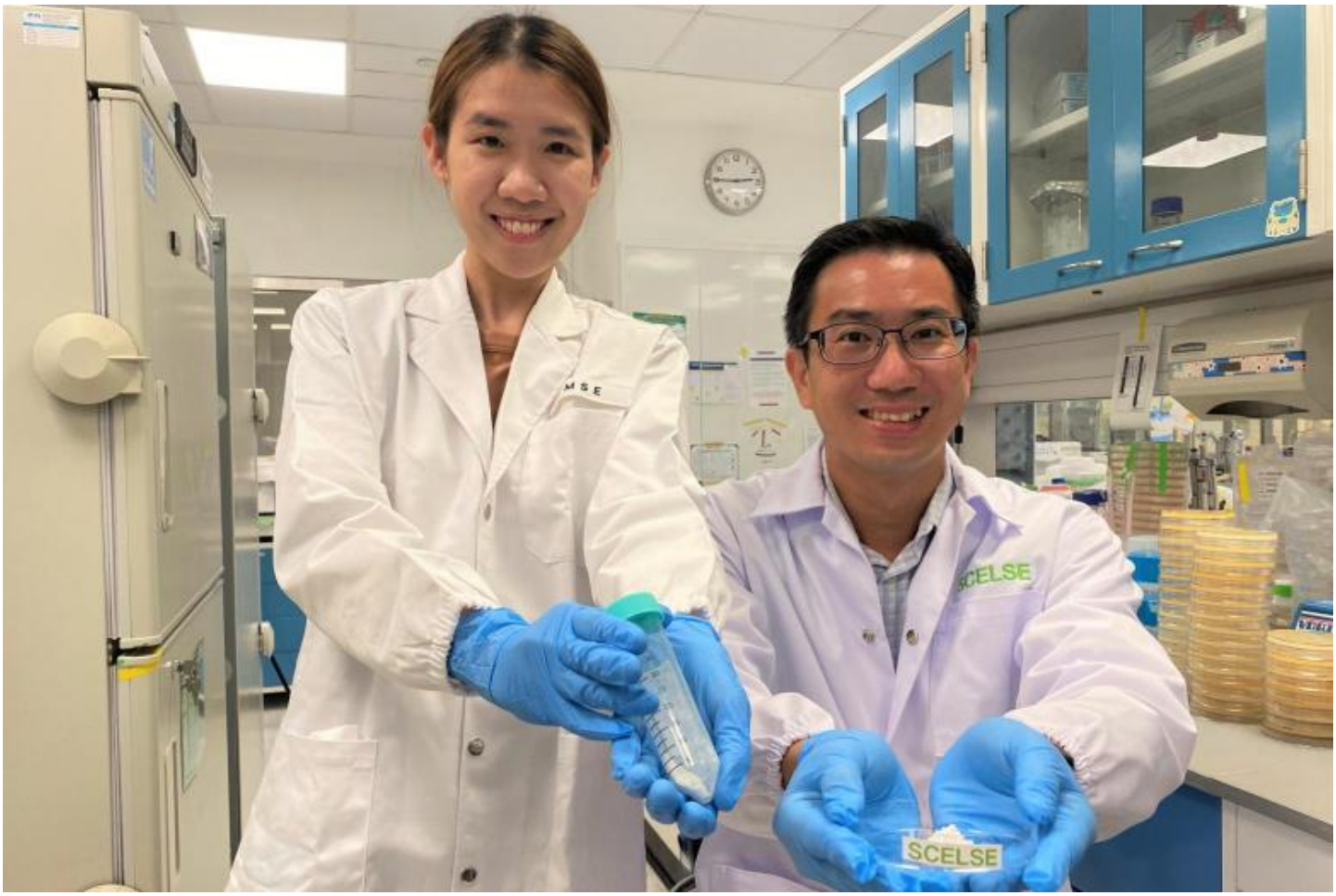
THE STRAITS TIMES

NTU team develops edible coating for probiotics that helps better deliver health benefits



NTU PhD student Tan Li Ling (left) and MSE Associate Professor Joachim Loo were part of the team that developed the edible coating for probiotic bacteria.
PHOTO: NTU

Clara Chong

PUBLISHED 33 MINS AGO

SINGAPORE - A team of scientists from Nanyang Technological University (NTU) has developed an edible coating for probiotic bacteria that allows them to reach the intestine successfully and deliver health benefits.

According to multiple studies, the bulk of probiotics delivered in commercial supplements and yogurts die off within the first 30 minutes of exposure to the harsh acidic environment of the stomach.

The NTU scientists cultivated Lacticaseibacillus bacteria before washing them in a salt solution. The bacteria were then packed together. The team used a spray-drying technique to produce gastric acid-resistant probiotics where alginate - a seaweed-derived carbohydrate - was used to encapsulate the bacteria.

The whole process takes about an hour.

The NTU team shared these developments in a virtual media briefing on Friday (March 25).

Encapsulated by the coating, the bacteria are only released upon reaching the small intestine, as the coating breaks down upon reacting with the phosphate ions present there.

Spray drying is an industrially scalable technique. It produces dry powder from a liquid by rapid drying with hot gas, and is the preferred method of drying many thermally-sensitive materials such as foods and pharmaceuticals.

Probiotics are live micro-organisms, usually bacteria, that provide health benefits when consumed at appropriate doses. They are found naturally in food like yogurt and pickles, and are also available in pills and powders.

If refrigerated, the coated probiotic bacteria could survive for over eight weeks, the scientists discovered. The coating does not degrade at all and so can protect the probiotics from gastric acid.

In comparison, probiotic drinks have a shelf life of up to seven weeks when refrigerated, but the probiotics they contain start to die off after being left at room temperature for a few hours.

The NTU team leader, associate Professor Joachim Loo of NTU's School of Materials Science and Engineering, said: "Probiotics are delicate microorganisms and cannot survive the harsh environment of our stomach. To increase the efficacy of probiotics as a dietary supplement, we sought to 'parcel-wrap' and deliver them to specific sites of the intestine where they function best."

This process also extends the shelf life of the probiotics, keeps them stable and provides them with protection at extreme pH conditions, Prof Loo added.

The alginate coating was also selected as it is safe for human consumption, of natural origin, and relatively low-cost, Ms Tan Li Ling, a PhD student at NTU's School of Materials Science and Engineering, as well as first author of the study, said.

Alginate also exhibits acid-buffering properties, limiting pH fluctuations in the bacteria's environment, thereby protecting them against the harsh conditions caused by the gastric acid.

Slated to reach the market in about three years time, this low cost and industrially viable method to encapsulate probiotics can enhance the functionality of existing probiotic products without increasing costs significantly.

Besides potentially serving as a more effective way to deliver probiotics, the NTU scientists say they are exploring using their innovation to enrich food and drinks, such as beer and other canned beverages, with probiotics.

MORE ON THIS TOPIC

Scientists at NTU turn durian seeds into food stabiliser and probiotics

Healthy brew: Probiotic tea and coffee for gut's sake