THE STRAITS TIMES

NTU team's coating for probiotics can better deliver health benefits

Clara Chong

PUBLISHED 3 HOURS AGO

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 then 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 last Friday.

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

Spray drying is an industrially scaleable 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 food and pharmaceuticals.

Probiotics are live microorganisms, usually bacteria, that provide health benefits when consumed at appropriate doses.

They are found naturally in food such as yogurt and pickles, and are also available in pills and powders.

If refrigerated, the coated probiotic bacteria could survive for more than 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's leader, Associate Professor Joachim Loo from the School of Materials Science and Engineering (MSE) at the university, 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, he added.

The alginate coating was selected also because it is safe for human consumption, of natural origin, and relatively low cost, said Ms Tan Li Ling, a PhD student at MSE and first author of the study.

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, this low-cost and industrially viable method to encapsulate probiotics can enhance the functionality of existing probiotic products without increasing costs significantly.

The NTU scientists are also exploring using their innovation to enrich food and drinks, such as beer and other canned beverages, with probiotics.

They will be working with the Singapore Food Agency on testing the innovation on other types of probiotics, which would enable it to be applied to the agrifood technology industry.

It could be used to enrich the diets of reared animals - such as fish and chicken - with probiotics.

Join **ST's Telegram channel here** and get the latest breaking news delivered to you.

A version of this article appeared in the print edition of The Straits Times on March 30, 2022, with the headline NTU team's coating for probiotics can better deliver health benefits. Subscribe

Subscribe today

Get unlimited access to exclusive stories and analyses by the ST newsroom

Choose your plan

- SINGAPORE
- ASIA
- WORLD
- OPINION
- LIFE
- BUSINESS
- TECH
- SPORT
- VIDEOS
- PODCASTS
- MULTIMEDIA