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硒化壳聚糖对种公鸡组织硒含量、硒酶活性及其基因表达的影响

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Effects of Seleno-Chitosan on Tissue Selenium Content, Activities and Gene Expressio of Selenoenzymes in Breeder Cocks

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摘要 本试验旨在比较研究硒化壳聚糖(SC)和亚硒酸钠(SS)对海兰褐种公鸡组织硒沉积量,硫氧还蛋白还原酶(TrxR)、Ⅰ型脱碘酶(IDⅠ)活性及*TrxR*2、*ID*Ⅰ基因表达的影响。选取280只20周龄海兰褐种公鸡,随机分为7个处理,每个处理4个重复,每个重复10只鸡。将SC和SS分别以0.4、0.8和1.2 mg/kg 3个硒水平添加到海兰褐种公鸡基础饲粮中,对照组饲喂基础饲粮,进行为期35 d饲养试验。结果表明:1)不同的硒源和硒添加水平对种公鸡生长性能影响不显著(*P*>0.05)。2)在睾丸中,1.2 mg/kg SS添加组硒含量显著高于对照组(*P*<0.05),1.2 mg/kg SC添加组硒含量极显著高于对照组(*P*<0.01);在肾脏中,0.8 mg/kg SS、1.2 mg/kg SS以及1.2 mg/kg SC添加组硒含量均显著高于对照组(*P*<0.05)。3)饲粮中添加0.4 mg/kg SS极显著提高了种公鸡睾丸TrxR活性(*P*<0.01),添加0.4 mg/kg SC显著了提高种公鸡睾丸TrxR活性(*P*<0.05),但只有添加0.4 mg/kg SC才能极显著提高肾脏IDⅠ活性(*P*<0.01)。4)0.4 mg/kg SC添加组睾丸*TrxR*2基因mRNA相对表达水平最高,但各组均差异不显著(*P*>0.05);随着硒添加水平的升高,在SS添加组,睾丸*TrxR*2基因mRNA相对表达水平呈现先升高后下降的趋势,而在SC添加组,睾丸*TrxR*2基因mRNA相对表达水平呈现先升高后下降再升高的趋势。与对照组比较,0.4 mg/kg SS添加组肾脏*ID*Ⅰ基因mRNA相对表达水平显著降低(*P*<0.05)。由此可知,SC对海兰褐种公鸡组织硒沉积,TrxR、IDⅠ活性以及*TrxR*2、*ID*Ⅰ基因表达有较大影响;建议添加低水平(0.4 mg/kg)SC。

关键词: 硒化壳聚糖 组织硒含量 硫氧还蛋白还原酶 Ⅰ型脱碘酶 基因表达

Abstract: This experiment was conducted to compare the effects of seleno-chitosan (SC) and sodium selenite (SS) on tissue selenium retention, thioredoxin reductase (TrxR) and iodothyronine deiodinase Ⅰ (IDⅠ) activities and mRNA relative expression levels of *TrxR*2 and *ID*Ⅰ genes in Hy-Line breeder cocks. Two hundred and eighty 20-week-old Hy-Line breeder cocks were allocated randomly into seven treatments with four replicates per treatment and ten breeder cocks per replicate. Control group was fed a basal diet, while the six other groups were fed the basal diet supplemented with 0.4, 0.8 and 1.2 mg/kg selenium from SC or SS, respectively. The experiment lasted for 35 days. The results showed as follows: 1) Se source and supplemental level did not influence the growth performance of breeder cocks (*P*>0.05). 2) The selenium content in testis of breeder cocks of 1.2 mg/kg SS supplemental group and 1.2 mg/kg SC supplemental group was significantly higher than that of control group (*P*<0.05 and *P*<0.01, respectively). The selenium content in kidney of breeder cocks of 0.8 mg/kg SS supplemental group, 1.2 mg/kg SS supplemental group and 1.2 mg/kg SC supplemental group had a significant increase compared with control group (*P*<0.05). 3) TrxR activity in testis of breeder cocks of 0.4 mg/kg SS supplemental group and 0.4 mg/kg SC supplemental group was significantly higher than that of control group (*P*<0.01 and *P*<0.05, respectively), but only IDⅠ activity in kidney of 0.4 mg/kg SC supplemental group was significantly higher than that of control group (*P*<0.01). 4) The mRNA relative expression level of *TrxR*2 gene in testis of breeder cocks of 0.4 mg/kg SC supplemental group was the highest of all groups, but there was no significant difference among all groups (*P*>0.05). With the increase of supplemental selenium level, the mRNA relative expression level of *TrxR*2 gene in testis was

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increased at first, and then descended in SS supplemental groups, while the mRNA relative expression level of *TrxR*2 gene was increased at first, then descended and increased at last in SC supplemental groups. The mRNA relative expression level of *ID*Ⅰ gene in kidney of breeder cocks of 0.4 mg/kg SS supplemental group was significantly lower than that of control group ($P<0.05$). These results indicate that SC has greater effects on the deposition of tissue Se, TrxR and IDⅠ activities and mRNA relative expression levels of *TrxR*2 and *ID*Ⅰ genes in Hy-Line breeder cocks, and supplementing SC at a lower level (0.4 mg/kg selenium) is better.

Keywords: seleno-chitosan, tissue selenium content, thioredoxin reductase, iodothyronine deiodinase Ⅰ, gene expression

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