

## 사료 內 Cu 및 Zn-methionine chelates 첨가가 육계의 생산성에 미치는 영향

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### ABSTRACT

An experiment was conducted to investigate the effects of supplemental Cu and Zn methionine chelates on the performance, nutrient digestibility, serum IgG level, gizzard erosion, and Cu and Zn contents in the liver and excretion of broiler chickens. One thousand hatched broiler chickens (Ross) of one day old were assigned to 4 treatments: control(T1), 100ppm of copper in the form of Cu-methionine chelate(Cu-Met, T2), 100ppm of zinc in the form of Zn-methionine chelate(Zn-Met, T3) and 100ppm of copper plus 100ppm of zinc in the form of methionine chelate(Cu-Zn-Met, T4). Each treatment had four replications of 50 birds each. Weight gain of chicks fed chelated products were significantly higher than that of chicks fed control( $P < 0.05$ ). Moreover, feed conversion of chicks fed chelated products were significantly lower than that of chicks fed control( $P < 0.05$ ). Combination of Cu and Zn chelates(Cu-Zn-Met) tended to show the best growth rate and feed conversion ratio. Nutrient digestibilities were not affected by dietary treatments. Serum IgG level of chicks fed Cu-Zn-Met was significantly higher than that of chicks fed control( $P < 0.05$ ). Gizzard erosion index was not significantly different among treatments. Contents of Cu and Zn in liver were not significantly affected by dietary treatments, whereas excretions of these minerals were significantly affected by dietary treatments.

(Key words : chelate, Cu, Zn, methionine, gizzard erosion, IgG, broiler)

### 서 론

Cu와 Zn는 고수준으로 사용되지만 이들 광물질은 배설량 과다로 환경오염을 일으킬 수 있기 때문에 착염화(chelation)의 필요성이 강조되고 있다(백인기, 2000). 또한 사료 내 높은 수준의 Zn 함량은 Cu의 이용률을 줄이는 길항작용이 있기 때문에 이용되기 쉬운 형태로 공급해야 한다(Hatfield 등, 2001). 근래에 와서 metal-amino acid 형태인 유기태 광물질의 연구가 활발히 진행되고 있는데 무기태인 oxide 형태나 sulfate 형태보다 더 효과적으로 장에서 흡수가 된다고 보고되었다(Wedekind 등, 1992; Aoyagi and Backer, 1993b).

### 재료 및 방법

35일간의 사양시험 종료 후 대사시험을 실시하였고 혈액과 간을 채취하였으며 gizzard를 erosion의 정도에 따라 4단계(0, 1, 2, 3)로 분리·검사하였다. 혈청 IgG의 농도는 Mancini(1965)에

의해 개발된 single radial immuno- diffusion test (RID test)에 준하여 측정하였다.

### 결 과

Cu와 Zn chelate 그리고 이들의 혼합 급여가 증체량, 사료섭취량, 사료요구율 및 폐사율에 미치는 영향은 Table 1에 나타냈다. 증체량은 사양 쏘 기간 동안 chelate 처리간에는 유의한 차이가 없었으나, control(T1)에 비해 chelate 처리구 모두 유의한 증체 효과를 나타냈다 ( $P<0.05$ ). 사료 요구율은 chelate 처리구 모두 control에 비해 낮았다( $P<0.05$ ). 혈청 IgG 농도, gizzard erosion, 그리고 간과 분(糞)에서의 Cu와 Zn함량은 Table 2에 나타냈다. 혈청 IgG 농도는 Cu-Zn-Met(T4) 처리구가 가장 높은 반면에 control(T1)이 가장 낮았으며( $P<0.05$ ), gizzard erosion index의 처리간의 차이는 없었다. 간에서의 Cu와 Zn함량의 차이는 Zn 혹은 Cu chelate를 첨가한 구가 control에 비해 다소 높은 경향을 나타내었지만 통계적인 유의성은 없었으며 반면에 분(糞)에서는 Zn 혹은 Cu chelate 첨가에 의한 함량의 차이가 뚜렷하였다 ( $P<0.05$ ).

**Table 1.** Effects of dietary metal-amino acid chelate on weight gain, feed intake, feed/gain and mortality in broiler chickens during 5-week period.

Item	Treatments <sup>1</sup>				Sem
	Control	Cu-Met	Zn-Met	Cu-Zn-Met	
Weight gain, g/bird	1645.2 <sup>b</sup>	1696.6 <sup>a</sup>	1709.3 <sup>a</sup>	1740.4 <sup>a</sup>	16.68
Feed intake, g/bird	2693.1	2705.2	2719.6	2740.5	31.21
Feed/gain, (g/g)	1.637 <sup>a</sup>	1.595 <sup>b</sup>	1.591 <sup>b</sup>	1.575 <sup>b</sup>	0.01
Mortality, %	0.40	1.20	0.40	2.00	0.66

<sup>1</sup> Each treated diet was supplemented with Cu or Zn at the level of 100ppm.

<sup>a-b</sup>Means in a row with no common superscript differ significantly ( $P<0.05$ ).

**Table 2.** Results of IgG, gizzard erosion and mineral contents in liver and excretion of broilers fed metal-amino acid chelate diets during 5-week period.

Item	Treatments <sup>1</sup>				Sem	
	Control	Cu-Met	Zn-Met	Cu-Zn-Met		
IgG, mg/ml	12.6 <sup>b</sup>	13.1 <sup>ab</sup>	13.5 <sup>ab</sup>	14.5 <sup>a</sup>	0.58	
Gizzard erosion index	1.1	1.0	1.1	1.3	0.31	
------(ppm)-----						
Liver	Cu	19.0	21.4	18.1	19.2	1.37
	Zn	83.2	83.6	86.5	85.3	1.31
Excretion	Cu	140.2 <sup>b</sup>	467.7 <sup>a</sup>	138.9 <sup>b</sup>	403.8 <sup>a</sup>	20.07
	Zn	591.6 <sup>b</sup>	617.9 <sup>b</sup>	969.3 <sup>a</sup>	914.9 <sup>a</sup>	33.39

<sup>1</sup> Each treated diet was supplemented with Cu or Zn at the level of 100ppm.

<sup>a-b</sup>Means in a row with no common superscript differ significantly ( $P<0.05$ ).

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