



The Velcro-like food sensor, made from an array of silk microneedles, can pierce through plastic packaging to sample food for signs of spoilage and bacterial contamination | Photo source [MIT / Felice Frankel](#)

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SILK-NEEDLE SENSOR DETECTS FOOD SPOILAGE



The sensor is made of microneedles moulded out of edible proteins and could lead to an easy-to-read food-waste sensor

Spotted: Engineers at MIT have developed a sensor that pierces packaging to sample food for signs of bacterial contamination and spoilage. The sensor is made of microneedles moulded out of edible proteins similar to those found in silk cocoons. It is a first step toward developing an easy-to-read sensor that can help prevent food waste.

The microneedles resemble Velcro and measure about 1.6 millimetres long by 600 microns wide — just one-third the diameter of a strand of spaghetti. They are used to draw fluid into the back of the sensor, which is printed with two types of specialised ink. These bio-inks change colour when they come into contact with fluids at different pHs, indicating when bacteria is present or when food is spoiled.

The researchers have successfully tested their sensors on fish deliberately infected with *E. coli*, indicating they could be used to head off outbreaks of salmonella and other bacterial infections. But the researchers also hope it could also help reduce the amount of food that is thrown out, by allowing people to easily check if the food that is past its sell-by date is still safe to eat.

Researcher Benedetto Marelli, the Paul M. Cook Career Development Assistant Professor in MIT's Department of Civil and Environmental Engineering, [adds that](#) “people also waste a lot of food after outbreaks, because they're not sure if the food is actually contaminated or not. A technology like this would give confidence to the end-user to not waste food.”

Springwise has highlighted other innovations that attempt to prevent or reduce food waste. These include an app that connects people with unwanted food and tech that can preserve [cooked food](#)

for years.

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Takeaway:

An estimated 1.3 billion tonnes of food is wasted globally each year. That is one-third of all food produced for human consumption. But many people throw away food that is still good because they can't tell if it has bacterial contamination. The microneedle sensors could help with this, detecting pathogens on both the surface and interior of foods, indicating contamination at an earlier point than existing sensors. The researchers hope the sensors could eventually be used at different stages along the supply chain, to monitor products before they reach consumers, as well as by consumers themselves.