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Scientists at NTU turn durian seeds into food stabiliser and probiotics



Professor William Chen, director of NTU's Food Science and Technology Programme, and Dr Jaslyn Lee, research fellow in the programme. Prof Chen's team has turned what would otherwise be food waste into usable products. PHOTO: LIANHE ZAOBAO

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SINGAPORE - A team of researchers at the Nanyang Technological University (NTU) may have given durian fans another reason to hail the King of Fruits.

The scientists have found a way to turn durian seeds into a food stabiliser (a binding ingredient used to give food items a uniform texture) and probiotics - a good bacteria that, when consumed, helps people to maintain a healthy digestive system.

The thorny fruit is popular in Singapore and in South-east Asia. In the first half of 2018, Singaporeans consumed six million durians.

Professor William Chen, director of NTU's Food Science and Technology Programme, saw this as a golden opportunity to salvage by-products from the seeds of some 12 million durians eaten each year.

The seeds, each about 3cm to 4cm in diameter, are usually discarded after the flesh is eaten.

With a technique that has since been patented, Prof Chen's team has turned what would otherwise be food waste into usable products.

"A majority of consumer food contains food stabilisers, which are indispensable to ensure that various ingredients that do not mix well can gel harmoniously. What we have done is to use something we often ignore when eating durians - its seeds - to produce a 100 per cent natural food stabiliser that can even keep our gut system healthy," said Prof Chen.

Prof Chen said that a majority of these stabilisers are now harvested from the gum of Acacia trees. It is commonly imported from Africa, and not something that can be mass produced here.

"With climate change rapidly affecting seasonal harvests, alternative and more sustainable sources need to be explored," Prof Chen said.

Explaining the process, Prof Chen said the durian seeds are first sliced and boiled to extract the gum within. On its own, the gum can be used as a natural food stabiliser.

These stabilisers, which contain sugar-protein biopolymers, are commonly used to give food products a smooth texture.

The durian gum stabiliser also holds together ingredients which are prone to separating - for example, when gelatine and a form of gum is added to soft candy and sweeteners.

It can also act as an emulsifier in lotions and cosmetics, to prevent the ingredients from breaking apart.

But several more steps are needed to turn the gum, a cheap medium to grow bacteria, into a stabiliser with probiotics.

To grow probiotics bacteria, the durian seed gum is allowed to ferment with some added bacteria cultures for several days and centrifuged - a process that removes all moisture from a solution.

The result is a light pink probiotic powder.

The scientists say that compared to regular powder-based probiotics found in commercial food stabilisers, what they developed has been found to be 20 per cent more effective in keeping probiotics in the stabiliser alive.

At 4 deg C - a temperature which can be reached with a household refrigerator - the probiotic count of commercial stabilisers went down significantly after five weeks, while the durian seed stabiliser allowed probiotic counts to stay stable for two months.

This is important, said Prof Chen, as the probiotics need to have a long enough lifespan to increase the shelf life of probiotic products by 20 per cent.

Prof Chen believes this process will make probiotic compounds more than four times cheaper: from \$60 for 1 litre of growth medium now in the industry, to \$13 per litre.

Ms Shilpa Thakker, senior director for research, quality, nutrition, and technology at Kellogg Asia Pacific, said of the NTU team's discovery: "This innovation allows us to use food by-products to develop functional ingredients.

"Future studies should now address challenges associated with the taste and texture of new ingredients harvested from food by-products."

Despite its origins, the durian gum probiotic did not taste like the fruit or smell like it.

Prof Chen's NTU research team is currently exploring several industry partnerships with interested companies, including multinational companies in the local food and beverage business.

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