

Bioavailability of Various Zinc Sources in Broilers

Executive Summary

- Relative Biological Values (RBVs) of Zinc from GemStone® were numerically greater than Zn amino acid complex (Table 1).
- For performance data, birds fed **GemStone** Zn had significantly higher ($P < 0.05$) body weights and feed intakes than the zinc oxide and zinc sulfate feeding programs (Table 2).
- **GemStone** Zn-fed birds exhibited significantly improved feed conversion versus all other zinc sources (Table 2).
- Broilers fed **GemStone** Zn had significantly greater ($P < 0.05$) bone and pancreatic zinc levels than other treatments (Table 3).

Materials and Methods

- 1,690 Ross 708, mixed-sex broiler chicks
- 10 birds per cage; 13 cages per treatment
- Fed basal diet (Zn-deficient, semi-purified) plus supplemental zinc sources
- Length of trial: 21 days
- Variables measured:
 - Bird performance (body weight, feed intake, feed conversion)
 - Bone zinc and ash concentrations
- Pancreas and liver zinc concentrations

Treatments

- Standard/Positive Control: 0, 7.5, 15 and 20 ppm Zn as Zinc Sulfate
- Negative Control: 7.5, 15 and 20 ppm Zn as Zinc Oxide
- **GemStone**: 7.5, 15 and 20 ppm Zn from **GemStone** Zn
- Zinc amino acid complex: 7.5, 15 and 20 ppm Zn from zinc amino acid complex

Results

Table 1. Estimated relative bioavailability of zinc sources for broiler chicks fed 0 – 21 days of age.

Relative Biological Values, %				
Variable	Zinc Oxide	Zinc Sulfate	GemStone Zn	Zinc Amino Acid Complex
Body Weight	56.0	100.0	131.5	118.9
Bone Ash (%)	38.8	100.0	135.6	119.5
Feed:Gain	51.1	100.0	128.1	102.0
Liver Zinc	61.7	100.0	132.9	115.4
Pancreas Zinc	47.7	100.0	136.2	116.5
Bone Zinc	46.6	100.0	135.5	119.3
Average	50.3	100.0	133.3	115.3

Table 2. Broiler performance of various zinc sources for chicks fed 0 – 21 days of age.

Performance				
Variable	Zinc Oxide	Zinc Sulfate	GemStone Zn	Zinc Amino Acid Complex
Body Weight (g)	609.0 ^B	613.3 ^B	644.2 ^A	644.4 ^A
Feed Intake (g per bird)	838.2 ^C	854.1 ^B	908.3 ^A	912.8 ^A
Feed:Gain (g/g)	1.376 ^D	1.394 ^C	1.411 ^B	1.417 ^A

^{A, B, C, D} Means within rows with different superscripts differ ($P < 0.05$)

Table 3. Bone ash and tissue mineral concentrations from chicks fed various zinc sources.

Ash and Mineral Data				
Variable	Zinc Oxide	Zinc Sulfate	GemStone Zn	Zinc Amino Acid Complex
Bone Ash, (%)	40.10 ^B	40.60 ^B	41.33 ^A	40.90 ^A
Bone Zinc, (ppm)	422.3 ^C	436.2 ^B	438.2 ^A	433.1 ^B
Pancreas Zn, (ppm)	92.2 ^C	101.1 ^B	104.3 ^A	99.7 ^B
Liver Zn, (ppm)	42.99 ^C	44.49 ^B	45.85 ^A	44.91 ^{AB}

^{A, B, C} Means within rows with different superscripts differ ($P < 0.05$)