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Comparison of different forms of dietary selenium supplementation on gene expression of cytoplasmic thioredoxin reductase, selenoprotein P, and selenoprotein W in broilers

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Effects of different forms of dietary selenium (Se) supplementation on gene expression of cytoplasmic thioredoxin reductase (TrxR1), selenoprotein P (SelP), and selenoprotein W (SelW) in broilers were investigated. A total of six hundred Ross 308 broilers (1-day-old) with similar body weight were randomly divided into three groups, each of which included 5 replicates of 40 birds. These three treatments received the same basal diet with only background Se level of 0.04 mg Se/kg, supplemented with 0.15 mg Se/kg as sodium selenite (SS) or l-selenomethionine (l-Se-Met) or d-selenomethionine (d-Se-Met) for 42 days. The SS supplemented diet increased TrxR1 activity in liver ($P < 0.01$) and kidney ($P < 0.01$) as well as SelP concentration in serum ($P < 0.05$) and liver ($P < 0.01$) more than the d-Se-Met supplemented diet. The addition of SS also highly increased liver ($P < 0.01$) and kidney ($P < 0.01$) TrxR1 activities of broilers in comparison with broilers fed l-Se-Met diet. In addition, liver TrxR1 activity in l-Se-Met group was higher than that in d-Se-Met group ($P < 0.05$). Liver and kidney mRNA levels of TrxR1 and SelP as well as breast muscle SelW mRNA level were significantly increased by l- and d-Se-Met supplementation in comparison with SS supplementation ($P < 0.01$), while the d-Se-Met group showed more effective ($P < 0.01$) than the l-Se-Met group in increasing the mRNA levels of TrxR1 and SelP in liver and kidney. Therefore, dietary l-Se-Met and d-Se-Met supplementation could improve mRNA levels of different selenoproteins studied and reduce amounts of TrxR1 and SelP in broilers compared with SS. Besides, l-Se-Met is more effective than d-Se-Met in raising TrxR1 activity and decreasing mRNA abundance of TrxR1 and SelP in broilers.

Keywords:

sodium selenite; l-selenomethionine; d-selenomethionine; mRNA abundance

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