The effect of dietary selenium sources on growth performance and oxidative stability in broiler chickens

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Introduction

Selenium is one of the essential nutritional elements whose main function consists of the protection of cells and tissues from oxidation damage (Schwarz and Foltz, 1957). The effect of selenium on poultry takes place in many ways (stomach and heart myopathy, exudative diathesis, pancreatic fibrosis, glutathione peroxidase, quality of meat and other).

The aim of study

This experiment was to compare the effect of dietary sodium selenite (SS), Se-enriched yeast (Sel-Plex) and Se-enriched alga Chlorella (SCH) on performance, carcass composition and oxidative stability of breast meat lipids in broiler chickens.

Material and methods

The fattening experiment with 420 cockerels ROSS 308 was carried out till 35 days of age. Chickens were alloted to 4 groups with different source of Se, each group after 3 repetitions of 35 broiler chickens. The 4 treatments were a maize-wheat-soybean meal basal diet with no supplemental Se (control), the basal diet supplemented with 0.15 mg/kg from SS, 0.15 mg/kg from Sel-Plex, and the basal diet supplemented with 0.15 mg/kg from SCH supplied by the Institute of Microbiology, Academy of Sciences of the Czech Republic. Commercial pelleted type feed mixture contained (22.67% crude protein, 12.87 MJ/kg ME and 50 mg/kg a-tocopherol). Feed and water were provided *ad libitum*. At the end of the experiment, 8 broiler chickens representing the average live weight of each group were selected. Eight breast filets from each group were stored in plastic bags at –70 C before thiobarbituric acid-reactive substances (TBARS) analysis. After thawing, parts of muscles were stored at 3 to 5 C for 0, 3 and 5 days before the determination of malondialdehyde. Lipid oxidation in minced meat samples was measured by the thiobarbituric acid method of destilation, and results were expressed as (TBARS) in mg of malondialdehyde/kg of muscle.

Results

Table 1. Effect of supplementation of selenium in the diet on the growth traits and carcass composition in broilers

Indicator		Group				Significance
		Control	Sel-Plex	Sodium selenite	Se-alga Chlorella	
1st day of age	(g)	38.45	37.88	38.51	38.10	NS
21st day of age	(g)	1013^{A}	946^{B}	970^{A}	968^{AB}	***
35th day of age	(g)	2111^{A}	2123^{A}	2098^{AB}	2010^{B}	**
Feed conversion (1 – 35 days of age)	(kg)	1.85	1.88	1.87	1.93	NS
Mortality (1 – 35 days of age)	(%)	4.76	2.86	2.86	1.9	NS
Carcass weight	(g)	1420	1442	1473	1331	*
Breast	(%)	24.8	25.7	26.2	25.06	NS
Thigh	(%)	23.6	22.7	23.2	23.3	NS
Liver	(%)	3.3^{A}	3.2^{AB}	3.3^{A}	3.1^{B}	*
Abdominal fat	(%)	1.7	1.9	1.9	1.8	NS
Dressing percentage	(%)	73.7	72.8	73.4	73.9	NS

*P≤0.05, **P≤0.01, ***P≤0.001; NS = non significant; ^{A,B}means with common superscripts do not differ significantly, determined by Scheffe s test

Table 2. Oxidative stability of meat content of MDA (mg MDA/kg of muscle)

Day of storage	Group				Significance		
	Control	Sel-Plex	Sodium selenite	Se-alga Chlorella	Storage	Group	Storage*group
0	4.8	9.7	6.5	5.7			
3	7.8	13.2	9.8	9.0	***	***	NS
5	10.3	16.5	13.1	13.8			

***P≤0.001; NS = non significant

Conclusion

The experiment shows that supplement of selenium has an effect on performance of broiler chickens, carcass composition but does not increase the oxidative stability of meat.

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