Review of SERS-based sensors for agricultural applications

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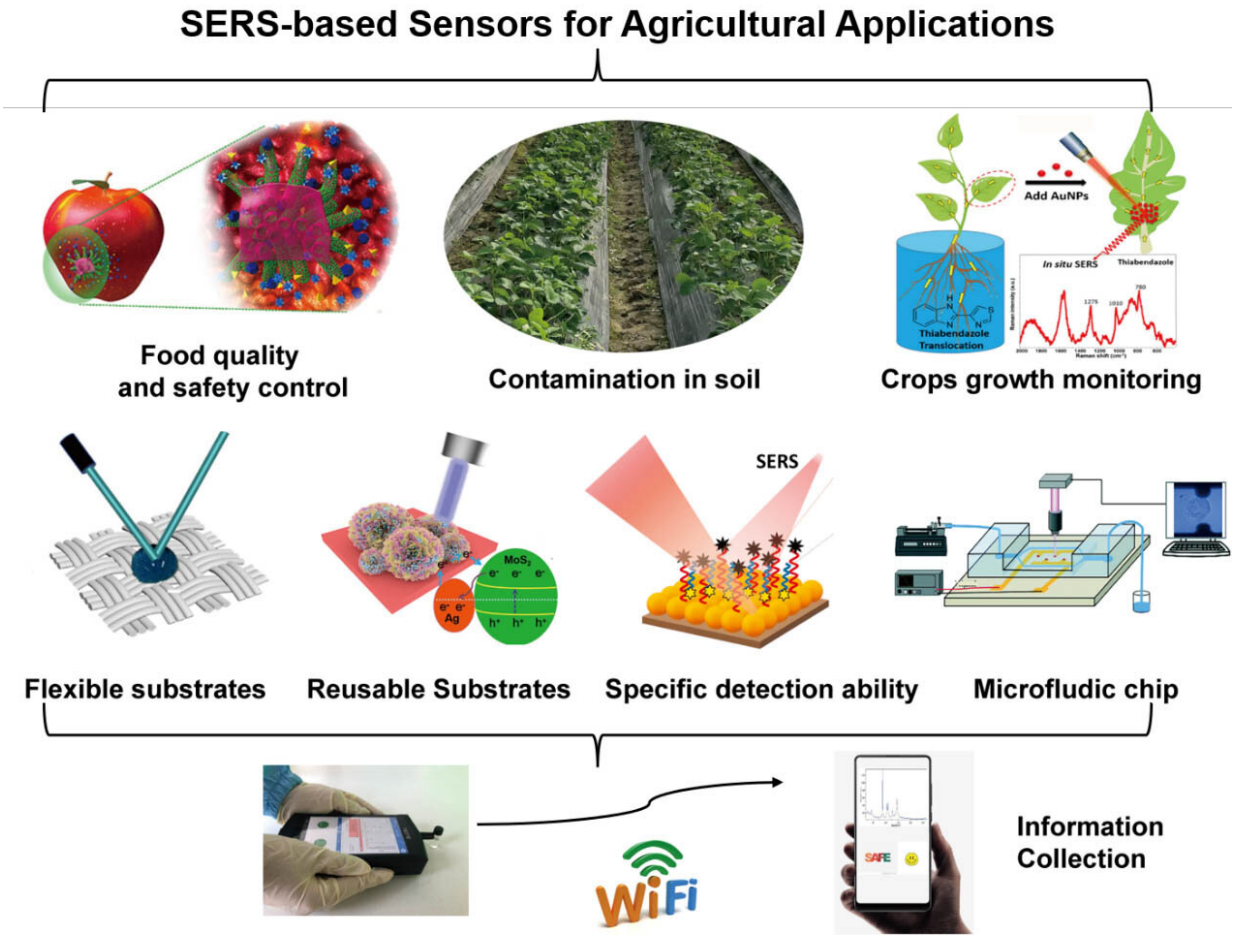

Schematic illustration of SERS-based sensors for agricultural applications. Credit: Liu Chao

A research team led by Prof. Huang Qing at the Institute of Intelligent Machines, Hefei Institutes of Physical Science (HFIPS) of Chinese Academy of Sciences (CAS) analyzed SERS-based agricultural sensor research and applications in a review paper.

Published in *Trends in Food Science & Technology*, this review provides a useful guide for the development of optical-spectroscopy sensing technology for intelligent agriculture.

Surface-enhanced Raman scattering/spectroscopy (SERS) technology has been applied in many fields as a non-destructive and sensitive detection and analysis tool with fingerprinting characteristics for chemical substances. Numerous application can be found in the agricultural field, including product quality assessment, crop growth monitoring, plant seed screening, and food safety control.

SERS technology boasts special advantages over most traditional methods in terms of detection speed, cost, efficiency, versatility, automation and portability. Therefore, the development of agricultural sensor technology based on SERS has also received increasing attention and attention.

Huang Qing's team has long been devoted to the basic and applied research of spectroscopy, including SERS technology.

In this review paper, they made a comprehensive survey of the current development of SERS agricultural sensors.

They shared their thoughts on the development and application of SERS technology in terms of detection of pesticide residues and other harmful substances in agricultural product quality and safety control.

Concerning the properties and advantages of SERS technique,

researchers introduced the applications of SERS sensors/substrates of different types, including flexible SERS substrates, reusable SERS substrates, specific target-selective SERS substrates, and microfluidic-based SERS chips, illustrating with examples applied to different scenarios.

"This review demonstrated the application prospects of SERS agricultural sensors," said Liu Rui, first author of the paper.

More information: Chao Liu et al, A review: Research progress of SERS-based sensors for agricultural applications, *Trends in Food Science & Technology* (2022). DOI: 10.1016/j.tifs.2022.07.012

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