saliva quickly and accurately. This instrument is still in R&D, but is expected to prove useful in both the lingering current and future pandemics.

The company is currently in talks with partners to extend the application of its technology to other areas of food processing and agriculture, with some announcements to come later this year. In the months and years to come, Lightsense is expected to launch their breakthrough technologies in various markets and applications to help improve public safety. 



WADE POTEET