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饲粮棉籽粕水平对高峰期蛋鸭产蛋性能、蛋品质、血浆生化指标、卵巢形态及棉酚残留的影响

阮栋, 林映才, 张罕星, 陈伟, 王爽

广东省农业科学院动物科学研究所, 畜禽育种国家重点实验室, 农业部动物营养与饲料(华南)重点开放实验室, 广东省动物育种与营养公共实验室, 广东省畜禽育种与营养研究重点实验室, 广州 510640

Effects of Dietary Cottonseed Meal Level on Laying Performance, Egg Quality, Plasma Biochemical Parameters, Ovarian Morphology and Gossypol Residue of Laying Ducks at Peak Production

RUAN Dong, LIN Yingcai, ZHANG Hanxing, CHEN Wei, WANG Shuang

State Key Laboratory of Livestock and Poultry Breeding, Key Laboratory of Animal Nutrition and Feed Science (South China) of Ministry of Agriculture, Guangdong Public Laboratory of Animal Breeding and Nutrition, Guangdong Key Laboratory of Animal Breeding and Nutrition, Institute of Animal Science, Guangdong Academy of Agricultural Science, Guangzhou 510640, China

摘要 本试验旨在研究饲粮棉籽粕（CSM）水平对高峰期蛋鸭产蛋性能、蛋品质、血浆生化指标、卵巢形态及棉酚残留的影响，以探讨饲粮中CSM适宜水平。试验选用19周龄龙岩山麻鸭720只，采用单因子随机分组试验设计，随机分为6组，每组4个重复，每个重复30只鸭。各组饲粮CSM水平分别为0（对照）、4.5%、9.0%、13.5%、18.0%和22.5%，CSM中游离棉酚（FG）实测值为266 mg/kg，试验期3个月。结果表明：1）与对照组相比，13.5%、18.0%和22.5%组显著降低了平均蛋重（$P<0.05$），22.5%组显著降低了平均蛋重和日产蛋重并提高了料蛋比（$P<0.05$）。2）饲粮CSM水平对高峰期蛋鸭产蛋率、破蛋率、畸形蛋率、蛋壳厚度、蛋壳强度、哈氏单位及蛋黄颜色无显著影响（$P>0.05$）。3）与对照组相比，9.0%、13.5%、18.0%和22.5%组显著降低了血浆还原型谷胱甘肽（GSH）含量和GSH/氧化型谷胱甘肽（GSSG）值，并提高了丙二醛（MDA）含量（$P<0.05$）；各组间GSSG含量、总抗氧化能力（T-AOC）及谷草转氨酶（GOT）、谷丙转氨酶（GPT）和碱性磷酸酶（ALP）活性均差异不显著（$P>0.05$）。4）9.0%、13.5%、18.0%和22.5%组可明显破坏优势卵泡的完整性，卵泡变形破裂，局部呈融溶状。5）22.5%组试验鸭直肠内容物中FG含量为4.55 mg/kg，胸肌、肝脏、肾脏及蛋黄、蛋清中并未检测出FG残留。综上所述，饲粮CSM水平低于9.0%时不影响高峰期蛋鸭产蛋性能、蛋品质，组织无损伤，胸肌及蛋中无棉酚残留。

关键词： 棉籽粕 蛋鸭 产蛋性能 蛋品质 血浆生化指标 卵巢形态 棉酚

Abstract： This experiment was conducted to study the effects of cottonseed meal (CSM) on laying performance, egg quality, plasma biochemical parameters, ovarian morphology and gossypol residue of laying ducks at peak production, and to estimate the dietary CSM optimal level of laying ducks. A single factor design was adopted and seven hundred and twenty 19-week-old *Longyan* laying ducks were randomly divided into 6 groups with 4 replicates per group and 30 ducks per replicate. Ducks in the six groups were fed the basal diet supplemented with 0 (control), 4.5%, 9.0%, 13.5%, 18.0% and 22.5% CSM, respectively. The content of free gossypol (FG) in CSM was 266 mg/kg. This experiment lasted for 12 weeks. The results showed as follows: 1) compared with the control group, the average egg weight in 13.5%, 18.0% and 22.5% groups was significantly decreased ($P<0.05$), and the average egg weight and daily egg mass in 22.5% group were significantly decreased ($P<0.05$), but the ratio of feed to egg in 22.5% group was significantly increased ($P<0.05$). 2) Dietary CSM level had no significant effects on laying rate, broken egg rate, abnormal egg rate, eggshell thickness, eggshell strength, Haugh unit and yolk color ($P>0.05$). 3) Compared with the control group, the plasma reduced glutathione (GSH) content and the GSH/oxidized glutathione (GSSG) value in 9.0%, 13.5%, 18.0% and 22.5% groups were significantly decreased ($P<0.05$), but the plasma malondialdehyde (MDA) content was significantly increased ($P<0.05$). There were no differences in total antioxidant capacity (T-AOC) and the activities of glutamic oxalacetic transaminase (GOT), glutamic pyruvic transaminase (GPT) and alkaline phosphatase (ALP) among all groups ($P>0.05$). 4) The integrity of the dominant follicles was impaired, and some of them were fractured to fusion in 9.0%, 13.5%, 18.0% and 22.5% groups. 5) The content of FG in rectal contents was 5.57 mg/kg in 22.5% group, but it was undetectable in breast muscle, liver, kidney, egg yolk and egg albumen. In conclusion, there is no negative effects on laying performance, egg quality

and organic damage when dietary CSM level is less than 9.0%, and there is no residues of gossypol in egg and breast muscle.

Keywords: cottonseed meal, laying ducks, laying performance, egg quality, plasma biochemical parameters, ovarian morphology, gossypol

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通讯作者 林映才，研究员，博士生导师，E-mail：lyc0123@tom.com

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