Biofilm xxx (xxxx) xxx

Contents lists available at ScienceDirect

Biofilm

journal homepage: www.sciencedirect.com/journal/biofilm

The Asia-Pacific Biofilms 2024: A global conference on microbial biofilms☆

The Asia-Pacific Biofilms 2024 (APB 2024), held during November 12 to 17 of 2024 in Guangzhou, China, established itself as a premier event in the field of microbiology and biofilm research. Organized by the Asia-Pacific Biofilms (APB) network, the conference brought together leading scientists, clinicians, engineers, and innovators from across the Asia-Pacific region and around the world (Fig. 1). With its theme focused on the multidisciplinary impact and applications of biofilms, the event highlighted the increasing global significance of microbial communities in addressing both scientific challenges and societal needs.

APB 2024 included one day for workshop and four days for the conference. Following the registration day on Nov 12, the workshop day (on Nov 13) included 5 topics. In the morning, 2 topics as "Standardization in Biofilm Methods" and "Dry surface biofilm study: models and methods" were arranged. In the first topic, Dr. Nuno Azevedo presented "key aspects of spatial structure in understanding multispecies biofilms". Dr. Albert Parker discussed "Assessing the limit of detection for biofilm methods". The second topic on dry surface biofilm models and methods featured contributions led by Dr. Honghua Hu, with co-presentations by Dr. Zhenbo Xu, Dr. Junyan Liu, Dr. Yu Li and Dr. Liping Guo. In the afternoon, in the first topic on "Methods to Study Biofilms", Dr. Boo Shan Tseng focused on "Studying the roles of matrix proteins", and Dr. Kasper Kragh demonstrated "Using isothermal microcalorimetry to develop better biofilm models". In the second topic as "Standardization on *anti*-biofilm and in vivo studies: touching upon fundamental", Dr. Su Ma, Dr. Yulong Tan, Dr. Ke Wang from, Dr. Zhenbo Xu, Dr. Xiaomei Lin and Dr. Yao Sun had together addressed the presentation of "Standardization on *anti*-biofilm and in vivo studies: touching upon fundamental questions". In the evening Author Workshop from ELSEVIER on "Getting your article published in <Biofilm>", Dr. Tom Coenye and Birthe Kjellerup shared insights on publishing biofilm research in the <Biofilm> journal, followed by an Editor Meet-and-Greet Session.

The first conference day (Nov 14) focused on "Medical Microbiology". In the morning, Session 1 (chaired by Dr. Garth Ehrlich and Dr. Zhenbo Xu) began with the Opening Ceremony of APB 2024 by Dr. Birthe Kjellerup, who had also presented the "Tribute to Paul Stoodley". Then, the session chairs announced the "Outstanding Contribution Award" of Asia-Pacific Biofilms had been awarded to Dr. Liang Yang and Dr. Yue Qu. As the first speaker, Dr. Garth Ehrlich then discussed the interplay among the stringent response, virulence factor production, and quorum sensing in biofilm metabolism. Dr. Chuanwu Xi explored environmental surveillance for infectious disease risk assessment. Dr. Janette Harro investigated metabolic shifts in *Staphylococcus aureus* during co-culture with *Pseudomonas aeruginosa*. Dr. Nathan Archer introduced host-directed therapies against antimicrobial resistance. In Session 2 (chaired by Dr. Chuanwu Xi and Dr. Liang Yang), Dr. Courtney Reichhardt presented on molecular mapping of the biofilm matrix. Dr. Rajendar Deora discussed bacterial biofilm formation beyond in vitro models. Dr. Luyan Ma presented on quorum sensing and exopolysaccharide production. Dr. Lei Cheng discussed the role of iron oxide nanoparticles in dental health. In the afternoon, in Session 3 (chaired by Dr. Luyan Ma and Dr. Jintao Liu), Dr. Matthew Parsek examined how *Pseudomonas aeruginosa* senses surfaces. Then, Dr. Thomas Bjarnsholt addressed the role of the infectious microenvironment in chronic infections. Dr. Jintao Liu presented on phage-induced bacterial community resistance. Dr. Claus Moser shared findings on chronic wound treatment using S100A8/A9 and hyperbaric oxygen. Dr. Zhijun Song presented on diagnosing and treating urinary biofilm infections. In Session 4 (chaired by Dr. Rajendar Deora and Dr. Xin Deng), Dr. Gordon Ramage discussed biofilms in diabetic foot ulcers. Dr. Ute Römling examined cyclic GMP-AMP signaling in *Escherichia coli*. Dr. Xin Deng outlined global regulatory networks in *Pseudomonas*. Dr. Mette Burmølle demonstrated how interspecies interactions influence synthetic microbial communities. Finally, Dr. Thomas Seviour presented findings on the co-existence of G-quadruplexes and extracellular RNA in *Pseudomonas* biofilm matrices.

The second conference day (Nov 15) was specially organized as "The Australian Day". In the morning, in Session 1 (chaired by Dr. Yue Qu), Dr. Mark Schembri discussed uropathogenic *E. coli* biofilms. Dr. Zlatko Kopecki presented advanced methods for managing bacterial biofilm wound infections. Dr. Katharina Richter introduced new strategies against superbugs. In the morning, in Session 2 (chaired by Dr. Xenia Kostoulias), Dr. Mark Willcox focused on controlling ocular bacterial biofilms with antimicrobial peptides. Dr. Peter Kingshott explored bacteria-material interactions on complex surfaces. Dr. Heema Vyas described the *anti*-biofilm effects of plasma-activated water. Dr. Simon Swift reported on how bovine lactoferrin enhances antibiotic killing of *Staphylococcus aureus* biofilms. In the afternoon, in Session 3 (chaired by Dr. Heema Vyas), Dr. Anton Peleg reviewed biofilms in ventricular assist device driveline infections. Dr. Yue Qu shared insights into biofilms in recurrent vulvovaginal candidiasis (RVVC). Dr. Michael Radzieta presented on chronic wound biofilms and non-medicated wound dressings. Dr. Freya Harrison developed a model for endotracheal tube biofilms to

This article is part of a special issue entitled: APB2024 published in Biofilm.

☆ Given their role as Co-Editor-in-Chief, Birthe Kjellerup had no involvement in the peer-review of this article and has no access to information regarding its peer-review. Full responsibility for the editorial process for this article was delegated to another journal editor.

https://doi.org/10.1016/j.bioflm.2025.100322
Received 25 September 2025; Accepted 30 September 2025
Available online 11 October 2025

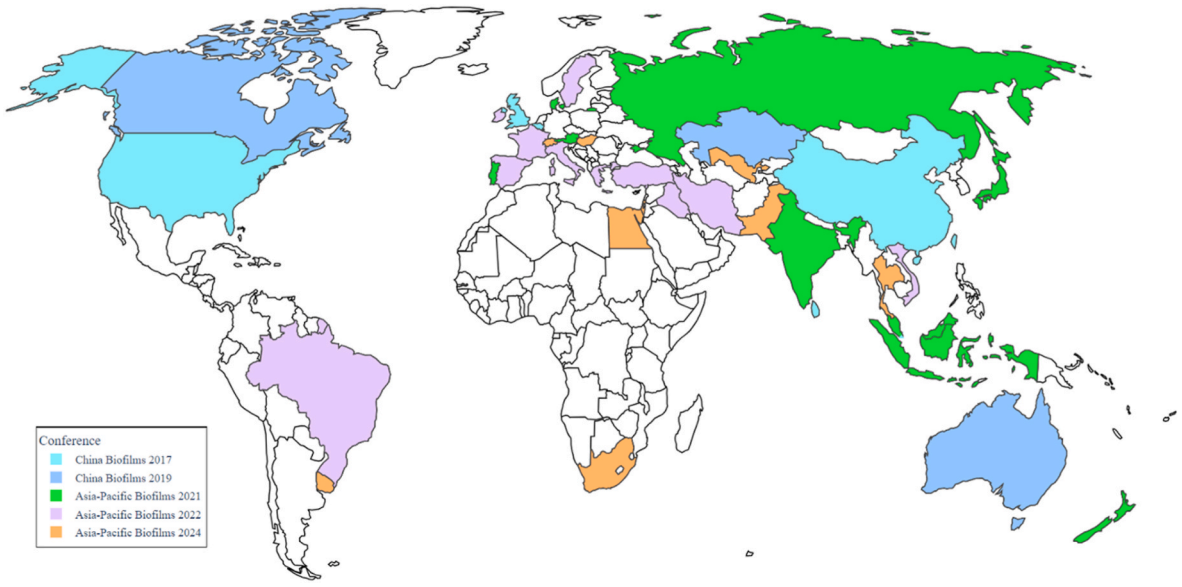

Fig. 1. The first time of the countries or territories participated in the conference.
* Participation indicated here only includes Speakers, Organizing Committee or Scientific Advisory Board members.

aid antimicrobial research.

In the afternoon of Nov 15, a special symposium on "Phage Therapy" was also organized in a different venue. Chaired by Dr. Liang Yang and Dr. Yanrui Ye, the symposium began with Dr. Yingfei Ma discussing phage synthetic biology and therapy. Then, Dr. Liang Yang covered adaptive evolution of *Pseudomonas aeruginosa* against phages. Dr. Xiaoxue Wang and Dr. Yunxue Guo studied host-phage interactions mediated by toxin/antitoxin systems. Dr. Haihua Liang described a bacteriophage protein regulating biofilms and evading immunity. Dr. Yanrui Ye talked about genome editing of *Pseudomonas aeruginosa* phages. Dr. James Doub and Dr. Guangchao Yu investigated bacteriophage activity in synovial fluid. At last, Dr. Anton Peleg discussed clinical applications of phage therapy.

An "Early Career Researchers and Students" Session was arranged in the evening of Nov 15. Chaired by Dr. Courtney Reichhardt and Dr. Heema Vyas, this session had included 11 presentations from Dr. Yao Sun, Dr. Liping Chen, Dr. Tahir Mehmood, Peirong Yu, Haoyue Xue, Kaizhong Xu, Sunday Oguntomi, Xueting Fu, Yunyao Liang, Biagio Delvecchio and Liyao Chen.

On the third conference day (Nov 16), 2 venues had been organized. In the venue of "Food Microbiology", Session 1 in the morning (chaired by Dr. Qingli Dong and Dr. Zhenbo Xu) began with the presentation of Dr. Nuno Azevedo on modulation of multispecies biofilms using antisense oligonucleotides. Then, Dr. Jianxiong Hao discussed the effects of electrolyzed water on eliminating *Listeria monocytogenes* biofilms. Dr. Qingping Zhong presented research on the effects of lactic acid bacteria as quorum sensing inhibitors on biofilms of foodborne pathogens. Dr. Qingli Dong discussed progress in understanding the biofilm risks posed by *Listeria monocytogenes*. Dr. Chunlei Shi identified molecular targets of an antibiofilm compound against *Staphylococcus aureus*, while Dr. Xin Wang characterized *Pseudomonas* spp. contamination in pasteurized milk production. In Session 2 (chaired by Dr. Biao Suo and Dr. Junyan Liu), Dr. Honghua Hu highlighted the underestimated concern of dry surface biofilms in microbial contamination, and Dr. Yu Ding showcased rapid detection methods for foodborne pathogens using hyperspectral imaging and machine learning. Dr. Junyan Liu examined the viable but nonculturable state as a microbial survival strategy. Other presentations included Dr. Mingming Guo's work on cationic antimicrobial peptides at the single-molecule level and Dr. Jun Yan's transcriptomic analysis of *Shewanella putrefaciens* biofilm formation under cold stress. In the afternoon, in Session 3 (chaired by Dr. Moutong Chen and Dr. Xiaodong Xia), Dr. Manuel Simões explored the effects of emerging chemicals on microbial communities. Dr. Xiaodong Xia presented on the role of the *rcpA* gene in *Vibrio parahaemolyticus* biofilm formation and virulence. Dr. Efstathios Giaouris investigated L(+)-lactic acid as a green inhibitor of *Campylobacter* biofilms. Dr. Yingwang Ye developed a platinum-based fluorescent nanozyme for sensitive detection and sterilization of Burkholderia gladioli. Dr. Huhu Wang studied the regulation of a non-coding small RNA in *Salmonella* biofilm formation, while Dr. Xiudong Xia focused on synthetic biology approaches to valorize soy whey. In Session 4 (chaired by Dr. Yulong Tan and Dr. Lei Yuan), Dr. Romain Briandet discussed harnessing biofilm properties in beneficial microbes for One Health advancements. Dr. Jingyu Chen examined stringent response factors in Yersinia enterocolitica's stress response. Dr. Yong Chen researched key technologies enhancing biological reaction processes based on cell aggregation. Dr. Su Ma and Dr. Yulong Tan screened foodborne active components impacting *Streptococcus mutans* biofilms. Dr. Xinyi Pang studied bacteriocins from lactic acid bacteria to combat foodborne pathogen biofilms. Dr. Yue Ma explored antibiofilm functions in food contact materials, and Dr. Danielle Duanis-Assaf analyzed *Salmonella* survival during chocolate production.

In the venue of "Basic Microbiology and *Anti*-Biofilms", Session 1 in the morning (chaired by Dr. Wei Hu and Dr. Liang Yang) began with the presentation of Dr. Ruifu Yang on revealing how acquiring biofilm production made *Yersinia pestis* flea-transmissible. Dr. Boo Shan Tseng used single-cell RNA sequencing to reveal *Pseudomonas aeruginosa* biofilm heterogeneity. Dr. Rikke Meyer discussed extracellular DNA as a multifunctional biofilm component. Dr. Hideyuki Kanematsu presented antibiofilm coatings and ISO evaluation methods. Dr. Lichuan Gu and Dr. Kundi Zhang showed how LasA from *Pseudomonas aeruginosa* selectively disrupted *Gardnerella vaginalis* biofilms. In Session 2 (chaired by Dr. Boo Shan Tseng), Dr. Yilin Wu described large-scale mechanical spiral waves in bacterial communities. Then, Dr. Kimberly Kline investigated how shear stress and quorum sensing influence enterococcal virulence, and Dr. Sophie Darch explored aggregate mechanisms in chronic infections. Further presentations included Dr. Beile Gao studying a novel PilZ protein stabilizing the flagellar motor stator ring, Dr. Boyang Qin reporting on collective fountain-like flow and fractal wrinkling driving bacterial community morphogenesis, and Dr. Xinjiong Fan presenting on an *anti*-biofilm enzyme strategy. In the afternoon, Session 3 "Quorum Sensing in Biofilms" (chaired by Dr. Haihua Liang and Dr. Yinyue Deng). Dr. Tim Tolker-Nielsen identified genes involved in

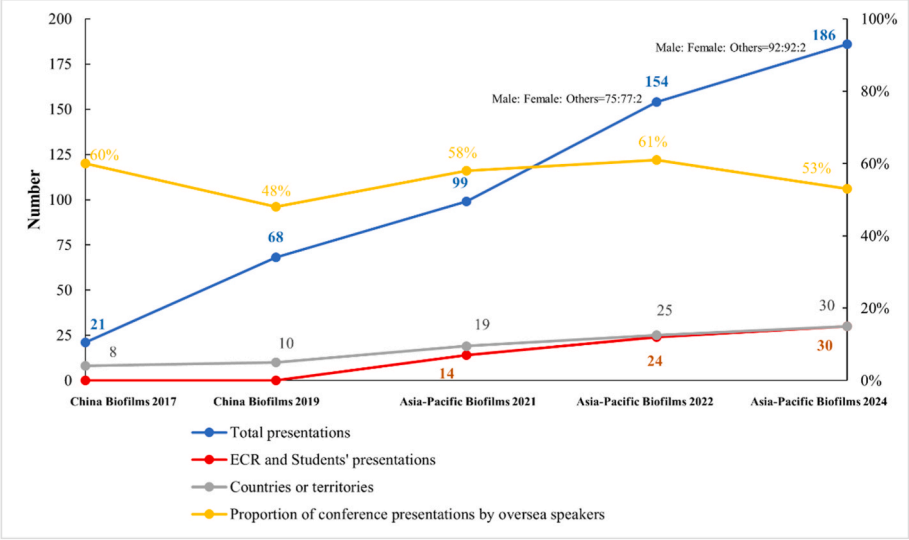

Fig. 2. Change in the speakers participated in the Asia-Pacific Biofilms conference.

antibiotic tolerance of *Pseudomonas aeruginosa* aggregates. Dr. Yinyue Deng elaborated on bacterial quorum sensing signals, and Dr. Zunying Liu presented on quorum sensing in seafood preservation. Dr. Aiqun Jia explored quorum sensing signaling deterrence by metabolites from *A. catechu* endophytes. Dr. Gongliang Zhang studied synergistic bacterial inhibition by flavoring substances and essential oils in wasabi. Subsequently, in Session 4 "*Anti*-Biofilms" (chaired by Dr. Haiyan Hu and Dr. Ning Sun), Dr. Tom Coenye introduced novel approaches to predict antimicrobial susceptibility in biofilms. Dr. Jinju (Vicky) Chen described computational modeling and nanocoatings against biofilms. Dr. Haiyan Hu presented tailored multilayer nanoparticles targeting resistant *P. aeruginosa*. Dr. Yang Wu reported on the *anti*-biofilm activity of the *Staphylococcus aureus* arlS kinase inhibitor tilmicosin. Dr. Oana Ciofu discussed antimicrobial resistance evolution in biofilms. Dr. Chaoqin Sun presented on an antibiofilm peptide inhibiting *Candida albicans* hyphal development.

Another "Early Career Researchers and Students" Session was arranged in the evening of Nov 16. Chaired by Dr. Boo Shan Tseng, this session had included 18 presentations from Dr. Yu Li, Dr. Mahesh Premarathna, Weixiong Zhang, Xueying Du, Chunyu Li, Pu Feng, Zhiwen Ding, Opeyemi Otemoye, Zhenqing Li, Yaqin Li, Yanqing Li, Feifeng Zhong, Yuying Zeng, Xiaolong Zhu, Yanling Zhu, Yuzhu Mao, Ziling Zhi and Sisi Chen.

On the fourth conference day (Nov 17), 2 venues had been organized. In the venue of "Environmental Microbiology", Session 1 (chaired by Dr. Zhenbo Xu and Dr. Guanglei Qiu), began with Dr. Yan Zhou presenting on energy-efficient wastewater treatment. Then, Dr. Tamas Felfoldi discussed saline lake microbiology. Dr. Erika Espinosa-Ortiz reviewed fungal biofilms. Dr. Faqian Sun explained quorum quenching for biofouling control in membrane bioreactors. Dr. Albert Parker covered bacterial transfer and hand hygiene post-biofilm. The following Session 2 (chaired by Dr. Olivier Habimana and Dr. Jinping Cheng) had included Dr. Olivier Habimana discussing silver nanoparticles' impacts on freshwater biofilms, Dr. Jinping Cheng on pollutants in microplastic biofilms, Dr. Xiaoqing Xu on genomic sequencing in wastewater epidemiology, and Dr. Xing Liu on stopping the decay of *Geobacter* electroactive biofilms. In Session 3 (chaired by Dr. Yan Zhou and Dr. Jialiang Kuang), Dr. Wei Ding discussed the lifestyle of marine biofilm bacteria and antimicrobial resource mining. Dr. Bin Cao and Dr. Sakcham Bairoliya quantified and analyzed extracellular DNA and RNA in the drinking water microbiome. Dr. Liang Duan reported on carbon-emission characteristics of wastewater treatment plants in the Beijing-Tianjin-Hebei region. Dr. Yanping Mao examined the effects of microplastics and antibiotics on microbiomes and resistomes in activated sludge. Dr. Bin Ji introduced a novel low-carbon wastewater treatment process combining microalgal and bacterial granular sludge. Dr. Jialiang Kuang focused on rapid recognition of microbial resources for bioremediation of organochlorine pesticides and flame retardants. In Session 4 (chaired by Dr. Fangang Meng and Dr. Le Han), Dr. Fangang Meng developed membrane bio-contactors for enhanced nitrogen removal, while Dr. Song Lin Chua engineered biofilms to trap and release microplastics. Dr. Le Han combined benthic bioturbation and membrane-aerated biofilm to eliminate nitrogen overload in freshwater sediments. Dr. Guanglei Qiu characterized polyphosphate-accumulating organisms genomically. Dr. Liang Zhang studied enhanced nitrogen removal in anammox coupled with heterotrophic denitrification by dosing waste activated sludge. Dr. Di Wu presented on intensifying wastewater treatment using sulfur bacterial biofilms.

In the venue of "Applied Microbiology", Session 1 (chaired by Dr. Gamini Seneviratne and Dr. Junyan Liu) began with Dr. Herbert Schellhorn addressing opportunities and challenges in molecular biology. Then, Dr. Gamini Seneviratne introduced soil biofilm induction to improve crop production and bioremediation. Dr. Judy Yang investigated biofilm formation under different flow and surface conditions. Dr. Peng Cai explored bacterial interactions in soil biofilms using microfluidics. Dr. Yan Li studied biofilm formation in biocontrol *Bacillus* strains against plant disease. In Session 2 (chaired by Dr. Ygal Achmon and Dr. Zhenbo Xu), Dr. Tao Dong investigated diverse functions of the type VI secretion system in microbial communities. Dr. Ygal Achmon decoded microbiome volatilomes related to food waste prevention. Dr. Enrico Marsili discussed biofilm electrochemistry and electrofermentation. Dr. Xiangjun Gong characterized 3D bacterial adhesion and detachment dynamics. Dr. Jiaofang Huang presented on constructions and applications of biofilm living materials. In Session 3 "Biofilms in Central Asia" (chaired by Dr. Enrico Marsili and Dr. Mahesh Premarathna), Dr. Vesselin Paunov highlighted nanotechnologies targeting pathogenic biofilms. Dr. Almagul Kushugulova unveiled complex biofilm dynamics of probiotic *Lactobacillus* strains. Dr. Iram Liaqat discussed bioremediation of heavy metals and organic pollutants via biofilms. Dr. Amila Henagamage studied fungal-bacterial biofilm solubilization of rock phosphate and its impact on potato crop enhancement. Then, in Session 4 "Biofilms and Synthetic Biology" (chaired by Dr. Yanrui Ye and Dr. Cheng Li), Dr. Darla Goeres discussed enhancing industry-academic partnerships. Dr. Cheng Li presented on metabolic engineering of non-model microorganisms. Dr. Yuanyuan Huang accelerated the design of pili-enabled living materials by integrating

bioinformatics, structural biology, and synthetic biology. Dr. Darshani Singhalage analyzed metabolite heterogeneity in fungal, bacterial, and fungal-bacterial biofilms. Dr. Wajira Balasooriya examined biofilm formation and EPS production by perchlorate-reducing microorganisms isolated from serpentine soils in Sri Lanka. Dr. Ishara Manawasinghe investigated fungal biofilms' potential in desert soil rehabilitation.

At last, At last, Dr. Zhenbo Xu closed the conference and announced the Asia-Pacific Biofilms 2026 will be organized by Monash University in Melbourne of Australia in March 26–28 of 2026.

As the fifth conference in this series (after 2017, 2019, 2021 and 2022), APB 2024 includes an organizing committee of 9 international and 9 local scientists, a total of 137 presentations (73 by oversea speakers), 30 presentations in "early career researchers and students" session, as well as approximately 300 scientists representing 30 countries or territories in Asia, Oceania, North America, Europe, Africa and South America (Fig. 2). Importantly, Asia-Pacific Biofilms 2024 supported gender equality and had successfully made the gender balance in all presentations (presentations by male/female speakers is 92 : 92). Please see https://www.asiapacificbiofilms.org/2024/for more information of the conference. Over the period 2017–2024, the Asia-Pacific Biofilms conferences have continuous growth in both scale and diversity. Also, a satellite conference, the "Microbial Stress Tolerance and Resistance" (MSTR) Conference, has been founded as an annual conference since 2023, with particular focus on persistent, viable but non-culturable (VBNC), small colony variant (SCV), uncultured, sub-lethal and other dormant states that formed under microbial stress in biofilms (please see https://www.asiapacificbiofilms.org/). The 1st and 2nd MSTR Conferences have been held in October 20–22 of 2023 in Guangzhou (organized by Dr. Junyan Liu) and August 23–25 of 2024 in Qingdao (organized by Dr. Yang Deng). The upcoming 3rd MSTR Conference is held in November 28–30 of 2025 in Ningbo (organized by Dr. Enrico Marsili). Up-to-date, the APB conferences have served as a vibrant hub for discussion across areas such as health, environmental sustainability, food safety, biotechnology, and synthetic biology.

CRediT authorship contribution statement

Zhenbo Xu: Writing – original draft, Writing – review & editing. **Birthe Kjellerup:** Writing – review & editing. **Chuanwu Xi:** Writing – review & editing. **Enrico Marsili:** Writing – review & editing. **Gamini Seneviratne:** Writing – review & editing. **Guanglei Qiu:** Writing – review & editing. **Honghua Hu:** Writing – review & editing. **Luyan Ma:** Writing – review & editing. **Liang Yang:** Writing – review & editing. **Yue Qu:** Writing – review & editing. **Yulong Tan:** Writing – review & editing. **Yaqin Li:** Writing – review & editing. **Feifeng Zhong:** Writing – review & editing. **Junyan Liu:** Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Zhenbo Xu[a,*], Birthe Kjellerup[b], Chuanwu Xi[c], Enrico Marsili[d], Gamini Seneviratne[e], Guanglei Qiu[f], Honghua Hu[g], Luyan Ma[h], Liang Yang[i], Yue Qu[j], Yulong Tan[k], Yaqin Li[l], Feifeng Zhong[l], Junyan Liu[m,n]

[a] *Department of Laboratory Medicine, The Second Affiliated Hospital of Shantou University Medical College, Shantou, 515041, China*

[b] *Department of Civil and Environmental Engineering, University of Maryland, College Park, MD, 20742, USA*

[c] *Eastern Institute of Technology, Ningbo, China*

[d] *Nottingham Ningbo China Beacons of Excellence Research and Innovation Institute, University of Nottingham Ningbo, Ningbo, 315100, China*

[e] *National Institute of Fundamental Studies, Kandy, Sri Lanka*

[f] *School of Environment and Energy, South China University of Technology, Guangzhou, China*

[g] *Jinhua Institute of Zhejiang University, Jinhua, China*

[h] *Molecular Microbiology, Institute of Microbiology, Chinese Academy of Sciences, Beijing, 100101, China*

[i] *School of Medicine, Southern University of Science and Technology, Shenzhen, China*

[j] *Department of Infectious Diseases, The Alfred Hospital and Monash University, Melbourne, 3004, Australia*

[k] *Special Food Research Institute, Qingdao Agricultural University, Qingdao, China*

[l] *School of Food Science and Engineering, South China University of Technology, Guangzhou, 510640, China*

[m] *College of Light Industry and Food Science, Guangdong Provincial Key Laboratory of Lingnan Specialty Food Science and Technology, Academy of Contemporary Agricultural Engineering Innovations, Zhongkai University of Agriculture and Engineering, Guangzhou, 510225, China*

[n] *Key Laboratory of Green Processing and Intelligent Manufacturing of Lingnan Specialty Food, Ministry of Agriculture, Guangzhou, 510225, China*

[*] Corresponding author.
E-mail address: zhenbo.xu@hotmail.com (Z. Xu).