

# 中文目次

## 综述

- 421** 乳酸菌在不同胁迫下应激反应及高活性保护机制研究进展  
陈宁, 吴磊, 谢新强, 赵昕宇, 吴清平
- 437** 益生菌对人类乳头瘤病毒感染的治疗作用及其机制研究进展  
王崇岳, 吴毓薇, 谢新强, 李滢, 吴清平
- 453** 生物法制备壳寡糖的研究进展  
薛萍红, 邓运鸿, 田学琴, 刘少芳, 胡志宏
- 467** 代谢工程改造酵母生产琥珀酸的研究进展  
顾子蕴, 唐永圣, 陈修来
- 489** 植物垂直传递内生菌研究进展  
郭丽榕, 郭青钰, 朱书生, 杨明挚
- 505** 共生微生物对昆虫脂质代谢的影响  
王争艳, 张洁, 张闪, 周丽贞, 罗琼
- 515** 外生菌根真菌及其助手细菌联合解磷的研究进展  
曹耿悦, 郑庭裕, 于梦雅, 张杰, 高鑫, 赵梦婷, 戴传超, 贾永
- 524** 丝状真菌衰老的研究进展  
唐雅碧, 吴佳玲, 李晓, 谢宁
- 537** 中药协同抗真菌药物抗隐球菌的研究进展  
杨轶涵, 毛娅芯, 徐新平
- 551** 宿主激酶调控小RNA病毒感染的研究进展  
窦雪儿, 连瑞雅, 王娜, 李莎莎, 李慧霞

## 研究报告

- 567** 东北早晚熟菜豆根际与根瘤微生物差异及根瘤菌固氮能力  
石晴, 汪芳芳, 徐伟慧, 陈文晶, 常春玲, 胡云龙, 王志刚
- 582** 三峡水库消落区苍耳根际微生物群落结构解析  
周兰芳, 吴胜军, 马茂华, 邹航, 黄金夏, 杨军
- 597** 泉州湾红树林根际土壤放线菌的分离鉴定及链霉菌W444次级代谢产物的鉴定  
张文州, 陈琳琳, 林水森, 林阳君, 庄月娥, 谢志新, 江红, 连云阳, 骆祝华, 彭飞
- 614** 毛竹根际解磷菌木糖氧化无色杆菌的分离及其解磷机制  
项春铸, 房翠莲, 田佳怡, 张清, 李全, 宋新章, 曹婷婷
- 629** 表皮葡萄球菌 $\Delta vraSR-lrgAB$ 突变株的构建和生物学特性  
尚爽婕, 陈卫国, 张晓奎, 朱健鹏, 白松, 陈晓婷, 武有聪
- 644** 鼠伤寒沙门菌 $greA/B$ 基因缺失株的构建及生物学特性  
叶景芬, 陈世雄, 武绍碧, 杨婉, 潘永, 廖怡雯, 罗雪, 杨琦

## 655 抗生素和低聚半乳糖干预对大鼠行为和神经递质的影响

韩水兵, 刘晓英, 刘子昱, 潘龙, 慕春龙, 朱伟云

## 671 CRISPR-Cas1对鲍曼不动杆菌耐药性与毒力的抑制作用

张鹏宇, 李金月, 郭停停, 包广宇, 胡健, 李国才

## 683 甘胆口服液对副溶血弧菌的抑菌作用及转录组分析

褚宽, 黄雷, 郑阿钦, 蔡雪, 程安达, 原居林, 吕利群, 姚嘉赟

## 698 基于电子分配的化能自养细菌培养策略

何晓敏, 林炜铁, 罗剑飞

## 715 微生物菌剂在船舶生化需氧量快速检测仪中的应用

周娟, 李捷, 于雪婷, 俄保巴毛, 扎西求忠, 李松枝, 明志军

## 729 小麦赤霉病胁迫下植物微生物群落特征及其与病害发生的关系

王楚涵, 吴传发, 羊健, 陈剑平, 葛体达, 邓扬悟

## 745 一株贝莱斯芽孢杆菌鉴定、全基因组学分析及其抗病促生特性

王春玲, 黄钰婷, 刘星, 徐良雄, 王艳君, 肖海霞, 朱柏诗, 毛露甜

## 758 防治卵孢小奥德蘑蛛网病生防菌筛选及其基因组分析

刘亚勇, 张涛涛, 高琳, 赵娟, 孟盼盼, 李莹菲, 秦文韬

## 771 流感病毒WSN毒株通过TGF- $\beta$ 1/Smad3介导的STAT3磷酸化调控类黏蛋白的表达

尤冬雪, 潘宸, 陈玉章, 周欣霓, 高铭, 陈梦颖, 王佳俊, 池晓娟, 王松

## 781 泛基因组分析鲁氏芽孢杆菌属的物种多样性与潜在工业应用(英文)

邹伟, 杨凌凌, 刘超杰, 郑佳, 张楷正, 乔宗伟

## 数据论文

## 796 我国家蟋蟀浓核和虹彩病毒的流行病学分析

李林霖, 郭昱彤, 陈佳伟, 王欣悦, 方可馨, 曾成育, 旦增列西, 孟洁, 地丽胡玛·阿吉, 徐雨欣, 杨勇波, 杨红

## 808 黄河三角洲典型植被下真菌群落结构组成

张婷, 宗可金, 季银利, 宋宪锐, 赵聪聪, 纪明德, 孔强, 王倩

## 专论

## 828 基于专利视角下人工智能在合成生物学中的应用

相强宇, 马丽丽, 高婉莹, 吴宗震, 左锟澜, 张璐, 陈泽欣, 李骏, 刘欢

## 846 基于文献计量学的菌丝球及其在环境领域的应用研究现状及发展趋势

王博涵, 汪宇, 张斯, 迟超, 王深研

# CONTENTS

## REVIEWS

- 421 Research progress in responses and high activity protection mechanisms of lactic acid bacteria under different stresses  
CHEN Ning, WU Lei, XIE Xinjiang, ZHAO Xinyu, WU Qingping
- 437 Research progress in the therapeutic effects and mechanisms of probiotics in HPV infection  
WANG Chongyue, WU Yuwei, XIE Xinjiang, LI Ying, WU Qingping
- 453 Recent advances in bioproduction of chitooligosaccharides  
XUE Pinghong, DENG Yunhong, TIAN Xueqin, LIU Shaofang, HU Zhihong
- 467 Advances in metabolic engineering of yeast for succinic acid production  
GU Ziyun, TANG Yongsheng, CHEN Xiulai
- 489 Research advances in vertically transmitted endophytes in plants  
GUO Lirong, GUO Qingyu, ZHU Shusheng, YANG Mingzhi
- 505 Effects of microbial symbionts on lipid metabolism in insects  
WANG Zhengyan, ZHANG Jie, ZHANG Shan, ZHOU Lizhen, LUO Qiong
- 515 Research progress of synergistic interactions between ectomycorrhizal fungi and mycorrhizal helper bacteria in phosphorus solubilization  
CAO Gengye, ZHENG Tingyu, YU Mengya, ZHANG Jie, GAO Xin, ZHAO Mengting, DAI Chuanchao, JIA Yong
- 524 Research progress in senescence of filamentous fungi  
TANG Yabi, WU Jialing, LI Xiao, XIE Ning
- 537 Research progress in combined application of traditional Chinese medicines and antifungal agents in treating *Cryptococcus* infections  
YANG Yihan, MAO Yixin, XU Xinpingle
- 551 Research progress in regulation of picornavirus infections by host kinases  
DOU Xue'er, LIAN Ruiya, WANG Na, LI Shasha, LI Huixia

## RESEARCH ARTICLES

- 567 Differences of rhizosphere and root nodule microorganisms between early and late maturing varieties of *Phaseolus vulgaris* in northeast China and nitrogen-fixing capacity of rhizobia  
SHI Qing, WANG Fangfang, XU Weihui, CHEN Wenjing, CHANG Chunling, HU Yunlong, WANG Zhigang
- 582 Microbial community structure in the rhizosphere of *Xanthium sibiricum* in the water-level-fluctuation zone of the Three Gorges Reservoir  
ZHOU Lanfang, WU Shengjun, MA Maohua, ZOU Hang, HUANG Jinxia, YANG Jun
- 597 Isolation and identification of actinomycetes from rhizosphere soil samples of mangrove forests in Quanzhou Bay and secondary metabolites of *Streptomyces* sp. W444  
ZHANG Wenzhou, CHEN Linlin, LIN Shuisen, LIN Yangjun, ZHUANG Yue'e, XIE Zixin, JIANG Hong, LIAN Yunyang, LUO Zhuhua, PENG Fei
- 614 Isolation and phosphorus-solubilizing mechanism of *Achromobacter xylosoxidans* in the rhizosphere of Moso bamboo  
XIANG Chunzhu, FANG Cuilian, TIAN Jiayi, ZHANG Qing, LI Quan, SONG Xinzhang, CAO Tingting
- 629 Construction and characterization of *ΔvraSR-rgAB* of *Staphylococcus epidermidis*  
SHANG Shuangjie, CHEN Weiguo, ZHANG Xiaokui, ZHU Jianpeng, BAI Song, CHEN Xiaoting, WU Youcong

- 644 Construction and biological characterization of *greA/B*-deleted *Salmonella Typhimurium* strains  
YE Jingfen, CHEN Shixiong, WU Shaobi, YANG Wan, PAN Yong, LIAO Yiwen, LUO Xue, YANG Qi
- 655 Effects of antibiotics and galacto-oligosaccharide on behaviors and neurotransmitters in rats  
HAN Shuibing, LIU Xiaoying, LIU Ziyu, PAN Long, MU Chunlong, ZHU Weiyun
- 671 CRISPR-Cas1 attenuates antibiotic resistance and virulence of *Acinetobacter baumannii*  
ZHANG Pengyu, LI Jinyue, GUO Tingting, BAO Guangyu, HU Jian, LI Guocai
- 683 Inhibition effect and transcriptome analysis of Gan Dan oral liquid against *Vibrio parahaemolyticus*  
CHU Kuan, HUANG Lei, ZHENG Aqin, CAI Xue, CHENG Anda, YUAN Julin, LYU Liqun, YAO Jiayun
- 698 Culture strategy of chemoautotrophic bacteria based on electron distribution  
HE Xiaomin, LIN Weitie, LUO Jianfei
- 715 Application of microbial agents in the rapid detector for BOD in the wastewater from ships  
ZHOU Juan, LI Jie, YU Xuetong, Ebaobamao, Zhaxiqizhong, LI Songzhi, MING Zhijun
- 729 Changes of microbiome in wheat under head blight stress and its correlation with disease occurrence  
WANG Chuhan, WU Chuanfa, YANG Jian, CHEN Jianping, GE Tida, DENG Yangwu
- 745 Identification, genomic analysis, and disease-resistant and plant growth-promoting characterization of a *Bacillus velezensis*  
WANG Chunling, HUANG Yuting, LIU Xing, XU Liangxiong, WANG Yanjun, XIAO Haixia, ZHU Boshi, MAO Lutian
- 758 Screening and genomic analysis of biocontrol bacteria against cobweb disease of *Oudemansiella raphanipes*  
LIU Yayong, ZHANG Taotao, GAO Lin, ZHAO Juan, MENG Panpan, LI Yingfei, QIN Wentao
- 771 Influenza A/WSN/33 virus regulates the expression of orosomucoid through STAT3 phosphorylation mediated by TGF-β1/Smad3  
YOU Dongxue, PAN Chen, CHEN Yuzhang, ZHOU Xinni, GAO Ming, CHEN Mengying, WANG Jiajun, CHI Xiaojuan, WANG Song
- 781 Pan-genome analysis of *Rummeliibacillus* sp. strains reveals their unexpected diversity and potential for industrial application  
ZOU Wei, YANG Lingling, LIU Chaojie, ZHENG Jia, ZHANG Kaizheng, QIAO Zongwei

## DATA PAPER

- 796 Epidemiology of *Acheta domesticus* densovirus and cricket iridovirus in China  
LI Linlin, GUO Yutong, CHEN Jiawei, WANG Xinyue, FANG Kexin, ZENG Chengyu, Danzengliexi, MENG Jie, Dilihua·Aji, XU Yuxin, YANG Yongbo, YANG Hong
- 808 Structures of fungal communities in soil of typical plants in the Yellow River Delta  
ZHANG Ting, ZONG Kejin, JI Yinli, SONG Xianrui, ZHAO Congcong, JI Mingde, KONG Qiang, WANG Qian

## SPECIAL SECTION

- 828 Application of artificial intelligence in synthetic biology from the patent perspective  
XIANG Qiangyu, MA Lili, GAO Wanling, WU Zongzhen, ZUO Kunlan, ZHANG Lu, CHEN Zexin, LI Jun, LIU Huan
- 846 Research status and trends of mycelial pellets and their application in the field of environment based on bibliometrics  
WANG Bohan, WANG Yu, ZHANG Si, CHI Chao, WANG Shenyan