



ISSN 1673-2383

CN 41-1378/N

CODEN HGDXC3

全国中文核心期刊

# 河南工业大学学报

(自然科学版)

**JOURNAL OF HENAN UNIVERSITY OF TECHNOLOGY  
(NATURAL SCIENCE EDITION)**

**2022 3**

第43卷 第3期

Vol.43 No.3

(6月20日出版)

河南工业大学学报(自然科学版)

第四十三卷

第三期

二〇二二年六月



主管单位  
河南省教育厅

主办单位  
河南工业大学

编辑出版  
河南工业大学  
学报编辑部

主编  
毕晓勤

副主编  
薛丹

责任编辑  
姚玮华  
金铁成

周凤航

英文审核  
李倩

印刷单位  
山西同方知网印刷  
有限公司

发行方式  
邮局发行

发行范围  
国内外公开

国内发行  
山西省邮政管理局

国外发行  
中国国际图书贸易  
集团有限公司

邮发代号  
国内: 22-574  
国外: BM2652

中国标准连续出版物号  
ISSN 1673-2383  
CN 41-1378/N

电话  
0371-67756156

邮编  
450001

地址  
郑州市高新区莲花街

投稿平台  
<http://zzls.cbpt.cnki.net>

电子邮箱  
xblk@haut.edu.cn

# 河南工业大学学报(自然科学版)

## 2022年6月第43卷第3期(双月刊)

### 目次

#### ·特约专栏·

低温等离子体食品非热加工理论与技术专题研究(主持人 成军虎)

等离子体多尺度氧化对展青霉素降解的影响

..... 成军虎,温馨,孔繁津,李孟轲,王一杰(1)

介质阻挡放电等离子体处理对大豆分离蛋白结构及凝胶特性的影响

..... 周迎雪,刘连杰,张琳琳,谭亦成,李晓娟,彭开锋,刘志伟,龚德力(10)

低温等离子体技术改性纤维素的研究进展

..... 祝红,牛德宝,张灿,成军虎(18)

#### ·粮油食品研究·

小麦粉特性对多孔挂面品质的影响

..... 陈洁,陈怡萱,汪磊,张蕴华(26)

冷冻温度及龙柏叶抗冻蛋白对小麦淀粉结构和理化特性的影响

..... 马豪,刘玫,郑学玲,李利民,刘翀(35)

以乳极性脂/蛋白为界面脂滴的体外消化特性研究

..... 冯坤,孙聪,梁少华(43)

响应面法优化虾青素-植物甾醇亚麻酸酯复合脂质体的制备工艺

..... 张新,潘丽,常振刚,郭晓引,李雪琴(51)

花生蛋白的浓度对其超声改性效果的影响

..... 张淑艳,章绍兵,陈林,张语青(58)

老对面团发酵过程中菌群结构及风味物质的影响

..... 刘悦,张灿,高玲玲,张康逸,闫美慧,张国治(65)

JOURNAL OF HENAN UNIVERSITY OF TECHNOLOGY  
(NATURAL SCIENCE EDITION)

Jun. 2022 Vol. 43 No. 3(Bimonthly)

贝莱斯芽孢杆菌降解脱氧雪腐镰刀菌烯醇及抑制禾谷镰刀菌的研究  
..... 曹荣耀,谢岩黎,刘晨,程思忠(74)

*Rufibacter sediminis* H-1 产胞外多糖发酵条件优化及多糖保湿和乳化性能  
研究 ..... 杨棒棒,周佳,屈建航,李春雨,罗宇(81)

HPLC-ELSD 法测定天然香料中水溶性糖的分布特征  
..... 刘雨,席辉,付英杰,李鹏,卢斌斌,孙世豪,宗永立(89)

UHPLC 法快速测定坚果炒货中 4 种抗氧化剂含量  
..... 周迎春,杨盛茹,华向美,李单单,贺金涛(96)

不同储藏条件下鲜湿糙米线品质变化动力学模型研究  
..... 乔聪聪,  
田晓红,王磊鑫,姜平,翟小童,曾凡坤,吴娜娜,谭斌(102)

·粮食储藏研究·

混凝土粮仓-粮食颗粒界面静动力特性直剪试验研究  
..... 郭呈周,周飞,曾长女(111)

基于 CNN-DBN 的小麦不完善粒识别技术研究  
..... 张庆辉,田欣欣,吕鹏涛,杨彬(118)

·综述·

富硒生物活性肽制备技术及其功能研究进展  
..... 黄继红,赵朋辉,  
侯银臣,陈文静,廖爱美,潘龙,李彦瑾,杨盛茹,李琰(125)

多酚对淀粉慢消化作用及其生物利用率研究进展  
..... 任顺成,陈佳乐,陶华(133)

Competent Authority

The Education Department of Henan  
Province

Sponsor

Henan University of Technology

Editor & Publisher

Editorial Department of Journal of  
Henan University of Technology

Editor-in-chief

BI Xiaojin

Associate Editor

XUE Dan

Executive Editor

YAO Weihua

JIN Tiecheng

ZHOU Fenghang

English Editor

LI Qian

Printer

Shanxi Tongfang Knowledge Network  
Printing Co., Ltd.

Distribution Mode

Post Office

Distribution Range

Domestic and Overseas

Domestic Distributor

Shanxi Provincial Postal  
Administration

Overseas Distributor

China International Book Trading  
Corporation

Issue Code

22-574

Overseas Code

BM2652

China Standard Serial Number

ISSN 1673-2383  
CN 41-1378/N

Tel 0371-67756156

Post Code 450001

Address

Lianhua Street, Zhengzhou High-Tech  
Development Zone, Zhengzhou, Henan,  
China

Website <http://zzls.cbpt.cnki.net>

E-mail [xblk@haut.edu.cn](mailto:xblk@haut.edu.cn)

**JOURNAL OF HENAN UNIVERSITY OF TECHNOLOGY**  
**(NATURAL SCIENCE EDITION)**

Vol. 43 No. 3(Sum. 207)

Jun. 20, 2022

**CONTENTS**

**Special column**

**Special study on theory and technology of non-thermal processing of cold plasma food (host CHENG Junhu)**

Effect of multi-scale plasma oxidation on the degradation of patulin ..... CHENG Junhu, WEN Xin, KONG Fanjin, et al(1)

The effects of dielectric barrier discharge plasma treatment on the structure and gelling properties of soy protein isolate  
..... ZHOU Yingxue, LIU Lianjie, ZHANG Linlin, et al(10)

Research progress of cellulose modified by cold plasma technology ..... ZHU Hong, NIU Debao, ZHANG Can, et al(18)

**Cereal oil and food research**

Effect of wheat flour characteristics on the quality of porous dried noodles  
..... CHEN Jie, CHEN Yixuan, WANG Lei, et al(26)

Effects of freezing temperature and antifreeze protein from *Sabina chinensis* (Linn.) Ant. cv. Kaizuca leaves on structure  
and physicochemical properties of frozen wheat starch ..... MA Hao, LIU Mei, ZHENG Xueling, et al(35)

Study on *in vitro* digestion characteristics of milk polar lipid/protein as interface lipid droplets  
..... FENG Kun, SUN Cong, LIANG Shaohua(43)

Optimization of preparation process of liposomes co-encapsulating astaxanthin and phytosterol linolenic acid ester by  
response surface methodology ..... ZHANG Xin, PAN Li, CHANG Zhengang, et al(51)

Effect of peanut protein concentration on its ultrasonic modification  
..... ZHANG Shuyan, ZHANG Shaobing, CHEN Ling, et al(58)

Influence of bacterial flora and flavor substances in the process of dough fermentation  
..... LIU Yue, ZHANG Can, GAO Lingling, et al(65)

Degradation of deoxynivalenol by *Bacillus velezensis* and its inhibition on the growth of *Fusarium gramineum*  
..... CAO Rongyao, XIE Yanli, LIU Chen, et al(74)

Fermentation condition optimization, moisturizing and emulsifying properties of exopolysaccharides produced by *Rufibacter*  
*sediminis* H-1 ..... YANG Bangbang, ZHOU Jia, QU Jianhang, et al(81)

Distribution characteristics of soluble sugars in natural fragrance and flavor ingredient by HPLC-ELSD  
..... LIU Yu, XI Hui, FU Yingjie, et al(89)

Rapid determination of four antioxidants in roasted seeds and nuts by UHPLC  
..... ZHOU Yingchun, YANG Shengru, HUA Xiangmei, et al(96)

Study on the kinetic model of quality changes of fresh brown rice noodles during storage at different temperatures  
..... QIAO Congcong, TIAN Xiaohong, WANG Leixin, et al(102)

**Grain storage research**

Experimental study on static and dynamic characteristics of concrete granary-grain particle interface  
..... GUO Chengzhou, ZHOU Fei, ZENG Changnyu, et al(111)

Research on unsound wheat kernels recognition technology based on CNN-DBN  
..... ZHANG Qinghui, TIAN Xinxin, LYU Pengtao, et al(118)

**Review**

Research progress on the preparation technology and function of selenium-enriched bioactive peptide  
..... HUANG Jihong, ZHAO Penghui, HOU Yinchen, et al(125)

Research progress on the effect of polyphenols on slow digestion of starch and its bioavailability  
..... REN Shuncheng, CHEN Jiale, TAO Hua(133)