

NUS team turns white bread into probiotic drink

Zero-waste process aimed at reversing trend of bread being thrown out before its time is up

Vanessa Liu

Every year, hundreds of tonnes of bread left on the shelves are thrown out by bakeries and confectioneries here before their time is up.

To reverse this wasteful trend, scientists from the National University of Singapore (NUS) are giving unsold bread a second chance at

life by turning it into a probiotic beverage.

The team of researchers from the department of food science and technology at NUS' Faculty of Science has filed a patent for the zero-waste fermentation process in which no by-products are created.

Associate Professor Liu Shao Quan, the project leader, pointed out that compared with other forms

of food waste, bread does not require additional processing steps to be ready for fermentation.

It also contains ample nutrients such as sugars, amino acids and vitamins, which are needed for the probiotics to grow during fermentation, he added.

The non-dairy drink has a creamy texture and a slightly fizzy and sweet taste, said Prof Liu.

Ms Nguyen Thuy Linh, who participated in the research for her final-year project for her undergraduate studies at NUS, said the team decided to focus their research ef-



(From left) Associate Professor Liu Shao Quan, Ms Nguyen Thuy Linh and Dr Toh Mingzhan with the probiotic beverage they created by fermenting a mixture made with surplus white bread. PHOTO: NATIONAL UNIVERSITY OF SINGAPORE

orts on white bread as it is the most common type of bread waste here.

A study by the National Environment Agency in 2016 found bread to be one of the top food items thrown out by households in Singapore, alongside rice and noodles.

Said Ms Linh: "I usually cannot finish a loaf of bread before the ex-

piry date. It is a waste to discard the nutrients in bread. So as a food science student, I was motivated to find a way to repurpose surplus bread."

To create the probiotic drink, white bread is first cut into small pieces and blended with water to create a slurry. The semi-liquid mixture is then pasteurised, and probi-

otic bacteria and yeast are added.

The mixture is left to ferment inside an incubator. After fermentation, the live probiotic cell count in the bread beverage increases to beyond one billion per 100ml, said Ms Linh.

The entire process, from bread to drink, takes about a day. The drink can be stored at room temperature for up to six weeks.

The team looked at various parameters during the nine months of research, including bread-to-water ratio, sterilisation settings and fermentation conditions.

Dr Toh Mingzhan, a research team member, noted that fermentation conditions inside the incubator were optimised to resemble those of the human gastrointestinal tract. The probiotics colonise the gastrointestinal tract after consumption.

"Probiotics will grow too slowly at low temperatures and die out if temperatures are too high, due to disruption of essential metabolic processes," said Dr Toh.

The researchers are now in talks with partners to bring the product to market here.

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