

MASSIVE LIBRARY OF BACTERIAL STRAINS COULD LEAD TO MENU OF NEW FERMENTED FOODS

Researchers in China have established a library of **MORE THAN 6,000 STRAINS OF LACTIC ACID BACTERIA**, which could help fuel a new industry of innovative fermented food products.

Yoghurt, kimchi, sauerkraut and miso all contain lactic acid bacteria (LAB). Commonly found in the intestines of mammals, these microbes are not only widely used in the preservation and preparation of many foods, but have long been on the radar of researchers for their potential health-related properties and industrial applications.

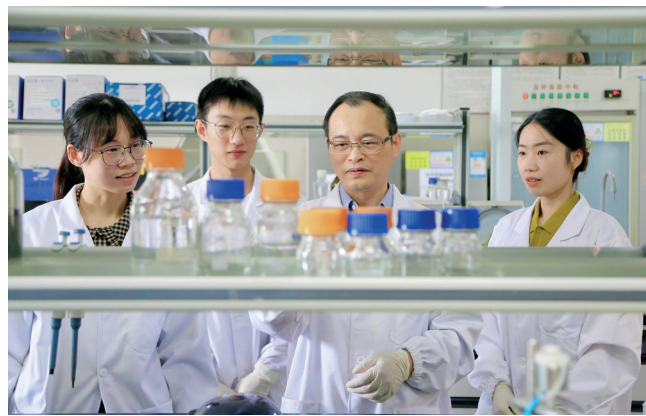
“Comprehensive analyses of the functions of various LAB and their metabolites are key to understanding the role of these bacteria in human digestive health,” says Qing Gu, head of school of Food Science and Biotechnology at Zhejiang Gongshang University in Hangzhou, China. Such knowledge could lead to the development of a diverse range of new fermented products, he says.

Gu and his team established the Key Laboratory of Food Microbial Technology of Zhejiang Province in 2012, with the aim of developing new fermented foods aimed at the Chinese market. “When we started the research 20 years ago,” he says, “the industry had to rely on LAB resources from abroad.”

It's now possible for China-based researchers to find new strains of LAB locally, study their metabolic properties and develop new fermented products.

LAB STRAINS SCREENING

To identify new LAB strains,



▲ Qing Gu (at centre) and his team are developing a LAB strain library in the Key Laboratory of Food Microbial Technology of Zhejiang Province.

the laboratory established an interdisciplinary method, combining genomics and metabolomics, to study the metabolites produced by the bacteria. Gu's team has developed a digital library containing the IDs of more than 6,000 LAB strains. 'ID cards' in the database reveal the traits of each strain, including its origin, genetic and metabolic features and potential nutritional benefits, enabling them to match industrial demands for food products with suitable strains.

During the screening process to produce the library, the team discovered a series of novel Lactobacillus bacteriocins — metabolites that inhibit the growth of other bacteria, such as plantaricin NC8¹. These bacteriocins are highly potent against a range of foodborne bacteria and fungi, natural materials with

potential antibacterial and food preservative properties.

“WE WANT TO SUPPORT THE CHINESE MICROBIAL INDUSTRY WITH CHINESE LAB STRAIN RESOURCES.”

The team also set up a multi-dimensional functional evaluation system. This included an *in vitro* bacterial testing ecosystem simulating a human gut environment, and various animal models to pinpoint the impact of different LAB metabolites, such as plantaricin NC8, indole-3-lactic acid, and phenyl lactic acid. These insights could help with the understanding of how different LAB strains and their metabolites could impact gut

microbes, as well as the immune system and metabolism².

“We want to support the Chinese microbial industry with Chinese LAB strain resources,” says Gu, who adds that they are working to develop LAB-fermented food products, including those made from fruits, vegetables, seafoods and meat, which he says could have “enhanced taste and even elevated nutritional properties”.

The researchers are already collaborating with several dairy manufacturers, to develop more than a dozen commercial fermented dairy products. They are seeking international collaborations, and hope to build an interdisciplinary team with young researchers joining from different fields, such as probiotics, human immunity, and bioinformatics. “It is a continuous journey to study the potential impacts of LAB on human health,” Gu says. ■

REFERENCES

1. Jiang, H., Tang, X., Zhou, Q. et al. *Appl Microbiol Biotechnol* **102**, 7465–7473 (2018). <https://doi.org/10.1007/s00253-018-9182-3>
2. Milani, C. et al. *Microbiol Mol Biol Rev* **81(4)**, e00036-17 (2017). <https://doi.org/10.1128/MMBR.00036-17>



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