

New NTU AI model tracks food freshness in efforts to reduce waste, boost food security

The research team is currently in talks with supermarket chains to bring the technology to market for trials, which are likely to start in the second half of 2026.



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08 Apr 2026 02:04PM



SINGAPORE: Supermarkets and wholesalers may soon be able to keep produce fresh for longer while reducing food waste, with the help of a new artificial intelligence tool developed by Nanyang Technological University (NTU).

The model created by the university's Future Ready Food Safety Hub (FRESH@NTU) – a joint venture with the Agency for Science, Technology and Research (A*STAR) and the Singapore Food Agency (SFA) – can predict how bacteria grow in different types of food. This allows retailers to better determine shelf life, storage conditions and stock management.

Researchers can, for example, track how Salmonella – a major cause of foodborne illness globally – grows on food over time.

“What we are trying to do here is to mimic the condition of the storage and we see how bacteria grow, so we can collect the data,” said Dr Youssef Ezzaky, a research fellow at FRESH@NTU.

“Then we feed this lot of data to (facilitate) machine learning, to train and to generate accurate models.”

REDUCING FOOD WASTE

As Singapore imports 90 per cent of its food, more accurate tracking of shelf life could mean stored food supplies do not need to be replaced as frequently – potentially cutting food waste and reducing reliance on constant imports, said observers.

Using its AI-based predictive modelling framework, the team can estimate contamination levels of harmful pathogens under real-world storage conditions along the supply chain with greater accuracy.

Professor William Chen, director of FRESH@NTU, said their approach captures snapshots at specific points along the distribution chain.

Using pork as an example, he explained that monitoring factors such as temperature and moisture throughout the process, from slaughterhouses to retailers, makes it possible to assess the meat's freshness and safety.

LOWERING FOOD POISONING RATES

Prof Chen, who is also director of the university's food science and technology programme, said the model has a wide range of applications.

"We know that whenever there's food poisoning incidents, coming from anywhere like central kitchen or restaurants, we react by sort of stopping the business operations... find(ing) out the cause of this food poisoning," said Prof Chen.

"All these are resource-intensive and time-consuming ... So what we call this is a reactive way of ensuring food safety."

Instead, he hopes the technology will encourage a more proactive approach.

The model could also help retailers decide more precisely when food is no longer safe to sell, reducing unnecessary disposal.

In addition, it may lower energy consumption for supermarkets and cold storage operators.

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He explained that AI can be used to monitor food freshness and safety in frozen storage, allowing operators to assess whether slightly higher temperatures – such as adjusting from -20°C to -16°C – can still maintain food quality.

“In doing so, we are actually helping the company save a lot in energy bills,” he added.

“Because when you change the temperature by one degree, that's a lot of reduction in the electricity bills.”

The research team is currently in talks with supermarket chains to bring the technology to market for trials, which are likely to start in the second half of this year.

Supermarket chain Sheng Siong has expressed interest in collaborating, noting that such innovations align with its priority of improving food safety.

The NTU team also hopes to partner cold storage and stockpiling firms, as part of broader efforts to boost Singapore's food security.

Source: CNA/ca(It)