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硫酸锌和蛋氨酸锌对产蛋后期蛋鸡生产性能、蛋品质及抗氧化性能的影响

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Effects of $ZnSO_4$ and Zinc Methionine on Performance, Egg Quality and Antioxidant Ability of Laying Hens in Late Laying Period

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摘要 本试验旨在研究硫酸锌和蛋氨酸锌对产蛋后期蛋鸡生产性能、蛋品质及抗氧化性能的影响。选取504只产蛋率和体重相近、健康的54周龄海兰灰蛋鸡,随机分成7组,每组6个重复,每个重复12只鸡。预试期4周,正试期6周,预试期饲喂缺乏锌的玉米-豆粕型基础饲粮(锌水平29.07 mg/kg),以尽量排除锌的影响;正试期各组分别饲喂基础饲粮和在基础饲粮中分别添加硫酸锌和蛋氨酸锌(锌添加水平分别为35、70和140 mg/kg)的试验饲粮。结果表明:1)锌源未显著影响产蛋率、平均日采食量、料蛋比($P>0.05$),但锌添加水平显著影响平均蛋重($P<0.05$),锌添加水平为35 mg/kg时平均蛋重显著高于70、140 mg/kg时($P<0.05$);2)锌源和锌添加水平均显著影响蛋壳厚度($P<0.05$),140 mg/kg蛋氨酸锌组蛋壳最厚;饲喂3周时70 mg/kg硫酸锌组的鸡蛋蛋白高度和哈夫单位显著高于对照组(饲喂基础饲粮)($P<0.05$),而饲喂6周时,各组无显著差异($P>0.05$);锌源未显著影响蛋壳强度和蛋黄颜色($P>0.05$);单因素方差分析显示,70 mg/kg硫酸锌组蛋品质最好;3)锌源和锌添加水平显著影响蛋鸡血浆和肝脏内的总超氧化物歧化酶(T-SOD)、铜锌超氧化物歧化酶(Cu,Zn-SOD)活性,总抗氧化能力(T-AOC),抗超氧阴离子能力(抗O_2^-能力)等抗氧化指标($P<0.05$),由各指标及单因素方差分析的结果可得出,70 mg/kg硫酸锌组抗氧化性能最佳。由此可见,锌源未显著影响蛋鸡生产性能,但在一定程度上提高鸡蛋品质、改善机体抗氧化状态,本试验条件下,产蛋后期海兰灰蛋鸡饲粮中使用硫酸锌且锌添加水平为70 mg/kg时效果最佳。

关键词: 锌 蛋鸡 生产性能 蛋品质 抗氧化

Abstract: This experiment was conducted to study the effects of different levels and sources of Zn on performance, egg quality and antioxidant ability of laying hens in late laying period. Five hundred and four 54-week-old healthy Hy-Line laying hens with the same laying rate and similer weight were randomly divided into 7 groups with 6 replicates per group and 12 hens per replicate. The pre-trial period lasted for 4 weeks and trial period lasted for 6 weeks.The laying hens were fed a Zn deficiency basal diet with Zn level at 29.07 mg/kg for pre-trial period. In trial period, the laying hens were randomly allocated into one of the 7 dietary treatments: basal diet (as control) and trial diets supplemented with $ZnSO_4$ and Zinc methionine (the basal diet supplemented levels of Zn were 35, 70, 140 mg/kg). The results showed as follows: 1) the Zn sources did not significantly affect the laying rate, average daily feed intake and the ratio of feed to egg ($P>0.05$), but the Zn levels were significantly affect the average egg weight ($P<0.05$), and the average egg weight of 35 mg/kg Zn group was significantly higher than that of 70, 140 mg/kg Zn groups ($P<0.05$); 2) the eggshell thickness was significantly affected by the different levels and sources of Zn, and the best group was 140 mg/kg Zinc methionine group; the album height and Haugh unit were significantly improved compared with control group after 3 weeks experiment ($P<0.05$), but there were no significant difference after 6 weeks experiment ($P>0.05$); the Zn sources had no effects on eggshell strength and egg yolk color ($P>0.05$); the ANOVA showed that the best group of egg quality was 70 mg/kg $ZnSO_4$ group; 3) the activities of total superoxide dismutase (T-SOD) and Cu/Zn-superoxide dismutase (Cu,Zn-SOD), total antioxidant capacity (T-AOC) and the ability of inhibiting superoxide anion both in serum and liver were significantly increased by different sources and different levels of Zn ($P<0.05$), and the best group was 70 mg/kg $ZnSO_4$ group. In conclusion, the Zn sources do not significantly affect performance, but can improve egg quality and antioxidant capacity of laying hens in some content. The best supplemental level and source of Zn are 70 mg/kg and $ZnSO_4$ in the present study.

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