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Effect Of Copper On The Sulfur Amino Acid Requirements Of Turkeys

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EFFECT OF COPPER ON THE SULFUR AMINO ACID REQUIREMENTS OF TURKEYS

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Copper as copper sulfate is often used as a growth promoter and crop mold growth preventative in turkey diets. Addition of 120 ppm copper to turkey diets in a previous study caused a slight decrease in body weights at 8 and 16 weeks of age when the diets contained 75, 85 or 100% of the NRC (1977) recommended sulfur-containing amino acid levels. This level of copper was suspected to decrease sulfur amino acid (S-AA) utilization and cause growth depression. Thus, a factorial experiment was designed to determine the effect of three different levels of copper (60, 120 or 240 ppm) on the growth rate of turkeys as affected by three different levels (75, 100 or 125% of NRC) of S-AA.

A total of 1200 day-old Nicholas white tom turkeys were randomly distributed into 36 pens. The low protein dietary series (23, 20, 18, 16, 14 and 12% protein, dropped at 4-week intervals) were used as recommended by Guenthner et al. (1978). Individual weights and group feed consumption data were obtained at 4-week intervals.

Table 1 shows the average body weights and feed consumption at 8 and 16 weeks of age. Birds receiving the 75% level of S-AA had significantly lower body weights compared to those on the 100% S-AA diets. However, diets with the 125% NRC level of S-AA did not support an increase in body weight over that of birds on the 100% S-AA level. Feed conversion ratios were not significantly affected by any of the factors studied.

Addition of 60 ppm of copper significantly increased body weights at 8 weeks of age. It appeared that 120 and 240 ppm copper slightly decreased body weights, although the effects were not significant. No significant interaction between levels of copper and methionine was observed.

This study suggested that copper at the 60 ppm level was beneficial in turkey diets as a growth promoter in addition to its function in preventing mold growth in the crop and also reducing aortic rupture.

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Table 1. Effect of copper on the sulfur amino acid requirements of turkeys

S-AA content as % of NRC	Copper ppm 0	60	120	240	Average
		Body weight @ 8 weeks, kg			
75	2.86	2.94	2.71	2.66	2.79[a]
100	3.17	3.24	3.06	3.07	3.14[b]
125	~~2.98~~ 3.16	3.25	3.11	3.12	3.12[b]
Average	3.00[ab]	3.15[bc]	2.97[a]	2.96[a]	
		Feed/gain			
75	1.93	1.94	1.97	1.96	1.95
100	1.84	1.83	1.87	1.85	1.85
125	1.84	1.81	1.80	1.83	1.82
		Body weight @ 16 weeks, kg			
75	8.74	8.73	8.70	8.53	8.67*
100	9.09	9.26	8.96	9.22	9.13
125	9.20	9.09	9.05	9.21	9.14
Average	9.01	9.03	8.90	8.99	
		Feed/gain			
75	3.32	3.32	3.03	2.96	3.15
100	3.06	2.97	3.14	3.04	3.05
125	3.41	3.21	3.06	3.05	3.18

[a,b,c]Means with different superscripts are significantly different ($P<0.05$).

*Significantly different from the other two groups ($P<0.01$).