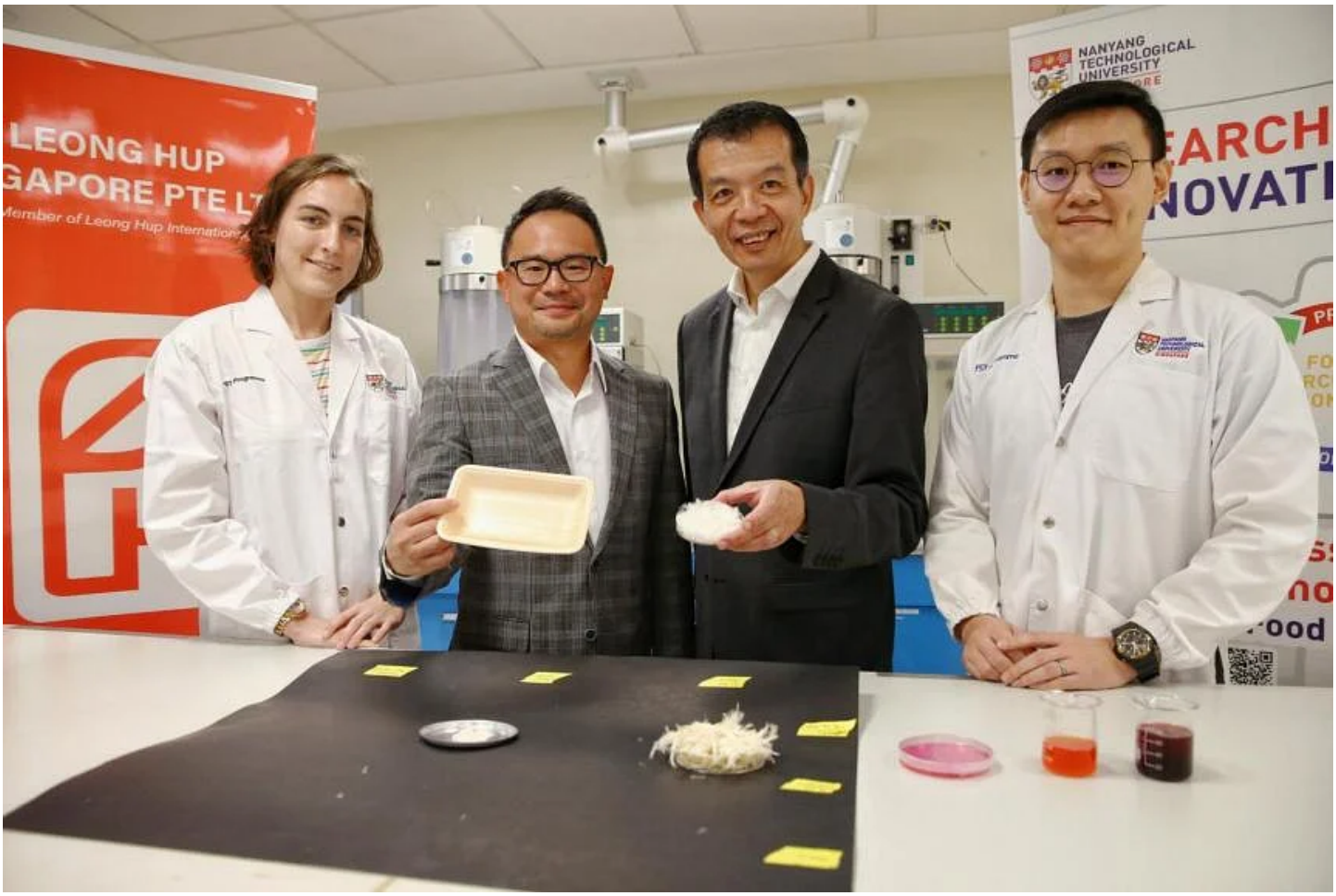
THE STRAITS TIMES

Poultry facility aims to repurpose chicken feathers, blood into useful materials



(From left) Ms Eleanor Soole, project officer of NTU's Food Science and Technology Programme; Mr Lau Joo Hwa, CEO of Leong Hup; Professor William Chen, director of NTU's Food Science and Technology Programme; and Mr Teng Ting Shien, PhD student of NTU's Food Science and Technology Programme. ST PHOTO: FELINE LIM

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SINGAPORE - A poultry processing facility here is a step closer to becoming zero-waste, now that its waste by-products, such as chicken blood and feathers, can be repurposed into useful materials.

Chicken feathers can be made into packaging trays used to hold meat, while organic waste such as blood, skin and bone can be made into cell-culture mediums for lab-grown meat.

This comes as Singapore looks to close its resource loop and repurpose its waste into useful materials.

The country is also looking to produce 30 per cent of its nutritional needs by 2030, with the alternative protein sector being one key area of potential growth.

These innovations are part of a collaboration between Nanyang Technological University (NTU) and international chicken producer Leong Hup.

To create more durable packaging trays to hold food items such as meat and fish, chicken feathers, which are rich in a protein known as keratin, can be processed into a biodegradable replacement for synthetic polymers - a type of plastic material used in the production of these trays.

Professor William Chen, director of NTU's Food Science and Technology Programme and co-lead of the industry collaboration, noted that the material is just as flexible as conventional plastic trays and can hold double the weight.

Synthetic polymers are made from petroleum oil and cause a large amount of greenhouse gas emissions through its production, use and disposal.

Leong Hup chief executive Lau Joo Hwa said about 10 tonnes of chicken feathers are disposed of or incinerated daily.

In Singapore, such waste is typically buried in landfills or incinerated, which also contributes to greenhouse gas emissions.

The collaboration, which began in June last year, brought about another innovation - the conversion of biological waste such as chicken blood into an alternative medium for cultivating cell-based meat.

Mr Lau noted that at least 3.5 tonnes of chicken blood are produced through the slaughter of about 50,000 chickens daily.

The blood would first have to be treated with chemicals before it can be safely discharged into the sewers, he added.

"The total costs for the blood treatment process, as well as the disposal of chicken feathers, have amounted to around $400,000 yearly.

"By repurposing these waste products into useful materials, we're also able to cut costs... while raising the sustainability profile of our company," he said.

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Prof Chen said organic matter, such as chicken blood, has high concentrations of growth factors and other nutrients.

Scientific experiments have also shown that chicken serum, which is separated from blood, is comparable to bovine serum from cows - the conventional medium used for cultivated meat.

However, bovine serum is extremely costly and recently came under question as the blood has to be taken from the heart of cow foetuses, while the mother cow is still pregnant, said Prof Chen.

"As the mother cow first has to be slaughtered for the blood to be extracted, the increased demand for cultivated meat could fuel an industry where more cows are inadvertently slaughtered in the process, which is ethically concerning," he added.

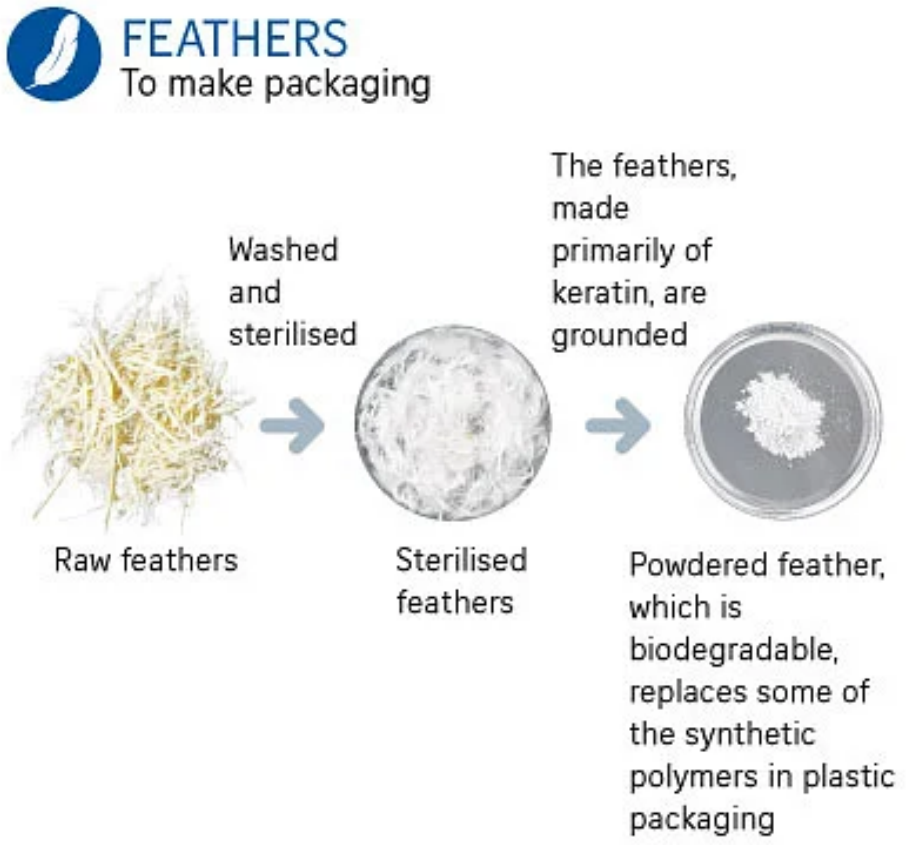
From blood to feathers, nothing goes to waste

In a move to be more environmentally conscious, Malaysian chicken producer Leong Hup, which has farms in many countries and exports packed chickens internationally, is working with Nanyang Technological University to make use of waste from its three facilities in Singapore which process live chickens, mainly from Malaysia.

PUTTING BY-PRODUCTS TO GOOD USE

BLOOD
For culturing of cells

Blood is taken from the chicken	Serum is separated from the blood cells and sterilised	Treated serum is added to cell cultures to cultivate lab-grown chicken



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NTU has received interest from various alternative protein firms to commercialise the use of its chicken serum for cell-cultured meat.

Other by-products from the poultry processing facility, such as chicken intestines, are currently being exported to Malaysia for use as fish feed, said Mr Lau.

But another possible area of collaboration would be to upcycle chicken faeces into bio-fertilisers for local urban farms here as Singapore ramps up its production of leafy vegetables, said Prof Chen.

The team is working on scaling up the production of feather-made packaging, and once this is commercially viable, Leong Hup will apply to the Singapore Food Agency to have its packaging certified as food-safe, said Mr Lau.

He added that the company expects to introduce the products it has developed with NTU in its overseas plants in Malaysia and South-east Asia by next year.