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饲料胆碱添加水平对产蛋期绍兴鸭产蛋性能、蛋品质、生殖器官发育的影响

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Effects of Choline Supplemental Level on Laying Performance, Egg Quality and Reproductive Organ Development of *Shaoxing* Ducks during the Laying Period

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摘要 本试验采用单因子随机试验设计,在玉米-豆粕型基础饲料中添加不同水平(0、250、500、750、1 000 mg/kg)的胆碱,以研究饲料胆碱添加水平对产蛋期绍兴鸭产蛋性能、蛋品质、生殖器官发育的影响,并探讨产蛋期绍兴鸭对胆碱的需要量。试验选用刚进入产蛋期的绍兴鸭540只,随机分为5组,每组6个重复,每个重复18只。试验期为20周。结果表明:1)饲料中添加胆碱可显著提高产蛋期绍兴鸭的平均蛋重($P<0.05$)。1 000 mg/kg组的产蛋率、平均蛋重、日产蛋重最高,料蛋比、畸形蛋率最低,但与500和750 mg/kg组相比差异不显著($P>0.05$)。2)饲料胆碱添加水平显著影响蛋黄颜色和蛋壳厚度($P<0.05$)。其中,蛋黄颜色随饲料胆碱添加水平的升高而降低,0、250、500、750 mg/kg组显著高于1 000 mg/kg组($P<0.05$),其他组间差异不显著($P>0.05$);蛋壳厚度以500 mg/kg组为最大,显著大于0、750 mg/kg组($P<0.05$),其他组间差异不显著($P>0.05$)。饲料胆碱添加水平对蛋形指数、蛋壳强度、蛋白高度及哈夫单位均无显著影响($P>0.05$),但蛋白高度及哈夫单位有随饲料添加胆碱水平的升高而增大的趋势,而蛋形指数、蛋壳强度则以500 mg/kg组为最大。3)饲料胆碱添加水平对绍兴鸭卵巢指数、输卵管长度指数、输卵管重量指数、优势卵泡总重/卵巢重量、优势卵泡总重量、优势卵泡数量均无显著影响($P>0.05$)。由此可知,在玉米-豆粕型基础饲料中添加胆碱可提高产蛋期绍兴鸭的平均蛋重,但会降低蛋黄颜色。综合考虑产蛋性能和蛋品质,在玉米-豆粕型基础饲料中添加500 mg/kg胆碱即可满足产蛋期绍兴鸭对胆碱的需要量。

关键词: 产蛋期 绍兴鸭 胆碱 产蛋性能 蛋品质 生殖器官发育 需要量

Abstract: In order to study the effects of choline supplemental level on laying performance, egg quality and reproductive organ development of *Shaoxing* ducks during the laying period, and to explore the choline requirement of *Shaoxing* ducks during the laying period, different levels (0, 250, 500, 750 and 1 000 mg/kg, respectively) of choline were supplemented in the corn-soybean meal based diet by a single-factor random experiment design. A total of 540 *Shaoxing* ducks during the initial egg-laying period were randomly assigned to 5 groups. Each group consisted of 6 replicates with 18 birds per replicate. The experiment lasted for 20 weeks. The results showed as follows: 1) choline supplementation significantly improved the average egg weight ($P<0.05$). The 1 000 mg/kg group had the highest laying rate, average egg weight and daily egg weight and the lowest feed to egg ratio and malformed egg rate, but no significant differences were found compared with the 500 and 750 mg/kg groups ($P>0.05$). 2) Choline supplemental level significantly affected the egg yolk color and eggshell thickness ($P<0.05$). The egg yolk color showed a decreasing trend with the choline supplemental level increasing, and that in 0, 250, 500 and 750 mg/kg groups was significantly higher than that in 1 000 mg/kg group ($P<0.05$), while no significant difference was found among other groups ($P>0.05$). The eggshell thickness in 500 mg/kg group was the highest and significantly higher than that in 0 and 750 mg/kg groups ($P<0.05$), while no significant difference was found among other groups ($P>0.05$). Choline supplemental level did not significantly affect the egg shape index, eggshell strength, Haugh unit and albumen height ($P>0.05$), but the Haugh unit and albumen height were increased with the choline supplemental level increasing, and the 500 mg/kg group had the highest egg shape index and eggshell strength. 3) Choline supplemental level had no significant effects on ovarian index, oviductus length index, oviductus weight index, total weight of advantage follicle/ovarian weight, total weight of advantage follicle and

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advantage follicle number ($P>0.05$). The results suggest that choline supplementation in the corn-soybean meal based diet can improve the average egg weight, but reduce the egg yolk color. Considering laying performance and egg quality, the supplementation of 500 mg/kg choline in the corn-soybean meal based diet can satisfy the choline requirement of *Shaoxing* ducks during the laying period.

Keywords: laying period, *Shaoxing* duck, choline, laying performance, egg quality, reproductive organ development, requirement

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