



Up to half of all fruit sold in the EU contains pesticides linked to human health problems | Photo source Joanna Nix-Walkup on Unsplash

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A TINY SENSOR DETECTS PESTICIDE RESIDUE ON INDIVIDUAL FRUITS

 FOOD & DRINK

The sensor can be sprayed on produce to detect even very low levels of pesticide

Spotted: It is well-known that many pesticides can cause negative health and environmental issues, including dermatological, gastrointestinal, neurological, carcinogenic, respiratory, reproductive, and endocrine effects. In fact, reports show that up to half of all fruits sold in the EU contain pesticides linked to human health problems. But detecting pesticides on produce can be costly and time-consuming. However, thanks to a new sensor, it may soon be possible to change this.

The tiny sensor, developed by researchers at Karolinska Institutet in Sweden, uses a technique called surface-enhanced Raman scattering (SERS). This is a spectroscopy technique that enhances the surface vibration of molecules using nanoscale roughened metal surfaces made of gold or silver. Using laser light matched to the vibrations, the SERS technique makes it possible to detect very low concentrations of substances without the need for more complex and expensive fluorescent labelling.

The researchers deposited small droplets of silver nano-particles onto a surface using flame spray. By fine-tuning the distance between individual nano-particles, the researchers can improve their sensitivity. The sensors were tested by applying a thin layer of tracer dye and using a spectrometer to determine their molecular fingerprints. The sensors were able to reliably detect molecular signals over a period of 2.5 months. The result demonstrates that the sensors can be applied over a large area and have a relatively long shelf life.

Haipeng Li, a postdoctoral researcher and the study's lead author [explained](#) that the sensors, "can detect pesticide residues on apple surfaces in a short time of five minutes without destroying the

fruit. While they need to be validated in larger studies, we offer a proof-of-concept practical application for food safety testing at scale before consumption.”

At Springwise, we have seen a number of recent innovations aimed at improving food safety and security. Several of these are designed to help food stay fresh longer, such as smart, [antimicrobial food packaging](#) and [non-toxic emulsions](#) which can help control the growth of fungi and bacteria on plants.

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Takeaway:

Current techniques for detecting pesticides on individual products, such as a single piece of fruit, can be both costly and cumbersome. By offering an inexpensive and easy-to-use alternative, the nano-sensors could become an efficient way to monitor traces of food pesticides much more easily. But the researchers are also interested in the application of this process to healthcare as well. The next step will be to see if the nano-sensors can be applied to areas such as discovering biomarkers for antibiotic-resistant bacteria in settings with limited resources.