

# CONTENTS

食品工业科技

2011年第2期，总238期

## 前瞻 Project

### 专家导航 Guideline

- 16 积极探索餐饮业转型升级之路，大力推动城市科学发展  
中国烹饪协会常务副会长 杨柳

### 热点追踪 Focus Tracing

- 22 食物强化的目标——使公共卫生受益(下)

### 安全视角 Food safety

- 26 条码技术在食用农副产品质量安全管理中的应用

## 实战 Application

### 营销管理 Sales Management

- 32 年关将至，白酒企业备战秘笈

## 互动 Communication

### 企业联办 Co-sponsored with Enterprise

- 36 天然防腐剂——“银象”牌纳他霉素(浙江银象专栏)  
37 纤维的力量(丹尼斯克专栏)  
38 天然营养型调味料——纯鸡肉粉(广东富农专栏)

### 展会风景 Exhibition View

- 40 展会现场服务管理  
44 FIC 2011展位预览

- 52 新年贺词 New Year Greetings

### 企业报道 Enterprise Report

- 56 十年风雨路，弹指一挥间  
——记青岛瑞可莱食品有限公司十周年庆典活动

## 信息 Information

- 58 资讯动态 News & Trends



GUANGYI



广东省著名商标

东莞市广益食品添加剂实业有限公司  
Dongguan Guangyi Food Additive Industry Co., Ltd.

高品质  
高纯度  
低价格



■ 特丁基对苯二酚(TBHQ)  
纯度：99.98%

■ L-抗坏血酸棕榈酸酯 纯度：98%以上  
(VC 酯)

应用范围：



0769  
88886882

www.guangyi.net

# CONTENTS

2011年第2期，总238期

## 研究与探讨

- 65 壳聚糖溶液的流变学性质及应用研究..李星科等  
*Study on rheological properties and application of chitosan solution.....LI Xing-ke et al*
- 69 广东清新冰糖桔与郁南无核沙糖桔特性差异研究.....黎永乐等  
*Study on the characteristics difference between the sugar orange from Qingxin and Yunan of Guangdong.....LI Yong-le et al*
- 73 番茄浆保温处理的工艺研究.....孙晶等  
*Study on manufacturing process of tomato pulp thermostatic treatment.....SUN Jing et al*
- 76 果蔬冰点与其生理生化指标关系的研究.....钟志友等  
*Study on relation between freezing and physiological and biochemical indexes of fruits and vegetables.....ZHONG Zhi-you et al*
- 79 小麦粉中神经酰胺类物质的提取及结构分析.....崔韶晖等  
*Extraction and structure analysis of a species of ceramide from wheat powder.....CUI Shao-hui et al*
- 81 草鱼肉蛋白酶解物功能特性及质量控制的研究.....李雪等  
*Functional properties and quality control of protein hydrolysates from grass carp fish (*Ctenopharyngodon idellus*) meat.....LI Xue et al*
- 85 杨梅渣黄酮类化合物提取及其抗氧化活性研究.....陈学丽等  
*Research on the extraction and anti-oxidation of flavonoids in *Myrica rubra* marc.....CHEN Xue-li et al*
- 88 油菜花粉油脂贮藏过程中挥发性成分变化研究.....徐响等  
*Changes of volatile compounds composition of rape bee pollen oil during storage.....XU Xiang et al*
- 92 褐藻糖胶不同干燥方法的研究.....杨波等  
*Study on different drying technology of fucoidan.....YANG Bo et al*
- 95 采用气相色谱质谱联用技术对不同窖龄窖泥浸出液的分析研究.....卫春会等  
*Study on pit mud lixivium of different cellar age by gas chromatography mass spectrometry.....WEI Chun-hui et al*
- 98 活性炭静态吸附马氏珠母贝胰酶水解产物中氨基酸特性研究.....郑惠娜等  
*Characteristics of activated carbon for absorbing amino acids in static state from *Pinctada martensi* meat protein hydrolysates.....ZHENG Hui-na et al*
- 101 喷雾干燥与水浴模拟实验条件对应关系的研究.....于章龙等  
*Study on the relationships between spray-drying conditions and water-bath simulation experiment.....YU Zhang-long et al*
- 104 转基因植物乳杆菌LP590体外耐受性质的研究.....刘海燕等  
*Study on tolerance to multistresses in vitro for genetically modified *Lactobacillus* 590.....LIU Hai-yan et al*
- 106 超临界CO<sub>2</sub>萃取北五味子藤茎挥发油的GC-MS分析.....李斌等  
*Determination of the volatile oil from caulis of *Schisandra Chinensis*(Turcz.) Baill with supercritical carbon dioxide fluid by GC/MS.....LI Bin et al*
- 109 喷雾干燥对发酵乳杆菌KLDS1.0709存活影响的研究.....郭云等  
*Survival of *Lactobacillus fermentum* KLDS1.0709 after spray-drying.....GUO Yun et al*
- 112 几种麦芽抗酵母菌粗蛋白含量比较及性质分析.....姜晓雷等  
*Character analysis and content comparison of anti-yeast crude protein from several kinds of barley malt.....JIANG Xiao-lei et al*

February, 2011(No. 238)

- 115 真姬菇发酵海带废渣制备多糖的抗氧化活性....解秋菊等  
*Antioxidant activity of exopolysaccharide from fermented kelp waste by *Hypsizigus marmoreus*.....XIE Qiu-ju et al*
- 118 大孔吸附树脂对茶多酚和咖啡碱吸附及洗脱性能的研究.....纪小燕等  
*Study on adsorbing and desorption characteristics of macroporous absorption resin for teapolyphenols and caffeine.....JI Xiao-yan et al*
- 121 大豆润滑油抗氧化性的研究.....齐颖等  
*Study on anti-oxidation activity of soybean-lubricant oil.....QI Ying et al*
- 123 滚揉时间和加水量对重组牛肉品质特性的影响.....马俊英等  
*Effect of tumbling time and applied water quantity on quality of restructured beef.....MA Jun-jun et al*
- 127 绵阳元宝枫种仁油脂成分分析研究..魏明等  
*Component analysis of oil in *acer truncatum* bunge kernel in Mianyang.....WEI Ming et al*
- 129 腊八蒜绿色素影响因素及护绿方法研究.....白冰等  
*Methods and influence factors in green protecting of "labu" garlic.....BAI Bing et al*
- 133 对氯苯氧乙酰改性壳聚糖的制备、抑菌及机理研究.....李小芳等  
*Synthesis, antibacterial activity and mechanism of para chlorinenoxyacetyl chitosan.....LI Xiao-fang et al*
- 136 金枪鱼鱼柳加工过程中组胺变化规律的研究.....祁兴普等  
*Study on histamine change in the processing of tune loin.....QI Xing-pu et al*
- 139 4种真菌制备海藻曲及其产香特征的初步研究.....刘烨等  
*Preliminary study on fermentation and flavour specificity of producing seaweed leaven using four fungi.....LIU Ye et al*
- 142 罗望子多糖硫酸酯的制备及表征..高义霞等  
*Preparation and characterization of sulfated tamarind polysaccharide.....GAO Yi-xia et al*
- 144 百里香挥发油成分分析及急性毒理学实验研究.....闫子娇等  
*Study of composition and emergency toxicology test of thymus.....YAN Zi-jiao et al*
- 147 菜籽多糖APS-2的理化性质及结构研究.....朱建飞等  
*Physicochemical and structural characterization of rapeseed polysaccharide APS-2.....ZHU Jian-fei et al*
- 149 蝇虫草水提液对Cu<sup>2+</sup>诱发蚕豆根尖微核率的影响.....田雪莲等  
*Effects of water extract of *Cordyceps militaris* on Cu<sup>2+</sup> induced micronucleus rate of viciafaba root-tip cells.....TIAN Xue-lian et al*
- 151 竹茹提取物成分分析及功能初探.....张建友等  
*Components analysis and functions of bamboo shavings extract.....ZHANG Jian-you et al*
- ## 生物工程
- 154 树脂固定化α-乙酰乳酸脱羧酶的初步研究.....陈卿等  
*Preliminary study on immobilization of α-acetolactate decarboxylase by resin.....CHEN Qing et al*
- 159 高产酒精酵母菌株及甘薯品种筛选.....聂世现等  
*Screening of high yield alcohol yeast and sweet potato varieties.....NIE Shi-xian et al*
- 162 高密度培养重组E.coli产胆固醇氧化酶的乳糖诱导策略.....杨海麟等  
*High cell density culture of recombinant *E.coli* producing cholesterol oxidase as lactose induced strategy.....YANG Hai-lin et al*

# CONTENTS

2011年第2期，总238期

- 166 枯草芽孢杆菌产弹性蛋白酶对肉嫩化的工艺研究.....  
*Study on application of extracellular elastase by Bacillus. Subtilis in meat.*..... HAN Jian-chun et al
- 169 利用活性真菌转化简单儿茶素为酯型儿茶素.....  
*Microbial transformation of tea epicatechins into epigallocatechin gallate by the active fungi.*..... DENG Zhi-hui et al
- 172 草鱼肉发酵香肠的发酵工艺研究.....  
*Study on the fermenting technology of Lactobacillus in grass carp fermented sausage.*..... WANG Lei et al
- 175 两种分子标识在酵母分子鉴定中的比较.....  
*Comparison of two molecular markers in yeast molecular identification.*..... CHEN Yuan-yuan et al
- 178 乳酸杆菌脉冲场凝胶电泳分子分型的条件优化.....  
*Optimization in molecular typing of Lactobacillus by pulsed field gel electrophoresis.*..... XU Fei-li et al
- 181 耐高糖度枸杞酒酵母菌的选育.....  
*Breeding of Lycium barbarum's yeast with high-sugar resistance.*..... HE Xiao-guang et al

## 工艺技术

- 183 酶法制取橙皮果胶的研究.....  
*Cellulase extraction of pectin from orange peel.*..... HAN Dong-mei et al
- 187 紫菜中类菌胞素氨基酸种类的确定及提取条件优化.....  
*Species identification and optimization of extraction conditions of mycosporine-like amino acids in Porphyra yezoensis.*..... XU Zhi-heng et al
- 191 模拟Mozzarella干酪工艺参数优化的研究.....  
*Study on optimization of process parameters of imitation Mozzarella cheese.*..... CHEN Chao et al
- 195 制备乳脂肪球膜磷脂-维生素A脂质体的工艺优化.....  
*Optimization of technology for preparing vitamin A liposomes from milk fat globule membrane phospholipids.*..... GUO Chen-feng et al
- 199 牡蛎超声波清洗工艺的初步研究.....  
*Preliminary study on the ultrasonic cleaning process of oyster.*..... ZHANG Jing-feng et al
- 201 喷雾干燥速溶香蕉粉制备工艺研究.....  
*Study on technique of instant banana powder by spray drying.*..... XU Xue-qin et al
- 205 氟苯尼考淀粉微球的制备及缓释性能的研究.....  
*Study on the preparation and drug release of florfenicol starch microsphere inclusion compound.*..... LI Zhong-jin et al
- 208 绿茶茶汤冷冻浓缩研究初报.....  
*Preliminary study on freeze concentration of green tea.*..... WANG Zhi-lan et al
- 211 鲶鱼鱼片与鱼糜脱脂方法的筛选研究.....  
*Filtration on the degreasing method of Pneumatophorus japonicus fillet and surimi.*..... OUYANG Jie et al
- 214 Box-Behnken响应面设计优化微波辅助提取大豆胚芽黄酮的工艺.....  
*Optimization of technology for microwave-assisted extraction of soybean embryo flavonoids using Box-Behnken response surface analysis.*..... GAO Ding-qing et al
- 217 罗非鱼片脱腥技术比较研究.....  
*Comparative study on deodorization of tilapia meat.*..... ZHENG Yuan-ping et al
- 220 螺旋藻甜酒酿的研制.....  
*Study on the progressing technology of spirulina sweeten glutinous rice wine.*..... TIAN Ya-hong et al

February, 2011(No. 238)

- 223 马铃薯淀粉加工汁水蛋白的臭氧鼓泡分离及营养评价.....  
*Nutrition value evaluation of potato protein separated from potato juice waste water by ozone bubbling.*..... REN Yan et al
- 227 梨果汁加工中酶解工艺的研究.....  
*Study on enzymolysis technology of pear juice processing.*..... SHAO Qin et al
- 230 蚕蛹甲壳素脱色工艺研究.....  
*Study on the decolorization of chitin from silkworm chrysalis.*..... ZHU Xin-peng
- 233 响应面法对乳清中乳糖酶解工艺条件的研究.....  
*Study on the technology condition of enzymatic hydrolyzing lactose in whey using response surface methodology.*..... XIANG Li-ji et al
- 236 脂肪酶催化棕榈酸和大豆磷脂的酸解反应研究.....  
*Lipase-catalyzed acidolysis of palmitic and soybean phospholipids.*..... BAN Ting-ting et al
- 240 马铃薯淀粉耐盐性树脂的合成工艺研究.....  
*Study on synthesis craft of potato starch salt-resisting super absorbent polymer.*..... DANG Bin et al
- 245 超声辅助提取功劳木中盐酸小檗碱工艺研究.....  
*Ultrasonic-assisted extraction of berberine from Caulis Mahonia.*..... BAI Jing-wen et al
- 248 高Vc红枣保健软糖的工艺研究.....  
*Processing technology on jujube soft candy with high vitamin C.*..... XU Mu-dan et al
- 251 青藏高原藏木香总黄酮提取工艺研究及含量测定.....  
*Study on the extraction technique and quantification of total flavonoids in Inula racemosa grown in Qinghai-Tibet plateau.*..... YANG Yue-qin et al
- 254 蕨麻Seavage法脱蛋白工艺研究.....  
*Study on deproteinization in extraction of polysaccharides from Patentillaunserina by Seavage.*..... HAO Bo-hui et al
- 256 响应面法优化水飞蓟素蛋白的提取工艺.....  
*Optimized technology for extracting milk thistle cake protein by response surface methodology.*..... ZHU Shu-yun et al
- 259 桑葚多糖提取、纯化分离及其降糖作用的研究.....  
*Study on the purification and hypoglycemic effect of polysaccharide in mulberries.*..... ZHAO Xi-lan
- 261 阴离子交换色谱法一步分离牛初乳中的sIgA.....  
*Single-step purification of sIgA from bovine colostrums by anion-exchange chromatography.*..... ZHANG Fei-yan et al
- 264 响应面法优化超临界CO<sub>2</sub>萃取杏香气成分的工艺参数.....  
*Optimization of apricot aroma component extraction conditions by supercritical CO<sub>2</sub> using response surface method.*..... HOU Wei-wei et al
- 266 莲子红皮多糖提取工艺研究.....  
*Study on extraction technology of polysaccharides from red skin of locus seed.*..... XU Hong et al
- 269 逆流色谱和超滤分级法分离海带多糖的研究.....  
*Study on separation and purification of kelp polysaccharide by using countercurrent chromatography and ultrafiltration grade separation method.*..... SONG Guang-lei et al
- 274 黄参粗多糖脱蛋白工艺以及对亚硝酸盐清除作用的研究.....  
*Study on removal process of proteins from crude Sphallerocarpus gracilis polysaccharides and its scavenging capability to nitrite.*..... GUO Xiao-peng et al

# CONTENTS

2011年第2期，总238期

February, 2011(No. 238)

## 包装与机械

- 277 软豆壳仁自动分离机的研制与开发.....  
冯永刚  
*Research and development of soft shell bean pod kernel automatic separator.....FENG Yong-gang*
- 280 活性气调包装对番木瓜品质的影响.....  
侯美玲等  
*Effects of intelligent modified atmosphere packaging on the quality of Carica papaya.....HOU Mei-ling et al*

## 食品添加剂

- 283 脲法合成咖啡酸叶黄素酯的研究.....  
杨云裳等  
*Lipase-catalyzed synthesis of caffeic acid lutein ester.....YANG Yun-shang et al*
- 285 红树莓色素的纯化及成分初步鉴定.....  
孙希云等  
*Purification and identification of pigments in red raspberry.....SUN Xi-yun et al*
- 289 利用Design-Expert设计优化木薯渣制备羧甲基纤维素钠工艺研究.....  
林莹等  
*Design and optimization of preparation of carboxymethyl cellulose with cassava residual by response surface analysis.....LIN Ying et al*

## 食品安全

- 292 密胺食品接触制品中游离甲醛的控制研究.....  
朱亚伟等  
*Study on control of content of free formaldehyde in finished melamine article intended to contact with foodstuffs.....ZHU Ya-wei et al*
- 296 不同利用方式对几种叶菜亚硝酸盐含量的影响.....  
潘静娴等  
*Effects of different methods of utilization on nitrite content of some leaf vegetables.....PAN Jing-xian et al*
- 299 我国食品进出口安全检测现状及对策.....  
姚璐等  
*Current situation of food import and export safety testing and countermeasures.....YAO Lu et al*

## 贮运保鲜

- 302 塑料薄膜包装对常温和低温条件下枸杞鲜果主要贮藏性状的影响.....  
李颖超等  
*Effects of film packaging on major storage characters of fresh wolfberry fruit during room and low temperature storage.....LI Ying-chao et al*
- 305 不同可食性涂膜对方竹笋保鲜效果的影响.....  
杨乐等  
*Effect of different edible coatings preservative on the preservation of Chimonobambusa busa utilis shoots.....YANG Le et al*

## 营养与保健

- 309 山药皂苷及其对离体心脏缺血再灌注损伤的保护作用.....  
胡长鹰等  
*Protection to ischemia reperfusion injury in rats isolated hearts of steroid saponin from Dioscorea batatas.....HU Chang-ying et al*
- 313 大蒜辣素对辐射引起的免疫损伤防护作用的研究.....  
王鑫等  
*Study on protective effects of allicin on immune injury caused by radiation.....WANG Xin et al*
- 316 乌茶急性毒性安全性评价研究.....  
王海燕等  
*Acute toxicity evaluation of Gaocha.....WANG Hai-yan et al*
- 319 玫瑰花黄酮对糖尿病小鼠的降血糖作用.....  
周达等  
*Anti-hyperglycemic effect of flavonoids of rose in vivo.....ZHOU Da et al*

## 分析检测

- 322 气相色谱分析多糖衍生化方法的研究与比较.....  
白娣等  
*Study and comparison of two derivatization methods of polysaccharides by GC.....BAI Di-si et al*
- 325 液相色谱-串联质谱法测定鱼肉中的七种全氟有机物.....  
罗海英等  
*Determination of seven perfluorinated compounds in fish by liquid chromatography-electrospray ionization tandem mass spectrometry.....LUO Hai-ying et al*
- 328 转基因玉米的多重PCR-毛细管电泳紫外检测技术研究.....  
张春娇等  
*Study on genetically modified maize by multiplex polymerase chain reaction-capillary electrophoresis with UV detection.....ZHANG Chun-jiao et al*
- 333 固相萃取-离子对色谱法测定酱油与黄豆酱中的三聚氰胺.....  
支晓芳等  
*Determination of melamine in sauce and bean-sauce with solid phase extraction and ion pair chromatography.....ZHI Xiao-fang et al*
- 336 毛细管区带电泳法测定葡萄酒中金属阳离子.....  
唐美华等  
*Determination of metal cation in grape wine by using capillary zone electrophoresis.....TANG Mei-hua et al*
- 338 氢化物发生原子荧光法测定灰树花中硒含量.....  
贾婷等  
*Determination of total selenium in grifola frondosa by hydride generation atomic fluorescence spectrometry.....JIA Ting et al*
- 341 芸花粕中绿原酸检测方法的建立.....  
胡鲜宝等  
*Study on chlorogenic acid determination method from sunflower seed meal.....HU Xian-bao et al*
- 344 软X射线技术对核桃内部品质的无损检测研究.....  
黄星奕等  
*Nondestructive detection of walnut internal quality using soft X rays technology.....HUANG Xing yi et al*
- 347 不同产地大花红景天有效成分的含量测定研究.....  
黎代余等  
*Determination of the active ingredient content of Rhodiola crenulata in different origins.....LI Dai-yu et al*
- 350 反相高效液相色谱法测定食品中的多种黄色工业染料.....  
杨琳等  
*RP-HPLC determination of five kinds of yellow industrial dyes in foods.....YANG Lin et al*
- 353 高效液相色谱-串联质谱法测定减肥保健食品中非法添加药物苯佐卡因.....  
马微等  
*HPLC-MS/MS determination of illegal drug benzocaine added in weight-loss functional foods.....MA Wei et al*
- 356 分光光度法测定洋葱精油中硫代亚磺酸酯含量.....  
吴海敏等  
*Determination of content of thiosulfonates in onion oil via spectrophotometry.....WU Hai-min et al*
- ## 专题综述
- 359 猪皮胶原蛋白的高效利用研究进展..余东华等  
*Research progress in high performance exploitation of pigs skin collagen.....YU Dong-hua et al*

362 食物致敏原及其检测技术的研究进展..王守法等  
*Research advances of food allergen and its detection techniques.....WANG Shou-fa et al*

366 甘露低聚糖及其衍生物制备技术研究进展.....  
毛跟年等  
*Research progress in preparation technique of mannose-oligosaccharides and its derivatives.....MAO Gen-nian et al*

2011年第2期，总238期

## 淋水式杀菌釜

- 新式杀菌釜理念
- 一个满足多种要求的系统
- 专为新式包装而设计
- 灵活多样的短时灭菌和消毒
- 生产控制
- 采用 PLC 全自动触摸屏控制



## 全水浸式杀菌釜

- 升温和降温速度快，迅速达到杀菌效果
- 多种容器
- 灵活多样
- 生产控制
- 采用 PLC 全自动触摸屏控制



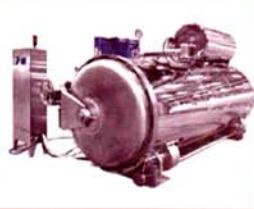
## 实验型杀菌釜

- 满足静止淋水和回转淋水
- 全程温度压力自动记录
- 全不锈钢制成，符合食品卫生要求



## 回转式杀菌锅

- 适用于瓶装、罐装食品二次灭菌
- 热传递更迅速均匀
- 高温短时杀菌



## 中试杀菌釜

- 专业中试产品
- 满足大批量产品测试和小型生产需要
- 模拟程度高
- 与大批量生产状况完全相同
- 使用范围广
- 满足静止淋水和回转淋水
- 自动化精度高
- 全程温度压力自动记录
- 材质
- 全不锈钢制成，符合食品卫生要求



## 乐惠集团

南京保立隆包装机械有限公司

锐托杀菌事业部

 地址：南京江宁开发区将军南路 600 号 P.C.: 211151  
 电话：025-52733617 传真：025-52733700

E-mail:retort.sales@lehui.com

www.retort.com.cn

www.lehui.com

### 369 壳聚糖及其衍生物用于降血糖的最新研究进展

来水利等

Research progress in chitosan and its derivatives used to lower blood sugar..... LAI Shui-li et al

### 373 固定化脂肪酶研究进展

冯超等

Research progress in lipase immobilization..... FENG Chao et al

### 376 红曲抗氧化的研究进展

温学伟等

Research advances of antioxidant action in Monascus..... WEN Xue-wei et al

### 379 二酰甘油油脂在国外食品工业中的应用

孙纪录等

Application of diacylglycerol oil in food industry abroad..... SUN Ji-lu et al

### 382 蛋白质消化率测定方法的研究进展

孙敏杰等

Development of methods for the determination of protein digestibility..... SUN Min-jie et al

### 386 国内牛肉加工业现状分析

吴斌等

Actualities of domestic beef processing industry..... WU Bin et al

### 389 紫甘薯色素抗菌与抗氧化作用研究进展

胡林子等

Research development of antioxidant and antimicrobial effect of purple sweet potato pigment..... HU Lin-zi et al

### 393 蛋粉加工及应用的研究现状分析

马爽等

Existing condition analysis of processing and application of egg powder..... MA Shuang et al

### 398 低聚异麦芽糖制备的研究进展

林亲录等

Research progress in the isomaltooligosaccharides production..... LIN Qin-lu et al

### 401 微流控芯片在食品安全分析中的应用

汪美凤等

Application of microfluidic chip in food safety analysis..... WANG Mei-feng et al

### 404 卵磷脂、魔芋精粉和膳食纤维的复合型膳食控制“三高”和改善便秘的研究

蒋丽等

Study on compound dietary with lecithin, konjac powder and dietary fiber of controlling diabetes mellitus, hypertension, hyperlipemia and improving constipation..... JIANG Li et al

### 408 核桃仁及内种皮营养与功能成分分析研究进展

冯春艳等

Research progress in nutritional and functional compositions analysis of walnut kernel and pellicle..... FENG Chun-yan et al

### 412 红曲霉生物代谢成分的研究进展

周波等

Research advances of bioactive metabolites from Monascus..... ZHOU Bo et al

### 418 功能性饮料的发展现状及展望

罗魏等

Present situation and prospects of functional drinks..... LUO Wei et al

### 422 高压水冲击波加工在改善肉类品质方面的应用

王琦等

Hydrodynamic pressure processing to improve meat quality and safety..... WANG Qi et al

### 425 利用细菌开发天然功能性食品添加剂研究进展

李述日等

Research development of preparation natural functional food additives from bacteria..... LI Shu-ri et al

### 431 LC-MS/MS在食品安全分析中的应用

周春红等

Application of LC MS/MS analysis of trace toxics in food..... ZHOU Chun-hong et al

### 436 阻抗法检测食品中微生物的研究进展

张爱萍等

Research progress in the impedance method in the detection of microorganisms in food..... ZHANG Ai-ping et al