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谷氨酸对脱氧雪腐镰刀菌烯醇刺激下的断奶仔猪生长性能、血常规及血清生化指标变化的干预作用

吴苗苗^{1,2}, 肖昊^{1,2}, 印遇龙¹, 李丽立¹, 李铁军¹

1. 中国科学院亚热带农业生态研究所, 中国科学院亚热带农业生态过程重点实验室, 湖南省畜禽健康养殖工程技术中心, 农业部中南动物营养与饲料科学观测实验站, 长沙 410125;
2. 中国科学院大学, 北京 100049

Intervention Effects of Glutamic Acid on the Changes of Growth Performance, Blood Routine and Serum Biochemical Indexes in Deoxynivalenol Stressed Weaner Piglets

WU Miaomiao^{1,2}, XIAO Hao^{1,2}, YIN Yulong¹, LI Lili¹, LI Tiejun¹

1. Scientific Observing and Experimental Station of Animal Nutrition and Feed Science in South-Central, Ministry of Agriculture, Hunan Provincial Engineering Research Center of Healthy Livestock and Poultry, Key Laboratory of Agro-Ecological Processes in Subtropical Region, Institute of Subtropical Agriculture, Chinese Academy of Sciences, Changsha 410125, China;
2. University of Chinese Academy of Sciences, Beijing 100049, China

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摘要 本文旨在探讨谷氨酸对脱氧雪腐镰刀菌烯醇(DON)刺激下的断奶仔猪生长性能、血常规及血清生化指标变化的干预作用。选用28日龄“杜×长×大”三元杂交断奶仔猪28头,随机分为4组,分别饲喂基础饲料(NC组)、基础饲料+4 mg/kg DON(DON组)、基础饲料+4 mg/kg DON+2%谷氨酸(DG组)和基础饲料+2%谷氨酸(Glu组),每组7个重复,每个重复1头猪。试验期为37 d,试验结束时测定仔猪的生长性能、脏器指数、血常规和血清生化指标。结果表明:与DON组相比较,DG组仔猪料重比显著下降了8.93%($P<0.05$),平均日增重有升高趋势,但差异不显著($P>0.05$);肝脏指数、肾脏指数和胰腺指数分别显著降低了10.66%、12.68%和11.71%($P<0.05$),脾脏指数显著升高了28.03%($P<0.05$);红细胞和血小板数量显著升高($P<0.05$),白细胞数量、中性粒细胞百分比、中性粒细胞绝对值、红细胞比积和平均血小板体积有升高趋势,但差异不显著($P>0.05$);血清葡萄糖含量、肌酸激酶和谷草转氨酶活性显著降低($P<0.05$),总蛋白含量显著升高($P<0.05$),谷丙转氨酶活性有降低趋势,但差异不显著($P>0.05$)。因此,谷氨酸具有提高DON刺激下的断奶仔猪生长性能并在一定程度上缓解DON应激损伤的效果。

关键词: 谷氨酸 脱氧雪腐镰刀菌烯醇 血清生化指标 生长性能 断奶仔猪

Abstract: This experiment was conducted to investigate the effects of glutamic acid (Glu) supplementation on the changes of the growth performance, blood routine and serum biochemical indexes in deoxynivalenol (DON) stressed weaner piglets. A total of 28 healthy crossbred (Duroc×Landrace×Large White) weaner piglets at 28 days of age were randomly assigned into 4 groups (7 piglets/group). Piglets in each group were fed a basal diet (NC group), the basal diet+4 mg/kg DON (DON group), the basal diet+4 mg/kg DON+2% Glu (DG group) or the basal diet+2% Glu (Glu group), respectively. The trial lasted for 37 days. The growth performance, visceral indexes, blood routine and serum biochemical indexes of piglets were measured. The results showed as follows: compared with DON group, feed/gain (F/G) in DG group was significantly reduced by 8.93% ($P<0.05$), and average daily gain (ADG) was increased ($P>0.05$); the indexes of liver, kidney and thymus in DG group were significantly decreased by 10.66%, 12.68% and 11.71% ($P<0.05$), respectively, and spleen index was significantly increased by 28.03% ($P<0.05$); the number of red blood cell and platelet in DG group was significantly increased ($P<0.05$), and the number of white blood cell, percentage of granulocyte, absolute value of granulocyte, hematocrit and mean platelet volume were increased ($P>0.05$); the glucose content, creatine kinase and aspartate aminotransferase activities in serum in DG group were significantly reduced ($P<0.05$), the serum total protein content was significantly increased ($P<0.05$), and the serum glutamic-pyruvic transaminase activity was decreased ($P>0.05$). In conclusions, Glu supplementation may improve the growth performance of weaner piglets and can alleviate the stress response induced by DON.

Keywords: glutamate acid, deoxynivalenol, serum biochemical indexes, growth performance, weaner piglets

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- [1] TUTELYAN C A.Deoxynivalenol in cereals in Russia[J].Toxicology Letters,2004,153(1): 173-179.
- [2] 甄阳光,柏凡,张克英,等.我国主要饲料原料及产品呕吐毒素污染分布规律研究[J].中国畜牧杂志,2009,45(8): 21-24.
- [3] WIJNANDS L M,LEUSDEN VAN F M.An overview of adverse health effects caused by mycotoxins and bioassays for their detection.Bilthoven: National Institute of Public Health and Environment,2000.
- [4] FRANKIE T,PAJK T,REZAR V,et al.The role of dietary nucleotides in reduction of DNA damage induced by T-2 toxin and deoxynivalenol in chicken leukocytes[J]Food and Chemical Toxicology,2006,44(11):1838-1844.
- [5] SWAMY H,SMITH T K,MACDONALD E J,et al.Effects of feeding a blend of grains naturally contaminated with *Fusarium* mycotoxins on swine performance,brain regional neurochemistry,and serum chemistry and the efficacy of a polymeric glucomannan mycotoxin adsorbent[J].Journal of Animal Science,2002,80: 3257-3267.
- [6] 尹杰,伍力,彭智兴,等.脱氧雪腐镰刀菌烯醇的毒性作用及其机理[J].动物营养学报,2012,24(1): 48-54.
- [7] ROTTER B A,PRELUSKY D B,PESTKA J J.Toxicology of deoxynivalenol (vomitoxin)[J].Journal of Toxicology and Environmental Health,1996,48: 1-34.
- [8] WATFORD M.Glutamine metabolism and function in relation to proline synthesis and the safety of glutamine and proline supplementation[J].The Journal of Nutrition,2008,138: 2003-2007.
- [9] STROLL B,HENRY J,REEDS P J,et al.Catabolism dominates the first-pass intestinal metabolism of dietary essential amino acids in milk protein-fed piglets[J].The Journal of Nutrition,1998,128: 606-614
- [10] VAN DER SCHOOR S R,VAN GOUDOEVER J B,STOLL B,et al.The pattern of intestinal substrate oxidation is altered by protein restriction in pigs [J].Gastroenterology,2001,121: 1167-1175.
- [11] REEDS P J,BURRIN D G,STOLL B,et al.Enteral glutamate is the preferential source for mucosal glutathione synthesis in fed piglets[J].American Journal of Physiology,1997,273: E408-E415.
- [12] YIN F G,JIANG W M,GUAN S,et al.Glutamine and animal immune function[J].Journal of Food Agriculture and Environment,2010,8(3): 135-141.
- [13] ACCENSI F,PINTON P,CALLU P,et al.Ingestion of low doses of deoxynivalenol does not affect hematological,biochemical,or immune responses of piglets[J].Journal of Animal Science,2006,84(7): 1935-1942.
- [14] UZARSKI R L,ISLAM Z,PESTKA J J.Potentiation of trichothecene-induced leukocyte cytotoxicity and apoptosis by TNF-alpha and Fas activation [J].Chemico-Biological Interactions,2003,146(2): 105-119.
- [15] LE DREAN G,AUFFRET M,BATINA P,et al.Myelotoxicity of trichothecenes and apoptosis: an *in vitro* study on human cord blood CD34⁺ hematopoietic progenitor[J].Toxicology *in Vitro*,2005,19(8): 1015-1024.
- [16] REEDS J P,BURRIN G D,STOLL B,et al.Intestinal glutamate metabolism[J].The Journal of Nutrition,2000,130: 978-982.
- [17] FAN M Z,MATTHEWS C J,ETIENNE M P N,et al.Expression of apical membrane L-glutamate transporters in neonatal porcine epithelial cells along the small intestinal crypt-villus axis[J].American Journal of Physiology Gastrointestinal Liver Physiology,2004,287: G385-G398.
- [18] GILL S,PULIDO O.Glutamate receptors in peripheral tissue: excitatory transmission outside the CNS[M].London: Kluwer Academic/Plenum Publishers,2005: 47-48.
- [19] AOYAMA K,WATABE M,NAKAKI T.Regulation of neuronal glutathione synthesis[J].Journal of Pharmacology Science,2008,108: 227-238.
- [20] PRELUSKY D B.The effect of deoxynivalenol on serotonergic neurotransmitter levels in pig blood[J].Journal of Environmental Science and Health,1994,29(6): 1203-1218.
- [21] 李月红,张祥宏,王俊灵,等.脱氧雪腐镰刀菌烯醇对小鼠胸腺细胞凋亡和增殖的影响[J].中国病理生理杂志,2002,18(7): 778-781.
- [22] 伍力,耿梅梅,王文策,等.哺乳仔猪发育期血液生化指标动态变化规律研究[J].西南农业学报,2010,23(2): 570-575.
- [23] STANG I R,SZIJARTO A,ONODY P,et al.Reduction of liver ischemia/reperfusion injury via glutamine pretreatment[J].Journal of Surgical Research,2011,166(1): 95-103.
- [24] 赵聘,赵云焕.复合抗热应激添加剂对蛋鸡血液生化指标的影响[J].河南农业科学,2005,2: 70-73.
- [25] 何世山,金小军.高温对肉鸡血液生化指标的影响[J].浙江大学学报: 农业与生命科学版,2003,29(3): 311-314.
- [26] 张宇.血常规检测的临床意义[J].中国医药指南,2012,17: 390-391.

- [27] 赵青,何敏,剌海阔,等.呕吐毒素不同给药方式对猪血常规指标的影响[J].中国畜牧兽医,2010,37(4): 47-50.
- [28] 霍星华,赵宝万,万学攀,等.脱氧雪腐镰刀菌烯醇的毒性研究进展[J].毒理学杂志,2008,22(2): 151-154.
- [29] WU G,KNABE D A,FLYNN N E.Biology of metabolism in growing animals[M].Oxford:Elsevier Science Ltd,2005.
- [1] 宋林,樊启学,胡培培,刘汝鹏,王昆鹏,姚昌林.饲料蛋能比对翘嘴鲌幼鱼生长性能、肠道和肝胰脏消化酶活性的影响[J].动物营养学报,2013,25(7): 1480-1487
- [2] 周明,刘波,戈贤平,谢骏,万金娟,崔素丽.饲料维生素E添加水平对团头鲂生长性能及血液和肌肉理化指标的影响[J].动物营养学报,2013,25(7): 1488-1496
- [3] 刘志,张铁涛,郭强,吴学壮,高秀华,杨福合,邢秀梅.饲料铜水平对育成期蓝狐生长性能、营养物质消化率及氮代谢的影响[J].动物营养学报,2013,25(7): 1497-1503
- [4] 张建禄,余平,黄吉芹,吉红,邱立疆,杨克.脱脂蚕蛹替代饲料中鱼粉对建鲤生长性能、体成分及健康状况的影响[J].动物营养学报,2013,25(7): 1568-1578
- [5] 王黎文,丁健,张建刚,林森,赵国琦.霉菌毒素吸附剂蒙脱石对泌乳奶牛生产性能和血清生化指标的影响[J].动物营养学报,2013,25(7): 1595-1602
- [6] 聂昌林,姜建阳,韩先杰,宋春阳.杜洛克与鲁烟白杂交断奶仔猪对可消化赖氨酸的需要量[J].动物营养学报,2013,25(7): 1617-1623
- [7] 肖曼,高振华,李兴华,张少成,陈训银,张晓慧,董爱华,曹赞,陈广信.酵母培养物对肉仔鸡生长性能、肠黏膜结构及肠道菌群的影响[J].动物营养学报,2013,25(7): 1624-1631
- [8] 李志华,付京花,唐雪莲,侯梦杰,吴海斌,潘庆.维生素E在罗非鱼幼鱼饲料中的应用及耐受性研究[J].动物营养学报,2013,25(7): 1648-1655
- [9] 毛述宏,林鑫,杨阳,林仕梅,罗琳,李斌斌.甘露聚糖酶对罗非鱼生长性能、消化代谢和非特异性免疫力的影响[J].动物营养学报,2013,25(7): 1641-1647
- [10] 董晓丽,张乃锋,周盟,屠焰,刁其玉.复合菌制剂对断奶仔猪生长性能、粪便微生物和血清指标的影响[J].动物营养学报,2013,25(6): 1285-1292
- [11] 杨雅涵,孙伟丽,李光玉,王凯英,鲍坤,徐超,荆祎.饲料蛋白质水平和限饲对冬毛期水貂生产性能、消化代谢和血清生化指标的影响[J].动物营养学报,2013,25(6): 1276-1284
- [12] 徐露蓉,栾兆双,胡彩虹,石波.饲料中添加纤维寡糖对生长猪生长性能、结肠菌群和肠黏膜通透性的影响[J].动物营养学报,2013,25(6): 1293-1298
- [13] 陈焱,汪攀,董晓芳,王安如,佟建明,张军,胡婷.约氏乳杆菌对0~17周龄蛋鸡生产性能、脏器指数及血清抗体水平和生化指标的影响[J].动物营养学报,2013,25(6): 1299-1306
- [14] 徐晓娜,王宝维,葛文华,张名爱,李文立.植酸酶对鹅生长性能、养分表观利用率及排泄物指标的影响[J].动物营养学报,2013,25(6): 1315-1323
- [15] 汤海鸥,高秀华,李学军,王晓睿.低能饲料中添加高剂量复合酶对肉鸡生长性能、养分利用率和器官指数的影响[J].动物营养学报,2013,25(6): 1338-1345