

Food scientists 'upcycle' unsold bread into tasty probiotic drink and cuts food waste

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NUS food scientists Assoc Prof Liu Shao Quan (left), Miss Nguyen Thuy Linh (centre) and Dr Toh Mingzhan (right) came up with a patented zero-waste process to make a new probiotic beverage using unsold bread. Credit: National University of Singapore

Surplus bread is a major waste problem for bakeries and food retailers.

While some unsold bread are donated to charities, most are resold as low-value animal feed. A team of food scientists from the National University of Singapore (NUS) has cooked up an innovative solution to reduce bread waste by using a novel fermentation process to 'upcycle' surplus bread into a beverage fortified with gut-friendly micro-organisms.

The new creamy drink, which is slightly fizzy and sweet, is currently the only known [probiotic](#) beverage made from a [bread](#) base. It can be stored at [room temperature](#) for up to six weeks while maintaining high counts of live probiotics to deliver maximum health benefits.

The research team behind the patented zero-waste process comprises project leader Associate Professor Liu Shao Quan, Dr. Toh Mingzhan and Miss Nguyen Thuy Linh from the Department of Food Science and Technology at the NUS Faculty of Science.

From bread to healthy beverage

"I usually cannot finish a loaf of bread before the expiry 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 by upcycling it into something delicious and nutritious," shared Miss Linh, who did this research as her final-year undergraduate project. She completed her undergraduate studies at NUS last year.

The NUS team tested different types of bread, and decided to focus on white sandwich bread as it is commonly available in supermarkets. They took nine months to perfect their recipe.

To create the bread-based [probiotic drink](#), white bread is first cut into small pieces and blended with water to get a bread slurry. After the slurry is pasteurized, probiotic bacteria and yeast are added, and the

mixture is left to ferment. The entire process takes about one day.

"Most probiotic drinks are dairy-based and unsuitable for people with lactose intolerance. Our bread-based probiotic beverage is non-dairy, making it an attractive option for this group of consumers," explained Dr. Toh.

The new bread-based probiotic drink can be stored at room temperature for up to six weeks and maintains at least one billion live probiotic cells per serving, which is the current recommendation by the International Scientific Association for Probiotics and Prebiotics to deliver maximum health benefits.

Commercialisation plans

The NUS team has filed a patent for the zero-waste process of making the bread-based probiotic beverage. They are now looking to work with industry partners to commercialize the drink.

"There is currently a lack of non-dairy probiotic food and beverage options in the market, so our refreshing and healthy new product will help to fill this gap. Our invention also enables bread makers to give their unsold products a new lease of life. We are confident that the bread-based probiotic beverage will have a strong appeal to those who are environmentally conscious," said Assoc Prof Liu.

Provided by National University of Singapore

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