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WHO and NTU to create lab-based safety tests to replace animal testing for novel foods

(From left) WHO's Dr Moez Sanaa, SFA chairman Lim Chuan Poh, NTU's Prof Lim Kah Leong, WHO's Dr Simone Moraes Raszl and NTU's Prof William Chen inking the three-year collaboration on June 18. ST PHOTO: TARYN NG

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SINGAPORE – The World Health Organisation (WHO) has teamed up with Nanyang Technological University (NTU) to find new, faster ways to test for the safety of novel foods and reduce the use of animal testing.

This includes placing human liver and intestinal tissues on a device to recreate how key organs will respond to newly developed foods like cell-based meats and microbes.

Once NTU has optimised the food safety methods, it will work with WHO to standardise these methods globally and help it establish a regulatory framework for future foods.

Animals, such as mice, must be exposed to the food being tested over prolonged periods, so they may need to be kept for one or two years, explained Dr Moez Sanaa, unit head of the Standards and Scientific Advice on Food and Nutrition at WHO.

In addition to ethical concerns, animal testing is also costly and involves a long process, which prolongs the food's approval, he added. Some experiment results may also be unreliable because animals are biologically different from humans.

Dr Sanaa was speaking to the media on June 18 after WHO signed a three-year partnership with NTU's Future Ready Food Safety Hub – an alliance by the university, A*Star and the Singapore Food Agency (SFA). The signing took place at a workshop focused on the safety of future foods, held at Royal Plaza on Scotts.

Without involving animals, the time taken to clear a food safety test can shrink to four months, down from three years, said NTU's Professor William Chen, director of the Future Ready Food Safety Hub.

"In contrast to the usual costs, which can reach several million for animal assessments and tests, our system is expected to cost less than 10 per cent of that," said Prof Chen.

Singapore was the first country to approve the sale of cell-cultured chicken in 2020, under Californian firm Eat Just.

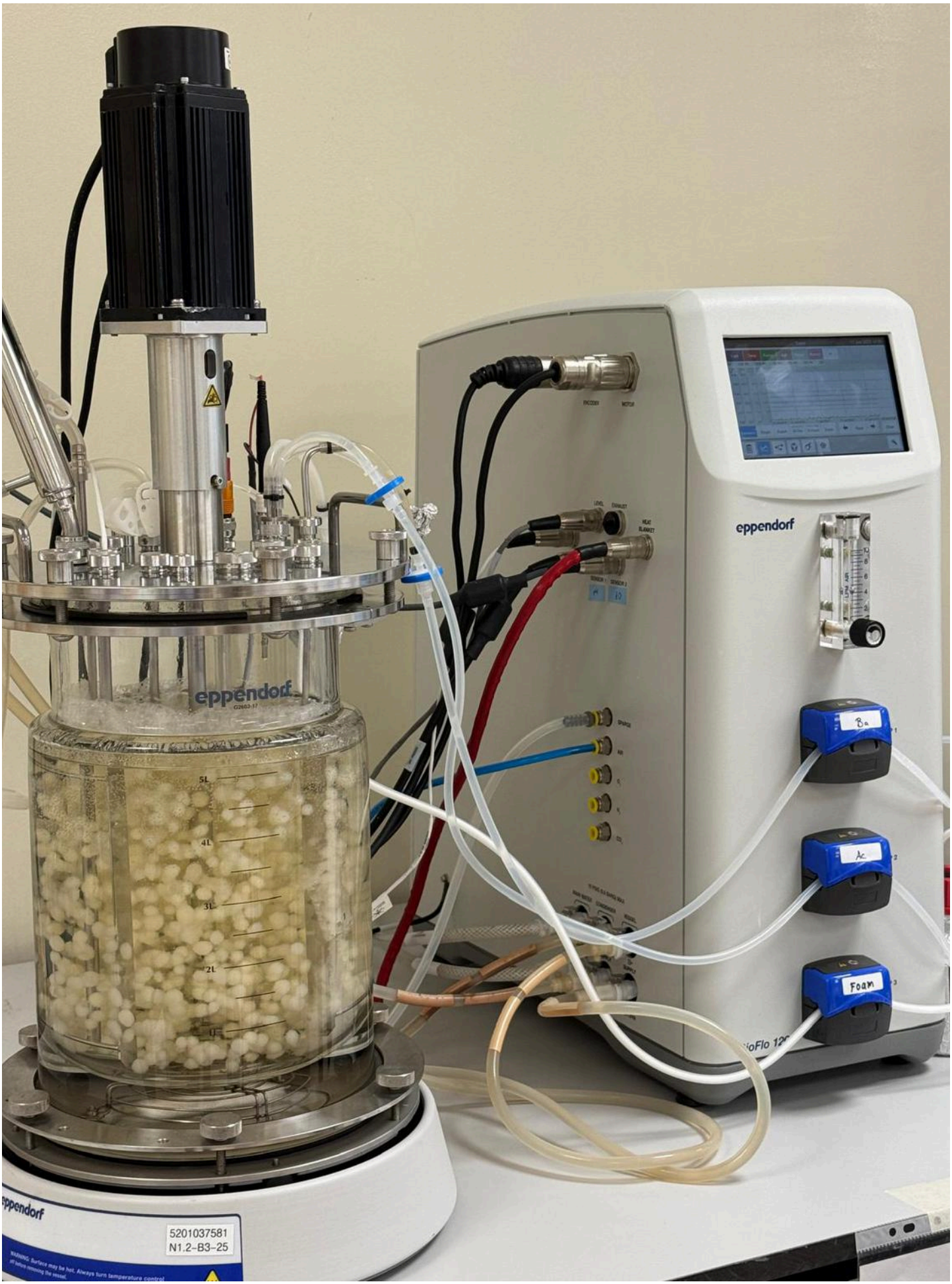
Most novel foods such as cell-based chicken and fungi protein multiply in bioreactors, which are large vats in a lab. Although this way of producing food appears clean and shielded from disease and pollutants, this does not mean the final products are completely safe, he cautioned.

For example, traces of toxic compounds could appear during the fermentation of mushrooms.

The food safety process that both WHO and NTU want to optimise involves three steps, and they will be conducted at the hub's lab on campus. First, computer

modelling and artificial intelligence will be used to predict the safety of a food item or ingredient.

Second, the food items will be run through a lab-based “digestion system” that mimics the conditions of the mouth, stomach and small intestine, to find out how the food is broken down and digested.



NTU's Future Ready Food Safety Hub growing mycelium in a bioreactor. PHOTO: NTU

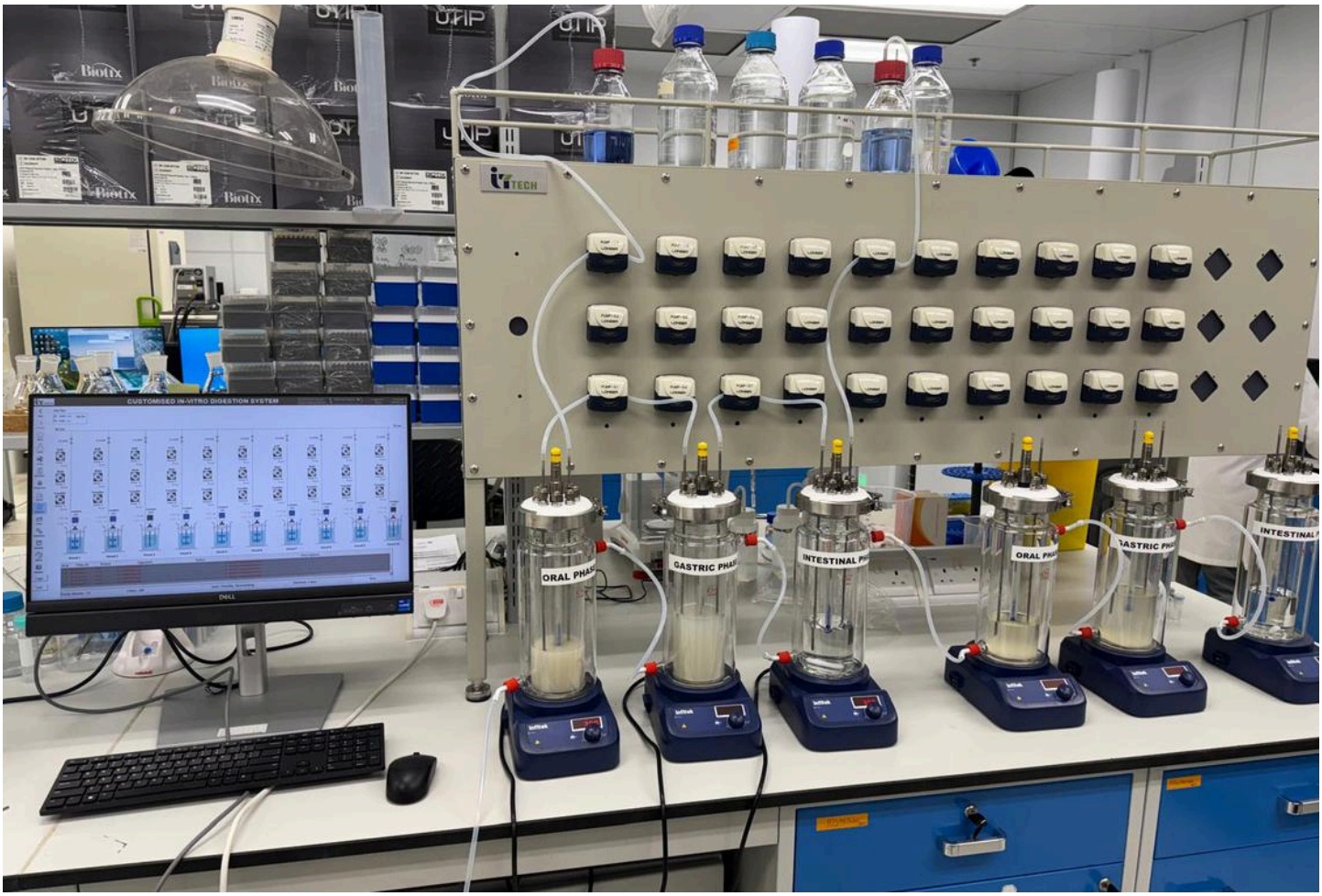
Third, the digested components are run through a device containing intestinal and liver tissues, to mimic how the body processes food and detects potential adverse effects caused by an ingredient.

The liver cells are important because the liver is the body's "detoxification centre", filtering out toxins from the blood and processing nutrients.

This third step is still in the works, said Prof Chen.

If there is a need to do animal testing to validate the food safety, this can be done as the last step.

Over the three years, NTU could also be appointed as a WHO collaborating centre on food safety and nutrition, which will further cement this partnership and the university's expertise in this field.



A digestion system in NTU's Future Ready Food Safety Hub that mimics the conditions of the mouth, stomach and small intestine. PHOTO: NTU

Singapore has more than 10 WHO collaborating centres in other domains, including health promotion and disease prevention, bioethics, digital health and health education.

Speaking at the workshop on June 18, SFA chairman Lim Chuan Poh said: “While conventional testing methods remain reliable, they are time-consuming and resource-intensive. We need new approaches that can keep pace with rapid innovation while maintaining rigorous safety standards.”

Improving food safety methods can help to fix the regulatory bottleneck that is limiting the growth of the novel food industry globally, said Professor Hanry Yu from the NUS Mechanobiology Institute.

Commenting on the new partnership, he said: “If we have better gatekeepers, then we can have more confidence to let more safe and novel food enter the market.”

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