

+

# vegconomist

- the vegan business magazine -

- New Products
- Interviews
- Food & Beverage
- Ingredients
- Fashion & Beauty
- Retail
- Cell-Cultured
- more



[News by Region](#) [Organizations and brands](#) [Listed Companies](#)

Sustainability / Environment

## Singapore: Scientists Are Developing Sustainable Process to Produce Lactic Acid from Jackfruit Seeds

August 30, 2023



Bookmark



© NTU Singapore

## **Scientists at Nanyang Technological University, Singapore (NTU Singapore) have developed a sustainable and effective technique to produce lactic acid using discarded jackfruit seeds.**

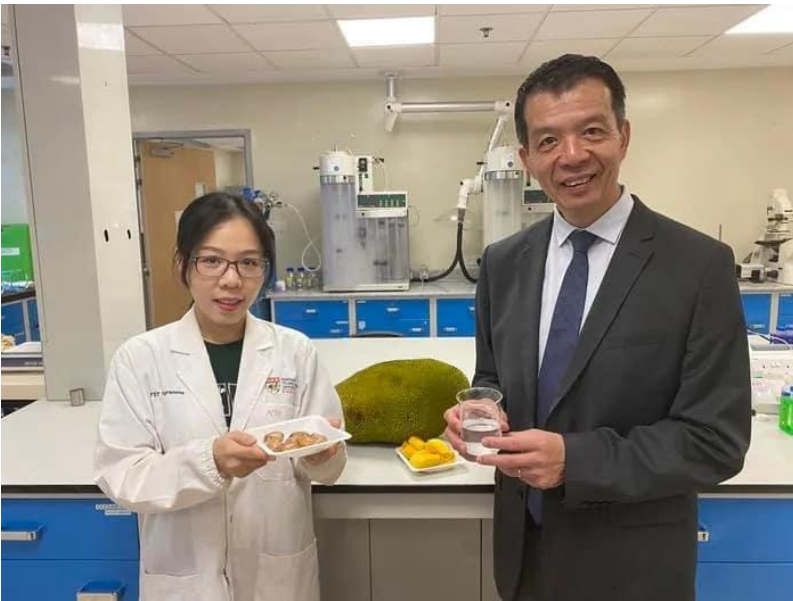
Lactic acid plays an indispensable role in the industrial production and preservation of many foods. It is used at various stages of making staple foods like bread, yogurt, cheese, kimchi, sauerkraut, and pickles. In 2022, around 1.5 million tons of lactic acid were produced worldwide.

Lactic acid is added to dairy products to add flavor, controls the acidity of jams and canned fruit, and extends the shelf life of packaged meat products. When baking, lactic acid provides better texture and volume to the dough. In addition, lactic acid helps emulsify dressings and sauces and preserves the bright colors of fruit and vegetables.

### **Lactic acid from jackfruit**

The method developed by NTU is cheaper and more sustainable than existing industrial methods because it requires fewer chemicals and processes, generates low levels of by-products, and reduces food waste through the use of unwanted jackfruit seeds.

Current industrial processes for producing lactic acid are costly because they typically involve the fermentation of raw materials such as sugar cane, corn starch and beet sugar, which have become more expensive due to increasing scarcity of arable land, natural disasters and rising inflation. Industrial processes also produce large amounts of by-products such as gypsum, which release greenhouse gases if disposed of improperly.



Tram Anh Ngoc Le, a PhD student in the Food Science and Technology (FST) program at NTU, and NTU Professor William Chen, Director of the Institute of Food Science and Technology © NTU Singapore

**Jackfruits** are enjoying increasing popularity in nutrition around the world. Their meat, which is similar in taste and consistency to conventional meat, is processed into meat substitutes. However, the pips, which make up almost a fifth of the fruit's total weight, end up in landfill. The study, which presents an innovation to reduce waste, reflects NTU's commitment to reducing its impact on the environment – one of the four major challenges of humanity that the university aims to address with its strategic plan NTU 2025.

Professor William Chen, Director of NTU's Food Science and Technology (FST) Program, who led the project, said: "Our jackfruit seed-based method for producing lactic acid is another success for NTU in finding new uses for products that would otherwise end up in the trash. Upcycling these products to produce lactic acid, an essential ingredient in almost all the food we eat, is one way to improve processing efficiency in the food supply chain while addressing two major pressures on the food industry – rising production costs and waste management."



© Digitalpress – stock.adobe.com

The concept was received positively by several of NTU's industrial partners. Mirte Gosker, executive director of The Good Food Institute Asia Pacific said: "Building a safer, more sustainable and more equitable food system in Asia is not just an option – it is a necessity. To achieve this, we must harness the full power of locally relevant ingredients to meet the growing global demand for protein, reduce waste and further optimize the plant-based food supply chain. The novel method of producing lactic acid, developed by NTU's Prof. William Chen, using previously discarded jackfruit seeds, is a compelling example of how we can do more with less."

## **The manufacturing process**

To make lactic acid from jackfruit seeds, NTU scientists first washed the seeds before adding sodium hydroxide at room temperature. This is a common process to remove the skin from canning fruits and vegetables before the pits are freeze-dried and blended into a powder.

They then added *Lactiplantibacillus plantarum*, a "good" bacteria commonly found in probiotics, to the jackfruit seed powder. It takes about two days to break down into sugar and lactic acid, which is later extracted through a filtration process.



©KARANA

Prof. Chen added: "We are confident that our technique could become a powerful tool for manufacturing companies to produce lactic acid. On the one hand, it uses several common production techniques already used in food processing plants, such as freeze drying, starch filtration and lactic acid extraction. On the other hand, the raw material for our lactic acid is a ubiquitous, undesirable product – jackfruit seeds. It is significantly cheaper than the current raw materials of corn and beet starch, and using a waste product would give companies a good credentials in their pursuit of sustainability. A necessary difficulty, however, would be to bring the jackfruit kernels to the lactic acid producers."

The study's first author, Tram Anh Ngoc Le, a PhD student in the FST program at NTU, said: "Who would have thought that the jackfruit tree, which is growing rapidly across Southeast Asia, could have the potential to solve the world's current food problems, such as B. combating food waste, food shortages due to inflation and food insecurity. Not only is jackfruit a nutrient-dense food that could feed millions of hungry people, but we've also found that its seeds hold even more promise in reducing the waste and chemicals in widespread industrial processes."

The NTU team will work on optimizing their lactic acid production method to further improve its yield and quality. The researchers also plan to expand their production process by collaborating with partners from the food and beverage industry.

More information at: [ntu.edu.sg](https://ntu.edu.sg)