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饲料砷污染对蛋鸡生产性能、蛋品质及抗氧化性能的影响

蒋媛婧, 袁超, 宋华慧, 邹晓庭

浙江大学饲料科学研究所, 农业部动物营养与饲料科学重点实验室, 杭州 310058

Arsenic Contamination in Feed Affects Performance, Egg Quality and Antioxidant Capacity of Laying Hens

JIANG Yuanjing, YUAN Chao, SONG Huahui, ZOU Xiaoting

Key Laboratory of Animal Nutrition and Feed Science of Ministry of Agriculture, Feed Science Institute, Zhejiang University, Hangzhou 310058, China

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摘要 本试验旨在研究饲料不同剂量的砷对蛋鸡生产性能、蛋品质及血清、肝脏和肾脏中抗氧化性能相关指标的影响。选用56周龄生产性能相近的“京红一号”蛋鸡320羽,随机分为4组,每组4个重复,每个重复20羽。对照组饲喂基础饲料,试验组(T₁、T₂和T₃组)分别饲喂在基础饲料中添加17、34、51 mg/kg砷的试验饲料。试验期8周。结果表明:1)各组间产蛋率、平均蛋重、平均日采食量和料蛋比均无显著差异($P>0.05$)。2)与对照组相比,T₁、T₂和T₃组第4周蛋壳强度分别降低了27.32%、17.86%和15.48%($P<0.05$),T₃组第4周的蛋白高度较对照组降低了17.33%($P<0.05$)。第4周和第8周蛋黄颜色均随饲料中砷含量的增加而下降,但差异不显著($P>0.05$)。3)T₃组血清巯基含量显著低于对照组($P<0.05$)。4)与对照组相比,T₃组肝脏中总超氧化物歧化酶活性显著降低($P<0.05$),T₂和T₃组肝脏中丙二醛含量显著升高($P<0.05$),各试验组肾脏超氧化物歧化酶活性均显著降低($P<0.05$),T₁和T₃组肾脏谷胱甘肽过氧化物酶活性显著降低($P<0.05$)。综上所述,饲料中砷污染可导致蛋品质降低,诱导脂质过氧化反应,降低蛋鸡抗氧化能力。

关键词: 砷污染 蛋鸡 生产性能 蛋品质 抗氧化性能

Abstract: This experiment was conducted to study the effects of arsenic contamination in feed on performance, egg quality and antioxidant capacity of laying hens. Three hundred and twenty 56-week-old ‘Jinghong No.1’ laying hens with the similar performance were randomly allocated to 4 groups with 4 replicates per group and 20 layers per replicate. The control group was fed a basal diet and experimental groups (groups T₁, T₂ and T₃) were fed the basal diets supplemented with 17, 34 and 51 mg/kg arsenic, respectively. The experiment lasted for 8 weeks. The results showed as follows: 1) there were no significant differences in laying rate, average egg weight, average daily feed intake and feed/egg ratio among all groups ($P>0.05$). 2) Compared with the control group, the eggshell strength in the groups T₁, T₂ and T₃ was decreased by 27.32%, 17.86% and 15.48% at week 4, respectively ($P<0.05$), and the albumen height in the T₃ group was decreased by 17.33% at week 4 ($P<0.05$). Arsenic contamination has a tendency to reduce yolk color at weeks 4 and 8 ($P>0.05$). 3) The serum hydrosulphyryl content in T₃ group was significantly lower than that in the control group ($P<0.05$). 4) Compared with the control group, the liver superoxide dismutase (SOD) activity in group T₃ was significantly decreased ($P<0.05$), and the liver malondialdehyde content in groups T₂ and T₃ was significantly increased ($P<0.05$); the kidney SOD activity in groups T₁, T₂ and T₃ was significantly decreased ($P<0.05$), and the kidney glutathione peroxidase activity in groups T₁ and T₃ was significantly decreased ($P<0.05$). These results indicate that arsenic contamination can reduce the egg quality, induce the lipid peroxidation, and reduce the antioxidant capacity of laying hens.

Keywords: arsenic contamination, laying hens, performance, egg quality, antioxidant capacity

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通讯作者 邹晓庭,教授,博士生导师,E-mail:xtzou@zju.edu.cn Email: xtzou@zju.edu.cn

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