

# 微生物学通报

## (Weishengwuxue Tongbao)



1974年创刊  
月刊

第52卷 第1期  
目次

2025年1月20日出版

### 专论与综述

- 1 医学微生物学学科发展报告  
李擎天, 朱泳璋, 姚玉峰, 王放, 吴文娟, 殷堃, 周冬生, 钟照华, 郭晓奎
- 17 病原菌胁迫下植物“呼救”策略的研究进展  
杨林桦, 杜晓雪, 张佳宁, 谢田朋, 杨涛
- 33 解脂耶氏酵母生物合成芳香族氨基酸衍生物的合成生物学策略  
陈茁, 朱源, 李伟国, 闫晓光, 颜丙扬, 乔建军, 赵广荣
- 46 后生元抗病毒性肠胃炎实验研究进展  
凌健棉, 王盼, 黎金彩, 蔡赐美, 周海泳, 晏琦, 胡文锋, 李雪玲
- 60 瘤内微生物与结直肠癌病程演进的研究现状与展望  
龙静, 王倩, 蒋义芳, 罗苑珂, 肖冲, 由凤鸣, 李雪珂
- 78 常压室温等离子体结合高通量筛选技术在微生物育种方面的研究进展  
康竞艺, 艾奕伶, 刘秀霞, 白仲虎
- 90 蛋白激酶在流感病毒生命周期不同阶段的作用  
杨宣叶, 高明阳, 胡欣妍, 刘倩芸, 吴玉湖, 马晓霞
- 101 细菌单细胞测序技术研究进展  
刘毛毛, 陈欢, 高原, 赵蓓蓓, 荣雅文, 黄俊
- 114 丁酸梭菌及其代谢物丁酸对炎症性肠病影响的研究进展  
钱亿帆, 朱建军, 杜勤超, 张润赞, 朱小宾, 陈杭萍
- 127 猪链球菌2型关键毒力因子及诱发疾病机制的研究进展  
董晨晖, 金美君, 李建, 岳怀宁, 刘燕, 王豪杰, 胡云皓, 朱良全

\*\*\*\*\*

### 研究报告

#### 环境微生物学

- 137 医院污水源生物气溶胶中耐药菌及耐药基因的季节变化特征  
刘扬, 王彦杰, 杨利莹, 朱昊然, 赖笔生, 刘亦凡, 李金龙
- 152 一株高氯酸盐还原细菌的分离鉴定与代谢特性  
罗文勇, 王皓明, 胡光荣, 李福利, 李捷
- 168 脱氮硫杆菌改良的耐热诱变及其诱变特性  
刘怀珠, 于慧艳, 胡彬彬, 姚永红, 张洋, 赵亮, 朱广斌, 吴新世
- 186 一株油脂降解菌的分离筛选及固定化  
司春灿, 林英, 殷俊
- 199 不动杆菌 PSB-K 解磷促生能力及全基因组测序分析  
赵健淞, 付若晗, 王跃麟, 赵鑫, 张越, 杨艳歌, 孙冬梅

#### 基因克隆及功能研究

- 219 布莱克韦尔虫草实时荧光定量逆转录 PCR 内参基因的筛选  
李佳妮, 张姝, 张永杰

#### 农业微生物学

- 230 柑橘废弃物堆肥中高效木质素降解菌的筛选及其降解效果  
李金业, 程昊, 徐青云, 刘小曼, 武松伟, 胡承孝

- 249 玉米浆添加对堆肥过程中磷组分转化及微生物群落的影响  
刘俊彩, 范博文, 赵立琴, 孙欣莹, 董子铭, 王萌萌, 孙宁, 杨凤军
- 263 茶薪菇‘赣茶 AS-5’担孢子单核体菌株的交配型鉴定及菌丝生长速度  
彭新红, 刘颖聪, 陈绪涛, 孙鹏, 戴丹, 胡佳, 王振, 戴建成, 魏云辉
- 276 豌豆绿肥翻压入土对攀枝花地区连续多年植烟土壤细菌多样性的影响  
宋景琦, 曾宗梁, 杨鹏, 余伟, 闫芳芳, 张宗锦, 张鹏, 辜运富
- 290 四川三台县麦冬//玉米间作体系根际微生物多样性及功能分析  
孙小芳, 曾华兰, 刘勇, 何炼, 况再银, 代顺冬, 华丽霞, 蒋秋平

#### 食品微生物学

- 309 白酒酿造环境中高温菌株的筛选、鉴定及其特性分析  
仲秀芳, 马景浩, 赵莹, 袁思涵, 富志磊, 田淑斌, 刘晓艳, 范光森

#### 兽医微生物学

- 327 笼养绿尾虹雉源肠球菌的分离鉴定及耐药性分析  
陈方山, 冯少华, 丁小保, 罗维, 陈黎, 李万洪, 马红, 张龙, 吴邦元

#### 微生物工程与药物研究

- 337 链霉菌 HKIB0006 中 collismycin A 葡萄糖酸修饰产物的发现  
吉火伍来, 赵子康, 陈媛, 曹明明, 张雅琼

#### 医学微生物学

- 350 桑酮 G 对变异链球菌生长和生物被膜形成的影响  
邹文海, 达春瑶, 肖颖欣, 龚志港, 刘祝祥
- 363 自噬相关基因 *ATG8* 在酵母细胞时序性寿命调控中的作用  
杨晓迪, 袁頔, 崔晓静, 华伟, 邓雁文, 陈亚芹, 崔红晶

\*\*\*\*\*

### 简报

- 373 肉座菌目 3 个中国新记录种  
吴晓倩, 余知和, 曾昭清

\*\*\*\*\*

### 技术与方法

- 383 11 种致牛腹泻病原的一步法多重 PCR/RT-PCR 检测方法的建立  
金美君, 胡云皓, 辛凌翔, 刘燕, 潘瑶, 王秀丽, 赵浩然, 汤承, 陈曦, 李锦铨, 朱良全

\*\*\*\*\*

### 经验交流

- 397 高温大曲产酯酵母的筛选、鉴定及发酵条件  
蒋泽元, 王庆兰, 卢青青, 何炜龙

\*\*\*\*\*

### 前瞻与评论

- 410 基于文献计量学的蛹虫草研究热点可视化分析  
油伦贺, 刘金坤, 刘冰, 谭铃文, 刘宇, 王建瑞
- 426 基于文献计量学的连作对土壤微生物群落影响研究的可视化分析  
杨阳, 王鸿, 张雪冰, 张帆, 郝兰兰

\*\*\*\*\*

### 高校教改纵横

- 445 大语言模型+智能评价的“双智”赋能现代工科微生物学混合式课程教学研究与实践  
谢晖, 朱守平, 刘鹏, 陈雪利
- 457 新工科背景下“水处理微生物学”课程“2+2+N”创新教学体系的构建与实践  
贾美玉, 辛明秀, 宋振辉, 卢玢宇, 徐玲玲, 刘亚洁, 余小霞, 郭亚丹, 闫喜凤
- 476 成果导向教育理念下大学生创新能力培养的探索与实践  
郭彤彤, 刘禹辰, 崔红, 李颖, 赵春涛, 张娣, 王继华

**REVIEWS**

- 1 Report on advances in Medical Microbiology  
LI Qingtian, ZHU Yongzhang, YAO Yufeng, WANG Fang, WU Wenjuan, YIN Kun, ZHOU Dongsheng, ZHONG Zhaohua, GUO Xiaokui
- 17 Research progress in the “cry for help” strategy of plants under pathogen stress  
YANG Linhua, DU Xiaoxue, ZHANG Jianing, XIE Tianpeng, YANG Tao
- 33 Strategy for the biosynthesis of aromatic amino acid derivatives by *Yarrowia lipolytica*  
CHEN Zhuo, ZHU Yuan, LI Weiguo, YAN Xiaoguang, YAN Bingyang, QIAO Jianjun, ZHAO Guangrong
- 46 Experimental research progress in postbiotics against viral gastroenteritis  
LING Jianmian, WANG Pan, LI Jincui, CAI Cimei, ZHOU Haiyong, YAN Qi, HU Wenfeng, LI Xueling
- 60 Current status and prospects of research on intratumoral microorganisms and progression of colorectal cancer  
LONG Jing, WANG Qian, JIANG Yifang, LUO Yuanke, XIAO Chong, YOU Fengming, LI Xueke
- 78 Research progress in atmospheric and room-temperature plasma combined with high-throughput screening in microbial breeding  
KANG Jingyi, AI Yiling, LIU Xiuxia, BAI Zhonghu
- 90 Roles of kinases in the life cycle of influenza virus  
YANG Xuanye, GAO Mingyang, HU Xinyan, LIU Qianyun, WU Yuhu, MA Xiaoxia
- 101 Advances in bacterial single-cell sequencing  
LIU Maomao, CHEN Huan, GAO Yuan, ZHAO Beibei, RONG Yawen, HUANG Jun
- 114 Research advances in the effects of *Clostridium butyricum* and its metabolite butyrate on inflammatory bowel disease  
QIAN Yifan, ZHU Jianjun, DU Qinchao, ZHANG Runzan, ZHU Xiaobin, CHEN Hangping
- 127 Research progress in critical virulence factors of *Streptococcus suis* serotype 2 and its disease-inducing mechanisms  
DONG Chenhui, JIN Meijun, LI Jian, YUE Huaining, LIU Yan, WANG Haojie, HU Yunhao, ZHU Liangquan

\*\*\*\*\*

**RESEARCH ARTICLES****Environmental Microbiology**

- 137 Seasonal changes of antibiotic resistant bacteria and antibiotic resistance genes in bioaerosols sourced from hospital sewage  
LIU Yang, WANG Yanjie, YANG Liying, ZHU Haoran, LAI Bisheng, LIU Yifan, LI Jinlong
- 152 Isolation, identification and characterization of a perchlorate-reducing bacterium  
LUO Wenyong, WANG Haoming, HU Guangrong, LI Fuli, LI Jie
- 168 Improved mutagenesis and mutagenic characteristics of thermotolerant strains of *Thiobacillus denitrificans*  
LIU Huaizhu, YU Huiyan, HU Binbin, YAO Yonghong, ZHANG Yang, ZHAO Liang, ZHU Guangbin, WU Xinshi
- 186 Screening and immobilization of a strain capable of degrading oil  
SI Chuncan, LIN Ying, YIN Jun
- 199 Phosphate-solubilizing and plant growth-promoting effects and whole genome sequencing of *Acinetobacter baumannii* PSB-K  
ZHAO Jiansong, FU Ruohan, WANG Yuelin, ZHAO Xin, ZHANG Yue, YANG Yange, SUN Dongmei

**Microbial Genetics**

- 219 Screening of reference genes for real-time quantitative reverse transcription PCR in *Cordyceps blackwelliae*  
LI Jiani, ZHANG Shu, ZHANG Yongjie

**Agricultural Microbiology**

- 230 Screening of efficient lignin-degrading bacteria in citrus waste compost  
LI Jinye, CHENG Hao, XU Qingyun, LIU Xiaoman, WU Songwei, HU Chengxiao
- 249 Addition of corn steep liquor affects the transformation of phosphorus fractions and microbial community during composting process  
LIU Juncai, FAN Bowen, ZHAO Liqin, SUN Xinying, DONG Ziming, WANG Mengmeng, SUN Ning, YANG Fengjun

# Microbiology China

- 263 Mating type and mycelial growth rate of basidiospore-derived monokaryons of *Cyclocybe chaxingu* Ganchar AS-5  
PENG Xinhong, LIU Yingcong, CHEN Xutao, SUN Peng, DAI Dan, HU Jia, WANG Zhen, DAI Jiancheng, WEI Yunhui
- 276 Application of pea green manure alters bacterial diversity in the soil cultivated with tobacco for years in Panzhihua  
SONG Jingqi, ZENG Zongliang, YANG Peng, YU Wei, YAN Fangfang, ZHANG Zongjin, ZHANG Peng, GU Yunfu
- 290 Biodiversity and functions of rhizosphere microbiome in the *Ophiopogon japonicus*-maize intercropping system in Santai County, Sichuan Province  
SUN Xiaofang, ZENG Hualan, LIU Yong, HE Lian, KUANG Zaiyin, DAI Shundong, HUA Lixia, JIANG Qiuping

## Food Microbiology

- 309 Screening, identification, and characterization of thermophilic strains in the brewing environment of *Baijiu*  
ZHONG Xiufang, MA Jinghao, ZHAO Xuan, YUAN Sihang, FU Zhilei, TIAN Shubin, LIU Xiaoyan, FAN Guangsen

## Veterinary Microbiology

- 327 Isolation, identification, and drug resistance of *Enterococcus* from captive Chinese monal (*Lophophorus lhuysii*)  
CHEN Fangshan, FENG Shaohua, DING Xiaobao, LUO Wei, CHEN Li, LI Wanhong, MA Hong, ZHANG Long, WU Bangyuan

## Microbial Engineering and Medicine

- 337 Discovery of products of collismycin A modified with gluconic acid in *Streptomyces* sp. HKIB0006  
JIHUO Wulai, ZHAO Zikang, CHEN Yuan, CAO Mingming, ZHANG Yaqiong

## Medical Microbiology

- 350 Effects of kuwanon G on the growth and biofilm formation of *Streptococcus mutans*  
ZOU Wenhui, DA Chunyao, XIAO Yingxin, GONG Zhigang, LIU Zhuxiang
- 363 The autophagy-related gene *ATG8* regulates the chronological lifespan of yeast cells  
YANG Xiaodi, YUAN Di, CUI Xiaojing, HUA Wei, DENG Yanwen, CHEN Yaqin, CUI Hongjing

\*\*\*\*\*

## COMMUNICATIONS

- 373 Three new records of *Hypocreales* in China  
WU Xiaoqian, YU Zhihe, ZENG Zhaoqing

\*\*\*\*\*

## TECHNOLOGY AND METHOD

- 383 A one-step multiplex PCR/RT-PCR method for detecting 11 pathogens causing bovine diarrhea  
JIN Meijun, HU Yunhao, XIN Lingxiang, LIU Yan, PAN Yao, WANG Xiuli, ZHAO Haoran, TANG Cheng, CHEN Xi, LI Jinqian, ZHU Liangquan

\*\*\*\*\*

## PROTOCOLS

- 397 Screening, identification, and fermentation condition optimization of ester-producing yeast in high-temperature Daqu  
JIANG Zeyuan, WANG Qinglan, LU Qingqing, HE Weilong

\*\*\*\*\*

## PERSPECTIVES AND COMMENTS

- 410 Visual analysis of research hotspots on *Cordyceps militaris* based on Bibliometrics  
YOU Lunhe, LIU Jinkun, LIU Bing, TAN Qianwen, LIU Yu, WANG Jianrui
- 426 Visual analysis of studies on effects of continuous cropping on soil microbial communities based on bibliometrics  
YANG Yang, WANG Hong, ZHANG Xuebing, ZHANG Fan, HAO Lanlan

\*\*\*\*\*

## EDUCATION

- 445 Research and practice on the blended teaching of Modern Engineering Microbiology empowered by large language model and intelligent evaluation  
XIE Hui, ZHU Shouping, LIU Peng, CHEN Xueli
- 457 Building and practice of the "2+2+N" innovative teaching system for Water Treatment Microbiology under the background of emerging engineering education  
JIA Meiyu, XIN Mingxiu, SONG Zhenhui, LU Binyu, XU Lingling, LIU Yajie, YU Xiaoxia, GUO Yadan, YAN Xifeng
- 476 Exploration and practice of fostering college students' innovation capability under the concept of outcome-based education (OBE)  
GUO Tongtong, LIU Yuchen, CUI Hong, LI Ying, ZHAO Chuntao, ZHANG Di, WANG Jihua