Effect of Sel-Plex and Bioplex substitution of inorganic trace mineral sources on performance, feathering, and hock condition of broilers

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A trial was conducted to compare performance, footpad, gait and feathering responses in broilers fed diets in which inorganic trace minerals were replaced by increasing levels of organic sources. There were 8 replicate pens of 75 mixed-sex Hubbard JV broilers for each of 4 treatments: 1) inorganic forms (CuSO4, ZnOxide, $FeSO_4$, MnOxide, NaSelenite) at 15 ppm Cu, 60 ppm Zn, Mn and Fe, and 0.3 ppm Se; 2) organic minerals: 5 ppm Cu and 15 ppm Zn, Mn and Fe in Bioplex (Alltech Inc.) form, and 0.1 ppm Se as Sel-Plex (Alltech Inc.); while treatments 3 and 4 contained the same organic mineral sources as trt 2 and respectively 2 and 3-fold higher levels. Diets were based on corn and soy. Birds were housed on straw litter for the 42 day trial with performance parameters measured at 21 and 42 days. Gait score was measured at day 21 and 42 (70 birds at day 21 and 100 birds per treatment at day 42). Hock burn scores, gait scores (21 and 42 days) and feather scores (42 days) were determined on the same birds. Data were subjected to ANOVA followed by a Duncan's post hoc test. Arcsine transformation of percentage data occurred prior to analysis. Increasing amounts of dietary Bioplex trace minerals tended to improve (NS) body weight at 42 days (2053, 2068, 2092 and 2084 g for trts 1-4, respectively). FCR (1.88-1.90) was unaffected. No effect on gait, footpad or hock scores was observed. Feather scores at 21 days increased with dietary Bioplex levels from 22.9 in trt 1 to 24.5 in trt 4 (not significant). At 42 days there was also a trend toward increased feathering. It can be concluded that inorganic trace mineral levels in broiler feed can be reduced to at least 1/3 of the standard levels when replace with organic forms (Bioplex, Sel-Plex) without compromising performance.

Keywords: Bioplex; broiler; feathering; organic mineral; inorganic mineral

Introduction

The proper use of inorganic minerals in poultry production, and the optimal levels at which they should be added to the feed is quite unclear. In particular, little is known about their bioavailability, as also in the last decennia no substantial research has been conducted to elucidate what the true requirement of minerals for broiler production really is. The objective of this trial was to evaluate the effect of supplementing minerals in organic form (Sel-plex and Bioplex) compared to inorganic minerals on broiler performance and some additional traits.

Material and methods

There were 4 treatments with 8 replicate floor pens of 75 mixed-sex Hubbard JV broilers. Treatment s were: (A) minerals in inorganic forms (CuSO4, ZnOxide, FeSO4, MnOxide, NaSelenite) at 15 ppm Cu, 60 ppm Zn, Mn and Fe, and 0.3 ppm Se, (B) organic minerals: 5 ppm Cu and 15 ppm Zn, Mn and

Fe in Bioplex (Alltech Inc.) form, and 0.1 ppm Se as Sel-Plex (Alltech Inc.), (C)equal to Tr. 2 but with twice the level of minerals, (D) equal to Tr. 2 but with threefold the levels of minerals. Diets were corn/soy based; 2 feeds: Feed 1 from 0-21d and Feed II (22-42 days)

Performance parameters were measured at 21 and 42 days while gait and hock burn scores were measured at day 21 and 42. feather scoring at 21 days was performed by counting of the feather germs on the breast from the peak of the breast bone towards the neck (n= 108 per treatment) and was conducted at 42 days on a 3 score system of the breast feathering (1: poor breast feathering to 3: good breast feathering; n= 68 per treatment). Data were subjected to ANOVA followed by a Duncan's post hoc test. Arcsine transformation of percentage data occurred prior to analysis.

Results and discussion

Increasing amounts of dietary Bioplex trace minerals tended to improve body weight at 42 days (2053, 2068, 2092 and 2084 g for Tr. 1-4, respectively; *Table 1*).

Table 1 Technical performance at 42 days

Treatment	Bodyweight (g)	FCR
A	2053	1.89
B	2068	1.90
C	2092	1.88
D	2084	1.88

FCR (ranging 1.88-1.90) was unaffected by treatments. No clear effects on gait, footpad or hock scores was observed. Feather scores at 21 days increased with dietary Bioplex levels from 22.9 in Tr. 1 to 24.5 in Tr. 4 (not significant). At 42 days there was also a trend toward increased feathering (*Table 2*).

Table 2 Feather scoring at day 21 and day 42

Treatment	21 days Germ count*	42 days Feather score **
A	22.9	1.80
B	22.7	1.87
C	23.7	1.93
D	24.5	1.90

* Counting of the feather germs on the breast from the peak of the breast bone towards the neck
** Score 1 to 3 on breast feather cover; 1: low cover, 2: medium cover and 3: full cover
n=108 at 21 days; n=68 at 42 days

Conclusion

It can be concluded that inorganic trace mineral levels in broiler feed can be reduced to at least 1/3 of the standard levels when replaced with organic forms (Bioplex, Sel-Plex) without compromising performance.