

**Hyperspectral Imaging for Detecting the
Application of Biochemical
Agents to Food Crops**

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Abstract

Damage to our nation's food crops, either through a willful act of terrorism or as a result of a natural disaster, would clearly result in a threat to our homeland security. A breach in the nation's biosecurity, either real or perceived, could cause widespread panic as well as irreparable economic damage to the U.S., where one in eight jobs depends on food production.

Remote sensing technologies, such as hyperspectral imagers (HSI) hold great potential for being an early detection tool. Researchers at Mississippi State University are designing, implementing, and validating the use of an HSI-based automated target recognition (ATR) system for detecting when airborne bio-chemical agents have been applied to agricultural crops. Likewise, the system could be used to detect false alarms, such as hoaxes aimed at causing disruptions in our nation's food supply.

The HSI technology can be mounted on handheld instruments, or airborne/satellite platforms. Thus, the proposed ATR system could be put directly into the hands of first responders or could be used to remotely detect events on a much larger scale via available airborne and/or satellite imagery. In the current project, the ATR system being designed is for use with handheld instruments. Field-level experiments are being conducted to validate the ATR system's capability to detect both chemical (such as toxic industrial chemicals) and biological agents (such as fungal-based diseases like soybean rust) present in food crops.