



动物营养学报

CHINESE JOURNAL OF ANIMAL NUTRITION

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动物营养学报 2013, Vol. 25 Issue (9) :2101-2110 DOI: 10.3969/j.issn.1006-267x.2013.09.024

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谷氨酸和精氨酸对饲喂霉变饲料育肥猪所受损伤的缓解作用

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Attenuating Effects of Glutamate and Arginine on Damage of Finishing Pig Fed a Contaminated Diet

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摘要 本研究旨在探讨霉变饲料对育肥猪生长性能、脏器指数、血常规、血清生化指标、抗氧化指标以及肉品质的影响及添加1%精氨酸或2%谷氨酸对饲喂霉变饲料造成的损伤的缓解作用。试验选用平均初始体重为(55.0±1.5) kg的“长×大”二元杂交育肥猪20头,随机分为4组,分别饲喂正常基础饲料(对照组)、基础饲料经过霉变处理后的霉变饲料(霉变组)、添加1%精氨酸的霉变饲料(精氨酸组)、添加2%谷氨酸的霉变饲料(谷氨酸组),每组5个重复,每个重复1头猪。试验期60 d。结果表明:1)与对照组相比,霉变组育肥猪末重、平均日增重和平均日采食量显著降低($P<0.05$),在饲料中添加精氨酸或谷氨酸未能提高育肥猪生长性能。2)与对照组相比,霉变组肝脏指数显著升高,脾脏指数显著下降($P<0.05$)。与霉变组相比,谷氨酸组肝脏指数显著降低,脾脏指数显著升高($P<0.05$),缓解了霉变饲料对肝脏、脾脏的损伤。3)与对照组相比,霉变组血清 γ -谷氨酰转氨酶活性显著升高($P<0.05$),白蛋白和总蛋白含量显著降低($P<0.05$)。与霉变组相比,精氨酸组血清谷丙转氨酶和乳酸脱氢酶活性显著降低($P<0.05$)。4)与对照组相比,霉变组中平均红细胞体积显著下降($P<0.05$),血小板压积显著升高($P<0.05$)。与霉变组相比,精氨酸组中性粒细胞百分比和中间值细胞绝对值显著升高($P<0.05$);谷氨酸组中间值细胞百分比、平均红细胞体积、平均血小板体积显著升高,血小板压积显著降低($P<0.05$)。5)与对照组相比,霉变组血清超氧化物歧化酶活性显著下降($P<0.05$)。与霉变组相比,谷氨酸组和精氨酸组血清谷胱甘肽过氧化物酶活性显著升高($P<0.05$),不仅如此,谷氨酸组血清超氧化物歧化酶活性也显著升高($P<0.05$)。6)与对照组相比,霉变组肌肉嫩度显著降低了20.22%($P<0.05$)。精氨酸组肌肉嫩度较霉变组显著提高($P<0.05$),且显著高于对照组($P<0.05$)。综上所述,饲料中添加1%精氨酸或2%谷氨酸能够对霉变饲料造成的育肥猪脏器、抗氧化以及肉品质的损伤起到一定的缓解作用。

关键词: 霉变饲料 育肥猪 精氨酸 谷氨酸

Abstract: This study was conducted to test the effects of a contaminated diet on growth performance, visceral indexes, blood routine, serum biochemical indexes, anti-oxidant indexes and meat quality of finishing pigs, and the attenuating effects of dairy 1% arginine (Arg) and 2% glutamate (Glu) on the damage challenged by the contaminated diet. A total of 20 finishing pigs (Landrace × Large White) with an average initial body weight of (55.0±1.50) kg were randomly allocated to 4 groups which were control group receiving an uncontaminated basal diet, contaminated group receiving the basal diet after mildew processing, Arg group receiving the contaminated diet and 1% Arg, and Glu group receiving the contaminated diet and 2% Glu, and each group had 5 replicates with 1 pigs each. The experiment lasted for 60 d. The results showed as follows: 1) compared with control group, final weight, average daily gain and average daily feed intake of finishing pigs in contaminated group were significantly decreased ($P<0.05$), but the supplementation of Arg or Glu could not increase the growth performance. 2) Compared with control group, liver index in contaminated group was significantly increased and spleen index was significantly decreased ($P<0.05$). Compared with contaminated group, liver index in Glu group was significantly decreased and spleen index was significantly increased ($P<0.05$). 3) Compared with control group, serum γ -glutamine transferase activity in contaminated group was significantly increased ($P<0.05$), and albumin and total

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protein contents were significantly decreased ($P<0.05$). Compared with contaminated group, serum alanine transaminase and lactate dehydrogenase activities in Arg group were significantly decreased ($P<0.05$). 4) Compared with control group, mean red cell volume in contaminated group was significantly decreased ($P<0.05$), and thrombocytocrit was significantly increased ($P<0.05$). Compared with contaminated group, the percentage of neutrophil granulocyte and mononuclear cells absolute value in Arg group were significantly increased ($P<0.05$); the percentage of mononuclear cells, mean red cell volume and mean platelet volume in Glu group were significantly increased ($P<0.05$), and thrombocytocrit was significantly decreased ($P<0.05$). 5) Compared with control group, serum superoxide dismutase (SOD) activity in contaminated group was significantly decreased ($P<0.05$). Compared with contaminated group, serum glutathione peroxidase activity in Glu group and Arg group was significantly increased ($P<0.05$), and SOD activity in Glu group was also significantly increased ($P<0.05$). 6) Compared with control group, muscle tenderness in contaminated group was significantly decreased by 20.22% ($P<0.05$). Compared with contaminated group, muscle tenderness in Arg group was significantly increased ($P<0.05$) and significantly higher than that in control group ($P<0.05$). In conclusion, the supplementation of 1% Arg or 2% Glu can alleviate the damage of organ, antioxidant system, and meat quality of finishing pigs challenged by the contaminated diet.

Keywords: [contaminated diet](#), [finishing pig](#), [arginine](#), [glutamate](#)

收稿日期: 2013-03-02;

基金资助:

国家973项目课题(2009CB118806);湖南省自然科学基金资助项目(12JJ2020);湖南省战略新兴产业科技攻关项目(2011GK4061)

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引用本文:


陈明洪, 段杰林, 尹杰等. 谷氨酸和精氨酸对饲喂霉变饲料粮育肥猪所受损伤的缓解作用[J]. 动物营养学报, 2013, V25(9): 2101-2110

CHEN Minghong, DUAN Jielin, YIN Jie etc. Attenuating Effects of Glutamate and Arginine on Damage of Finishing Pig Fed a Contaminated Diet[J]. Chinese Journal of Animal Nutrition, 2013, V25(9): 2101-2110.

链接本文:

http://118.145.16.228/Jweb_dwyy/CN/10.3969/j.issn.1006-267x.2013.09.024 或 http://118.145.16.228/Jweb_dwyy/CN/Y2013/V25/I9/

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