

APRU Food Security Webinar Series 2024

▾ Precision Agriculture and Food Shelf Life Extension in Asia-Pacific

Webinar 3 June 20 Thursday at 6pm (Vancouver, Los Angeles)
/ June 21 Friday at 9am (Singapore, Taipei)
/ June 21 Friday at 10:30am (Adelaide)

Speakers



Dr. Yansong Miao

Nanyang Technological University, Singapore
“Precision Engineering for Agriculture
Agrifood Resilience”



Dr. Dan Li

National University of Singapore
“1 + 1 > 2 : Selective Support of
Beneficial Bacteria with Food Waste”

Dr. Yansong Miao

Precision Engineering for Agriculture Agrifood Resilience



Abstract

The escalating global food demand, amplified by climate change, soil degradation, and plant diseases, poses a substantial challenge to impending food security. However, the synthetic re-engineering of plant resilience signaling pathways emerges as a promising remedy. Here, we elucidate our efforts to augment plant stress tolerance and optimize their agrifood production performance by manipulating plant resilience signaling pathways through protein engineering. These stress responses in plants are orchestrated by intricate signaling pathways which involve an array of proteins engaging in complex and diverse crosstalk during unfavorable conditions. To tailor these proteins, we harness the principle of molecular condensation and amalgamate interdisciplinary technologies such as structural biology, biochemistry, biophysics, and machine-learning-aided protein design. This strategy enables us to reprogram these pathways, thereby enhancing plant resilience to a multitude of biotic and abiotic stressors. Our work underscores the transformative potential of synthetically engineering plant signaling pathways for sustainable agrifood technologies to escalate productivity and resilience.

Biography

Dr. Yansong Miao is an associate professor in the School of Biological Sciences at NTU. Dr. Miao received his B.S. from Zhejiang University, China, followed by a Ph.D. from The Chinese University of Hong Kong. He was a Human Frontier Science Program (HFSP) Postdoctoral Fellow at the University of California, Berkeley, before joining NTU in 2015.

Dr. Dan Li

1 + 1 > 2 : Selective Support of Beneficial Bacteria with Food Waste



Abstract

This talk will cover our recent efforts in using food waste to support the growth and functionality of beneficial bacteria in the food systems. Two case studies will be presented. The first story is over primary production. *Bacillus subtilis* (BS) is a well-known beneficial microorganism for plants but is not competitive in the plant rhizosphere microbiome. We report the selective support of *Brassica rapa* subsp. *Chinensis* (Xiao Bai Cai) juice (XBCJ) on BS both in hydroponic nutrient solution and the plant rhizosphere of lettuce. The second story is about food preservation. *Lactiplantibacillus plantarum* 299V is a probiotic bacterium as well as is known to produce microbial antagonistic metabolites that could be used for food preservation. In this study, we found that the pomelo (*Citrus maxima*) peel extract (PPE), extracted with a simple homogenization with water and heating procedure, was able to support the growth of *L. plantarum* 299V without the need for any supplement. The product after 48 h fermentation (FPPE-48h), when formulated in an edible coating, was able to inhibit *Listeria monocytogenes* and spoilage-causing microorganisms on salmon fillets during chilled storage.

Biography

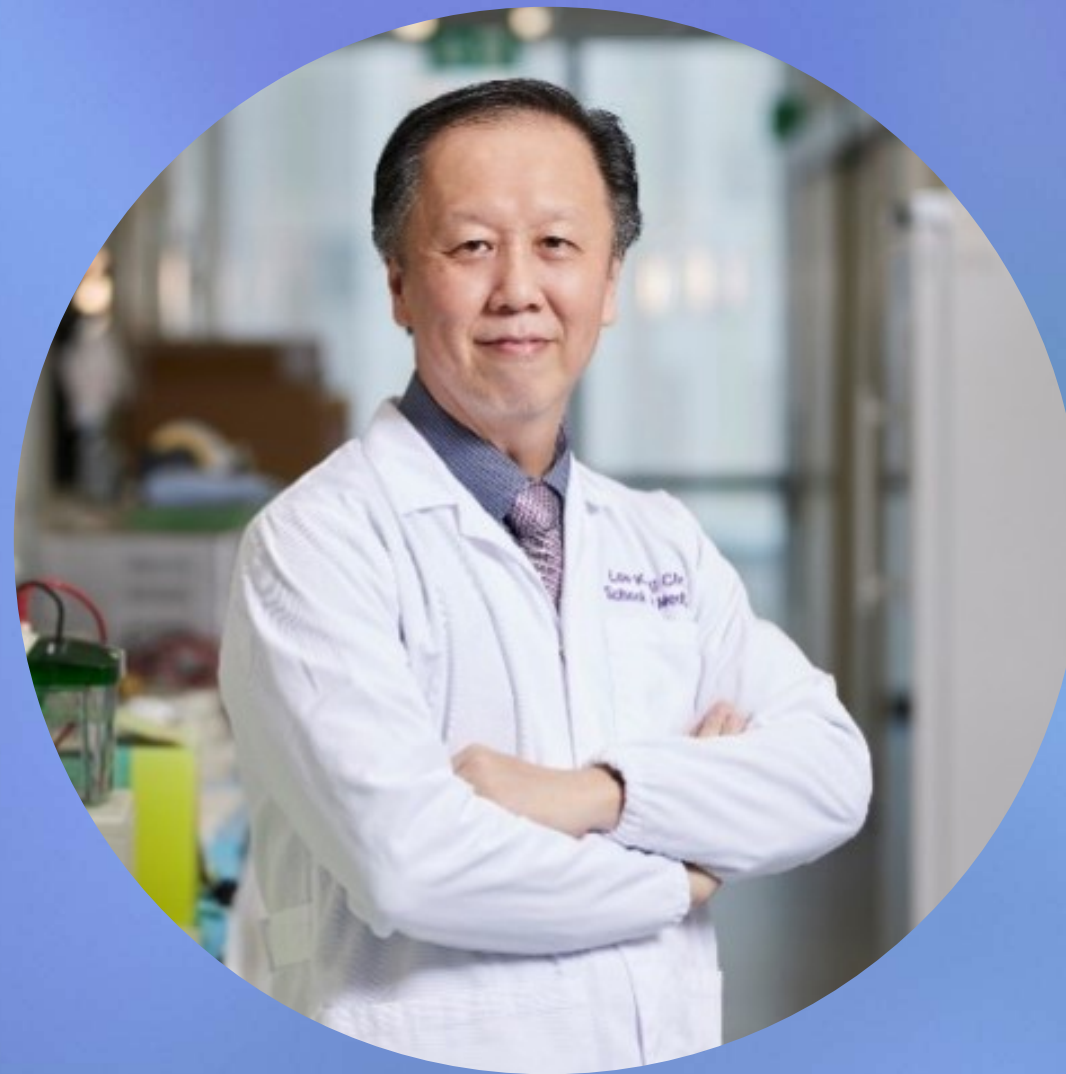
Dr. Dan Li is an assistant professor at the Department of Food Science and Technology, National University of Singapore. She also works as Associate Director of the Faculty Research Centre on Sustainable Urban Farming (SUrF) at NUS. Dr. Li obtained her Ph.D. in Applied Biological Science from Ghent University, Belgium.

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Moderators



Prof. Kah Leong Lim

Nanyang Technological University, Singapore



Prof. Thorsten Wohland

National University of Singapore