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Low-cost tool detects plastic particles in food using fluorescent labeling in minutes

Story by Prabhat Ranjan Mishra • 6d • 3 min read



Low-cost tool detects plastic particles in food using fluorescent labeling in minutes

Nano and microplastics pose a serious threat to human health as these can absorb toxins. Byproducts of degrading plastic materials such as lunchboxes, cups and utensils, microplastics have the capacity to penetrate biological barriers within the human body.

To measure plastic released from everyday sources like disposable cups and water bottles, researchers have developed a low-cost, portable tool.



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The device developed by University of British Columbia researchers detects plastic particles ranging from 50 nanometres to 10 microns in size in minutes.

Paired with an app, the device uses fluorescent labeling to detect plastic particles that are too small to be detected by the naked eye.

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professor in the faculty of land and food systems, who developed the tool.

“This new technique allows quick, cheap detection of these plastics, which could help protect our health and ecosystems.”

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World pumps out 57 million tons of plastic pollution yearly and most comes in Global South



Existing methods to **detect** microplastics require skilled personnel and expensive equipment. Therefore, researchers aimed at exploring a faster, accessible and more reliable detection method.

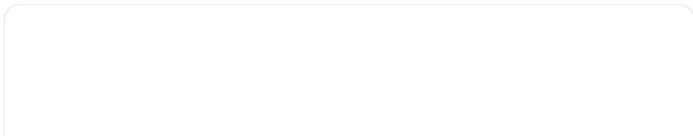
To develop the portable tool, researchers created a small, biodegradable, 3D-printed box containing a wireless digital microscope, green LED light and, an excitation filter.

To measure the plastics, they customized MATLAB software with machine-learning algorithms and combined it with image capture software.

Portable tool works with a smartphone or other mobile device

The result is a portable **tool** that works with a smartphone or other mobile device to reveal the number of plastic particles in a sample.

The tool only needs a tiny liquid sample – less than a drop of water – and makes the plastic particles glow under the green LED light in the microscope to visualize and measure them. The results are easy to understand, whether by a technician in a food processing lab or just someone curious about their morning cup of coffee, according to [University of British Columbia](#).





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Co-author of the study published in [ACS Sensors](#), Haoming (Peter) Yang, a master's student in the faculty of land and food systems, stated that once the microscope in the box captures the fluorescent image, the app matches the image's pixel area with the number of plastics.

Each test costs only 1.5 cents

"The readout shows if plastics are present and how much. Each test costs only 1.5 cents."

Currently calibrated to measure polystyrene, the tool can also measure different types of plastics like polyethylene or polypropylene after the machine-learning algorithm is tweaked.

To analyze plastic particles for other real-world applications, researchers now aim to commercialize the device.

"To reduce plastic ingestion, it is important to consider avoiding petroleum-based plastic products by opting for alternatives like glass or stainless steel for food containers," said Dr. Yang.



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"The development of biodegradable packaging materials is also important for replacing traditional plastics and moving towards a more sustainable world."

The long-term impacts of ingesting plastic from beverages, food, and even from airborne plastic particles are still being studied but show cause for concern, according to [UBC](#).

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