

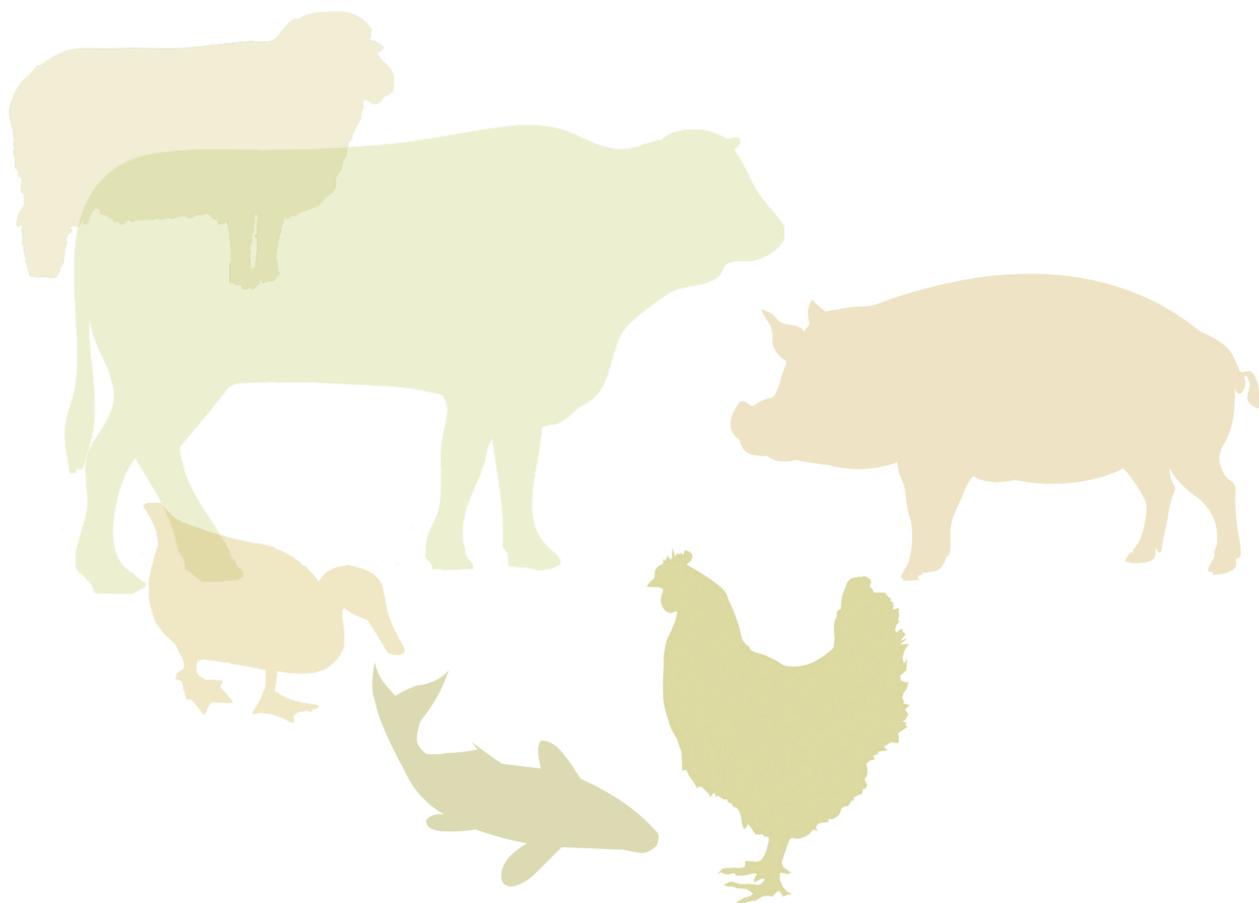


ISSN 1006-267X
CN 11-5461/S

动物营养学报

CHINESE JOURNAL OF ANIMAL NUTRITION

www.ChinaJAN.com



Vol.29 No.12
2017

中国畜牧兽医学会
CHINESE ASSOCIATION OF
ANIMAL SCIENCE AND VETERINARY MEDICINE

万方数据

动物营养学报

第二十九卷

第十二期

二〇一七年

中国畜牧兽医学会

动物营养学报

中国科学引文数据库(CSCD)核心库(C库)来源期刊 中国精品科技期刊 中文核心期刊
中国科技核心期刊 中国科学评价研究中心权威期刊(A⁺级) 中国农业核心期刊
英国 CAB Abstracts 收录期刊 美国 Chemical Abstracts 收录期刊

第 29 卷 第 12 期 2017 年 12 月

目 次

综述

- | | |
|---------------------------------|---------------------------------|
| 425 维生素 E 对鹅反季节繁殖卵泡发育的调节作用及研究现状 | 李思明 唐艳强 肖海红 郭小泽
陈彦良 刘文舒 欧阳玲花 |
| 4249 畜禽养殖舍氨气排放特性及减排技术研究进展 | 王 悦 赵同科 邹国元 杨金凤
田 壮 李新荣 |
| 4260 大豆球蛋白的抗营养作用及检测技术研究进展 | 宋青龙 袁 翔 张海燕 譙仕彦 |
| 4266 家禽肠道健康评价指标研究进展 | 孙永波 王 亚 萨仁娜 张宏福 |
| 4273 肉鸡福利评价指标研究进展 | 孙永波 王 亚 萨仁娜 张宏福 |
| 4281 硒代蛋氨酸的生物学功能及在蛋鸡生产中的应用 | 孟田田 刘怡琳 张 彬 吴 信
印遇龙 |
| 4287 一磷酸腺苷激活的蛋白激酶对动物糖脂代谢的调节作用 | 高晓娜 郭小权 |
| 4295 黄酮类化合物的免疫调节作用及机制 | 杨 杰 沙金丹 高 翔 林思彤
孙婷婷 田春莲 刘明春 |
| 4301 代谢组学及其在动物营养中的应用 | 王郝为 吴端钦 |
| 4308 青贮饲料有害微生物及其抑制措施 | 张 适 常 杰 胡宗福 王思珍
牛化欣 |

猪营养

- | | |
|--------------------------------------|---|
| 4315 多营养源饲料对生长育肥猪生长性能、养分表观消化率及肉品质的影响 | 徐亚兰 陈代文 余 冰 虞 洁
罗钧秋 黄志清 郑 萍 毛湘冰
罗玉衡 黄纯波 何 军 |
| 4323 饲料维生素 D 添加形式对公猪繁殖性能的影响 | 魏冬芹 董洪俊 吕 刚 吴 德
徐盛玉 方正锋 车炼强 冯 斌
李 健 林 燕 |

协 办 单 位

(2017 年度,排名不分先后)

动物营养学国家重点实验室

播恩集团管理总部

武汉新华扬生物股份有限公司

万方数据 美农生物科技股份有限公司

肇庆市华芬饲料酶有限公司

禽营养

- 4334 饲料中硒添加水平对产蛋高峰期临武鸭产蛋性能、蛋品质、血清抗氧化指标和蛋硒含量动态变化的影响 黄璇 李闯 蒋桂韬 张旭
王向荣 胡艳 刘伯承 戴求仲
- 4342 前后期饲料不同粉碎粒度组合对肉鸡生长性能的影响 葛春雨 李军国 段海涛 于纪宾
于治芹 孙杰 秦玉昌

反刍与草食动物营养

- 4349 瘤胃保护型亮氨酸对滩羊母羊繁殖性能、消化性能及初乳品质的影响 张桂杰 寇启芳 牛文志 曹思怡
- 4355 饲料能量和蛋白质水平对 61~120 日龄湖羊羔羊生长性能、氮代谢和血清生化指标的影响 吕小康 祁敏丽 王杰 王世琴
崔凯 刁其玉 张乃锋
- 4365 饲料中铜添加量对断奶至 2 月龄长毛兔生产性能和血清指标的影响 张永翠 程光民 伏桂华 刘公言
姜八一 谭兴智 刘建胜

水产营养

- 4372 80%赖氨酸硫酸盐与 98%赖氨酸盐酸盐对生长中期草鱼生长性能、消化吸收能力和消化器官生长发育影响的比较研究 胡凯 苏玥宁 冯琳 刘扬
姜维丹 吴培 姜俊 周小秋
- 4386 不同配比的亚麻籽油与大豆油混合油全部替代鱼油对杂交鲟生长的影响 刘彩霞 邢薇 刘洋 李铁梁
马志宏 姜娜 李文通 罗琳

分子营养

- 4398 白藜芦醇通过激活去乙酰化酶 1/腺苷一磷酸激活的蛋白激酶信号通路影响牛脂肪细胞凋亡 成海建 游伟 靳青 刘倚帆
万发春 宋恩亮 刘桂芬 谭秀文
张相伦 刘晓牧

饲料营养

- 4408 饲料菊糖添加水平对肉仔鸡盲肠、直肠菌群结构及主要菌群数量的影响 杨桂芹 王琪 刘海英 董维国
朱鑫
- 4419 嗜酸乳杆菌发酵棉籽粕对黄羽肉鸡肌肉营养成分和风味特性的影响 王永强 张晓羊 刘建成 聂存喜
张凡凡 蒋粒薪 马贵军 张文举
- 4433 复合酶制剂对几种糟渣类原料养分利用率和代谢能的影响 张旭 黄璇 李闯 王向荣
蒋桂韬 吴端钦 戴求仲
- 4440 枯草芽孢杆菌对围产期母猪繁殖性能和子代生长的影响 韩丽 孔祥峰 赵越 解培峰
高乾坤 章文明 印遇龙 王占彬
- 4447 减少矿物质元素的饲料中补充包膜半胱胺对育肥猪生长性能、胴体品质、矿物质元素沉积及排放的影响 白苗苗 刘红南 张旺宏 张晓峰
徐康 刁欠云 邓近平 印遇龙
- 4449 酿酒酵母和芽孢杆菌对育肥猪养分表观消化率、肠道形态结构和肠道免疫的影响 秦红 蔡传江 赵燕 高航
车向荣 郭亮 郝爱萍
- 4469 苜蓿皂苷对断奶仔猪生长性能、肠道菌群、组织抗氧化能力及相关酶 mRNA 表达的影响 王文静 刘伯帅 陈要鹏 孙骁
肖俊楠 林锦翔 王成章 史莹华
- 4477 复合微生态制剂对断奶仔猪生长性能、血清生化和免疫指标及粪便中挥发性脂肪酸含量的影响 金三俊 董佳琦 任红立 汪晶晶
高鹏辉 刁新平
- 4485 饲料添加壳寡糖对肉鸡肉品质、抗氧化性能、小肠黏膜组织结构及肠道菌群的影响 白洁 刘国华 年芳 郑爱娟
蔡辉益 常文环
- 4495 饲料中添加梧桐子油和罗格列酮对绵羊生产性能、血清激素和生化指标的影响 史晓雪 牛占宇 幸超 张三润
闫婉姝 张润厚

饲料资源开发

4503 饲料添加人参渣对妊娠母猪繁殖性能及血浆生理生化指标的影响 齐莉莉 马伟 翁士乔 周云晓
陈炳 王进波

饲料安全

4510 玉米赤霉烯酮对断奶小母猪卵巢指数及孕激素受体分布和表达的影响 杨立杰 黄丽波 李思梦 刘法孝
姜淑贞 杨在宾

研究简报

4518 夏季高温条件下饲料中添加刺梨提取物对皖西白鹅生长性能、脂质代谢及肝脏中热休克蛋白 70 基因表达的影响 李梦云 姚国佳 杨建平 姬向波
刘健 张晓根

4525 低聚壳聚糖对母猪繁殖性能、泌乳性能和血浆生化指标的影响 刘莹莹 张星 任慧波 罗璇
袁旭鹏 邓缘 彭英林

4534 凝结芽孢杆菌对感染沙门氏菌蛋鸡生产性能蛋品质和血浆生化指标的影响 黄世猛 黄楚然 赵丽红 张建云
计成 马秋刚

4542 外源脂肪酶对花鲈生长性能、体组成、血清生化指标 消化酶活性及营养物质表观消化率的影响 王国霞 王敏 孙育平 胡俊茹
黄文庆 陈晓瑛 邱世殿 黄燕华

455 饲料中添加番茄渣对育肥猪生长性能、胴体性状、肉品质和抗氧化能力的影响 李贝贝 徐泽权 李涛 于晨晨
马欣 王子荣

4562 德氏乳杆菌对宁乡猪生产性能、胴体性状及肉品质的影响 韦良开 李瑞 刘明 枉侯军
侯淑玲 侯改凤 黄兴国

4570 镰刀菌毒素污染饲料导致的断奶仔猪肝脏损伤与自然修复研究 陈宁波 陈祥兴 杨维仁 姜淑贞
黄丽波

458 不同水平玉米赤霉烯酮对断奶母仔猪血清酶、代谢产物和肠道形态的影响 程群 姜淑贞 黄丽波 杨维仁
杨立杰 蔡琬婷 廖柔鸢

4588 尿肠球菌 WEI-10 对断奶仔猪的安全性评价 冯媛媛 乔琳 姚宏明 介琳霞
高长斌 刘蕊

4597 饲料粗蛋白质水平对“京红 1 号”蛋鸡产蛋后期生产性能和蛋品质的影响 段国香 李美玲 张建云 计成
赵丽红 马秋刚

4603 不同干燥工艺加工的苜蓿粗多糖对蛋鸡生产性能、蛋品质和血清、鸡蛋中抗体含量的影响 辛小青 董晓芳 佟建明

4613 饲料碘含量对牦牛体外瘤胃发酵的影响 范小红 薛艳锋 郝力壮 刘书杰
柴沙驼 牛建章 张晓卫 王迅

4621 饲料中添加不同生物制剂对杜寒杂交肉羊生产性能和屠宰性能的影响 贾鹏 万凡 马涛 王文义
杨东 王韵斐 郭宝林 赵丽芳
刁其玉 杨开伦

4632 青苔和大叶藻对刺参生长性能及免疫指标的影响 路晶晶 郭冉 赵春龙 崔兆进
夏辉 解伟 王美雪 杨品贤

4639 低蛋白质饲料中苏氨酸水平对离乳前期梅花鹿仔鹿生长性能和营养物质表观消化率的影响 李仁德 王晓旭 张铁涛 张婷
王静 张雪蕾 李光玉 王凯英

4648 麦麸阿魏酰低聚糖对敌草快致氧化应激大鼠血浆和组织抗氧化能力的影响 段元霄 王园 史俊祥 孟子琪
张倩茹 李暄 安晓萍 齐景伟

Volume 29 Number 12 December 2017

CONTENTS

REVIEW

- 4245 Research Progress in Regulation of Vitamin E on Follicular Development of Geese in Counter-Season Production
- 4249 Research Statuses of Ammonia Emission Characteristics and Mitigation Technologies from Livestock Houses
- 4260 Progress in Anti-Nutritional Action of Glycinin and Its Detection Technology
- 4266 Research Progress on Evaluation Indicators of Intestinal Health in Poultry
- 4273 Research Progress on Evaluation Indexes of Broiler Welfare
- 4281 Biological Functions of Selenomethionine and Its Application in Laying Hens
- 4287 Regulatory Effects of Adenosine Monophosphate-Activated Protein Kinase on Glucose and Lipid Metabolism in Animals
- 4295 Immune Regulation Function of Flavonoids and Its Mechanisms
- 4301 Metabolomics and Its Application in Animal Nutrition
- 4308 Harmful Microorganisms in Silage and Their Suppression Measures

SWINE NUTRITION

- 4315 Effects of Multi-Nutrient Source Diet on Growth Performance, Nutrient Apparent Digestibility and Meat Quality of Growing-Finishing Pigs
- 4323 Effects of Dietary Vitamin D Forms on Reproductive Performance of Boars

POULTRY NUTRITION

- 4334 Effects of Selenium Supplemental Level on Laying Performance, Egg Quality, Serum Antioxidant Indices and Dynamic Change of Egg Selenium Content of *Linwu* Ducks during Peak Laying Period
- 4342 Effects of Different Diet Particle Size Combinations on Growth Performance of Broilers in Early and Later Periods

LI Siming, TANG Yanqing, XIAO Haihong, GUO Xiaoze, CHEN Yanning, LIU Wenshu, OUYANG Linghua
WANG Yue, ZHAO Tongke, ZOU Guoyuan, YANG Jinfeng, TIAN Zhuang, LI Xinrong
SONG Qinglong, YUAN Xiang, ZHANG Hai'an, QIAO Shiyan
SUN Yongbo, WANG Ya, SA Ren-na, ZHANG Hongfu
SUN Yongbo, WANG Ya, SA Ren-na, ZHANG Hongfu
MENG Tiantian, LIU Yilin, ZHANG Bin, WU Xin, YIN Yulong
GAO Xiaona, GUO Xiaoquan
YANG Jie, SHA Jindan, GAO Xiang, LIN Sitong, SUN Tingting, TIAN Chunlian, LIU Mingchun
WANG Haowei, WU Duanqi
ZHANG Shi, CHANG Jie, HU Zongfu, WANG Sizhen, NIU Huaxin

XU Yalan, CHEN Daiwen, YU Bing, YU Jie, LUO Junqiu, HUANG Zhiqing, ZHENG Ping, MAO Xiangbing, LUO Yuheng, HUANG Chunbo, HE Jun
WEI Dongqin, DONG Hongjun, LYU Gang, WU De, XU Shengyu, FANG Zhengfeng, CHE Lianqiang, FENG Bin, LI Jian, LIN Yan

HUANG Xuan, LI Chuang, JIANG Guitao, ZHANG Xu, WANG Xiangrong, HU Yan, LIU Bochong, DAI Qiuzhong
GE Chunyu, LI Junguo, DUAN Haitao, YU Jibin, YU Zhiqin, SUN Jie, QIN Yuchang

SUPPORTED FROM

(2017, in no particular order)

State Key Laboratory of Animal Nutrition

The Management Headquarter of Boen Corporation

Shanghai Mogen Animal Nutrition Technology Co., Ltd.

Sunhy Biology (Wuhan) Co., Ltd.

Huafen Feed Enzymes (Zhaoqing)

RUMINANT AND HERBIVORE NUTRITION

- 4349 Effects of Rumen Protected Leucine on Reproductive Performance, Digestion Performance and Colostrums Quality of Ewes of *Tan* Sheep
- 4355 Effects of Dietary Energy and Protein Levels on Growth Performance, Nitrogen Metabolism and Serum Biochemical Indices of *Hu* Lambs at 61 to 120 Days of Age
- 4365 Effects of Dietary Copper Addition on Performance and Serum Indices of Weaning to 2-Month-Old Long Hairy Rabbits

ZHANG Guijie, KOU Qifang, NIU Wenzhi, CAO Siyi

LYU Xiaokang, QI Minli, WANG Jie, WANG Shiqin, CUI Kai, DIAO Qiyu, ZHANG Naifeng
ZHANG Yongcui, CHENG Guangmin, FU Guihua, LIU Gongyan, JIANG Bayi, TAN Xingzhi, LIU Jiansheng

AQUACULTURE NUTRITION

- 4372 A Comparative Study; Effects of 80% *L*-lysine • H₂SO₄ and 98% *L*-lysine • HCl on Growth Performance, Digestion and Absorption Capacities and Growth Development of Digestive Organs of Young Grass Carp (*Ctenopharyngodon idella*)
- 4386 Effects of Total Replacement of Fish Oil by Mixed Oils with Different Ratios of Linseed Oil and Soybean Oil on Growth of Hybrid Sturgeon (*Acipenser baeri* Brandt ♀ × *A. schrenckii* Brandt ♂)

HU Kai, SU Yuening, FENG Lin, LIU Yang, JIANG Weidan, WU Pei, JIANG Jun, ZHOU Xiaoqiu

LIU Caixia, XING Wei, LIU Yang, LI Tieliang, MAZhibing, JIANG Na, LIWanrong, LUO Lin

MOLECULAR NUTRITION

- 4398 Resveratrol Induces Apoptosis of Bovine Adipocytes through Activated Sirtuin Type 1/Adenosine Monophosphate Activated Protein Kinase Signaling Pathway

CHENG Haijian, YOU Wei, JIN Qing, LIU Yifan, WAN Fachun, SONG Enliang, LIU Guifen, TAN Xiuwen, ZHANG Xianglun, LIU Xiaomu

FEED SCIENCE AND TECHNOLOGY

- 4408 Effects of Inulin Supplemental Level on Microbial Community Structure and Main Microbial Populations in Cecum and Rectum of Broilers
- 4419 Effects of Cottonseed Meal Fermented by *Lactobacillus acidophilus* on Muscle Nutrients and Flavor Characteristics of Yellow-Feathered Broilers
- 4433 Effects of Compound Enzyme Preparation on Nutrient Utilization Rate and Metabolize Energy of Several Residue Type Ingredients
- 4440 Effects of *Bacillus subtilis* on Reproductive Performance of Sows and Growth of Their Offspring during Perinatal Period
- 4447 Effects of Addition of Coated Cysteamine in Reducing Mineral Elements Diet on Growth Performance, Carcass Quality, Mineral Elements Deposition and Excretion of Finishing Pigs
- 4459 Effects of *Saccharomyces cerevisiae* and *Bacillus* on Nutrient Apparent Digestibility, Intestinal Morphological Structure and Intestinal Immunity of Finishing Pigs
- 4469 Effects of Alfalfa Saponin on Growth Performance, Intestinal Microflora, Antioxidant Ability and Related Enzyme mRNA Expression in Tissues of Weaned Piglets
- 4477 Effects of Compound Probiotics on Growth Performance, Serum Biochemical and Immune Indices and Volatile Fatty Acid Contents in Feces of Weaned Piglets
- 4485 Effects of Dietary Chitosan Oligosaccharide on Meat Quality, Antioxidant Activity, Intestinal Mucosal Structure and Intestinal Flora of Broilers
- 4495 Effects of Dietary Supplementation of Sycamore Seed Oil and Rosiglitazone on Production Performance, Serum Hormone and Biochemical Indexes of Sheep

YANG Guiqin, WANG Qi, LIU Haiying, DONG Weiguo, ZHU Xin

WANG Yongqiang, ZHANG Xiaoyang, LIU Jiancheng, NIE Cunxi, ZHANG Fanfan, JIANG Lixin, MA Guijun, ZHANG Wenju

ZHANG Xu, HUANG Xuan, LI Chuang, WANG Xiangrong, JIANG Guitao, WU Duanqin, DAI Qiuzhong

HAN Li, KONG Xiangfeng, ZHAO Yue, XIE Peifeng, GAO Qiankun, ZHANG Wenming, YIN Yulong, WANG Zhanbin

BAI Miaomiao, LIU Hongnan, ZHANG Wanghong, ZHANG Xiaofeng, XU Kang, XI Qianyun, DENG Jinping, YIN Yulong

QIN Hong, CAI Chuanjiang, ZHAO Yan, GAO Hang, CHE Xiangrong, GUO Liang, HAO Aiping

WANG Wenjing, LIU Boshuai, CHEN Yaopeng, SUN Xiao, XIAO Junnan, LIN Jinxiang, WANG Chengzhang, SHI Yinghua

JIN Sanjun, DONG Jiaqi, REN Hongli, WANG Jingjing, GAO Penghui, DIAO Xinping

BAI Jie, LIU Guohua, NIAN Fang, ZHENG Aijuan, CAI Huiyi, CHANG Wenhuan

SHI Xiaoxue, NIU Zhanyu, XING Chao, ZHANG Sarun, YAN Wanshu, ZHANG Runhou

FEED RESOURCES DEVELOPMENT

- 4 503 Effects of Ginseng Residue Supplementation on Reproductive Performance and Plasma Physiological and Biochemical Indexes of Gestation Sows

FEED SECURITY

- 4510 Effects of Zearalenone on Ovary Index, Distribution and Expression of Progesterone Receptors in Ovaries of Weaned Gilts

SHORT COMMUNICATIONS

- 4518 Effects of *Rosa roxburghii* T ract Extract on Growth Performance, Lipid Metabolism and Heat Shock Protein 70 Gene Expression in Liver of *Wanxi* White Geese under High Temperature in Summer

- 4525 Effects of Oligo-Chitosan on Reproduction Performance, Lactation Performance and Plasma Biochemical Parameters of Sows

- 4534 Effects of *Bacillus coagulans* on Performance, Egg Quality and Plasma Biochemical Parameters of Laying Hens Infected with *Salmonella*

- 4542 Effects of Exogenous Lipase on Growth Performance, Body Composition, Serum Biochemical Indices, Digestive Enzyme Activities and Nutrient Apparent Digestibilities of *Lateolabrax japonicus*

- 4554 Effects of Tomato Pomace Supplementation on Growth Performance, Carcass Traits, Meat Quality and Antioxidant Capacity of Finishing Pigs

- 4562 Effects of *Lactobacillus delbrueckii* on Performance, Carcass Traits and Meat Quality of *Ningxiang* Pigs

- 4570 Study on Liver Injury by *Fusarium* Toxins Contaminated Diet and Liver Natural Restoration of Weaned Gilts

- 4578 Effects of Different Levels of Zearalenone on Serum Enzymes and Metabolites and Intestinal Morphology of Weaned Gilts

- 4588 Safety Evaluation of *Enterococcus faecium* WE I-10 on Weaned Piglets

- 4597 Effects of Dietary Crude Protein Level on Performance and Egg Quality of *Jinghong* Laying Hens during Late Stage of Egg Production

- 4603 Effects of Crude Polysaccharides Isolated from Alfalfa Used Different Drying Process on Performance, Egg Quality and Serum and Egg Antibody Contents of Laying Hens

- 4613 Effects of Dietary Iodide Content on Rumen Fermentation of Yaks *In Vitro*

- 4621 Effects of Dietary Supplementation of Different Biological Agents on Production Performance and Slaughter Performance of Dorper × Thin-Tailed *Han* Crossbred Mutton Lambs

- 4632 Effects of Green Algae and *Sargassum* on Growth Performance and Immune Indices of Sea Cucumber (*Apostichopus japonicus*)

- 4639 Effects of Threonine Level in a Low Protein Diet on Growth Performance and Nutrient Apparent Digestibility of Early Weaning Sika Deer

- 4648 Effects of Wheat Bran Feruloyl Oligosaccharides on Plasma and Tissue Antioxidant Capacities of Diquat-Induced Oxidative Stress Rats

QI Lili, MA Wei, WENG Shiqiao, ZHOU Yunxiao, CHEN Bing, WANG Jinbo

YANG Lijie, HUANG Libo, LI Simeng, LIU Faxiao, JIANG Shuzhen, YANG Zhibin

LI Mengyun, YAO Guojia, YANG Jianping, JI Xiangbo, LIU Jian, ZHANG Xiaogen

LIU Yingying, ZHANG Xing, REN Huibo, LUO Xuan, YUAN Xupeng, DENG Yuan, PENG Yinglin

HUANG Shimeng, HUANG Churan, ZHAO Lihong, ZHANG Jianyun, JI Cheng, MA Qiugang

WANG Guoxia, WANG Min, SUN Yuping, HU Junru, HUANG Wenqing, CHENG Xiaoying, QIU Shidian, HUANG Yanhua

LI Beibei, XU Zequan, LI Tao, YU Chenchen, MA Xin, WANG Zirong

WEI Liangkai, LI Rui, LIU Ming, WANG Houjun, HOU Shuling, HOU Gaifeng, HUANG Xingguo

CHEN Ningbo, CHEN Xiangxing, YANG Weiren, JIANG Shuzhen, HUANG Libo

CHENG Qun, JIANG Shuzhen, HUANG Libo, YANG Weiren, YANG Lijie, CAI Wanting, LAO Rouwan

FENG Yuanyuan, QIAO Lin, YAO Hongming, JIE Linxia, GAO Changbin, LIU Rui

DUAN Guoxiang, LI Meiling, ZHANG Jianyun, JI Cheng, ZHAO Lihong, MA Qiugang

XIN Xiaoqing, DONG Xiaofang, TONG Jianming

FAN Xiaohong, XUE Yanfeng, HAO Lizhuang, LIU Shujie, CHAI Shatuo, NIU Jianzhang, ZHANG Xiaowei, WANG Xun

JIA Peng, WAN Fan, MA Tao, WANG Wenyi, YANG Dong, WANG Yunfei, GUO Baolin, ZHAO Lifang, DIAO Qiyu, YANG Kailun

LU Jingjing, GUO Ran, ZHAO Chunlong, CUI Zhaojin, XIA Hui, XIE Wei, WANG Meixue, YANG Pinxian

LI Rende, WANG Xiaoxu, ZHANG Tietao, ZHANG Ting, WANG Jing, ZHANG Xuelei, LI Guangyu, WANG Kaiying

DUAN Yuanxiao, WANG Yuan, SHI Junxiang, MENG Ziqi, ZHANG Qianru, LI Xuan, AN Xiaoping, QI Jingwei