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Is that meat fresh? Check your phone

Colour-changing barcode behind novel e-nose.



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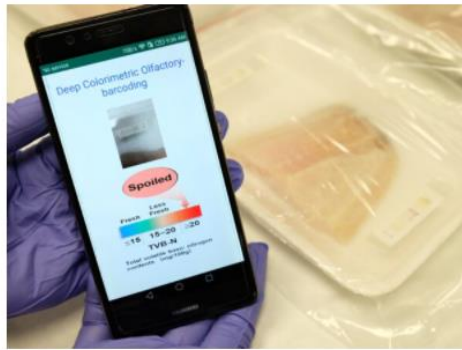


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Your phone might soon be able to do a sniff test for you.

Researchers are working on an artificial olfactory system they say mimics the mammalian nose and can accurately determine when meat is past its best.

It's based on a colour-changing barcode that reacts to meat gases, works just as well with beef, chicken or fish, and has applications in other parts of the food chain, they write in a [paper](#) in the journal *Advanced Materials*.



Credit: NTU Singapore

"Our proof-of-concept artificial olfactory system, which we tested in real-life scenarios, can be easily integrated into packaging materials and yields results in a short time without the bulky wiring used for electric signal collection in some e-noses that were

developed recently," says co-lead author Chen Xiaodong from Nanyang Technological University Singapore (NTU).

The project is a collaboration between NTU, Australia's Monash University, and Jiangnan University, China.

In mammals, gases that are produced by decaying meat bind to receptors in the nose. These receptors then generate and transmit signals to the brain which organises them into patterns, allowing us to interpret the odour of aging or decaying meat.

The e-nose has 20 bars in a barcode that mimics these receptors. Each bar is made of chitosan, a natural sugar, which is embedded on a cellulose derivative and loaded with dye. The dye then reacts to the gases by changing colour, creating unique patterns which act as a "scent fingerprint".

The team also developed an artificial intelligence system that can interpret the fingerprint using a library of barcode colours. The results – fresh, less fresh or spoiled – are then available via a smartphone app within 30 seconds.

To test the system, they glued the barcode to the packaging film of six meat packages, stored them at 25 degrees Celsius and monitored their freshness across 48 hours. Over 4000 images of the barcodes were taken at different time intervals without opening the package.

The e-nose was found to be 100% accurate in identifying spoiled meats, 96% accurate for fresh meat and 99% accurate for less fresh meats.

The researchers are now working to extend the e-nose concept into other types of perishables.



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