

## **Efficacy between chelated vs organic and inorganic trace minerals in broilers**

*Wedekind KJ, Minier M, Chen J, Richter S, and Vazquez-Anon M*

*Novus International, Inc., St Charles, MO*

The primary objective of this trial was to compare efficacy of chelated trace minerals (combination of Zn-Cu-Mn methionine hydroxy analog chelate (MMHAC, MINTREX®, Novus International, Inc; 32-8-32 mg/kg diet; Zn, Cu, Mn, respectively) vs other organic trace minerals (OTM; proteinate, glycinate) at equivalent Zn-Cu-Mn concentrations; 32-8-32, respectively, as well as two inorganic trace mineral treatments (ITM provided as sulfates at 32-8-32 mg/kg and at commercial levels of ITM; 100-125-90 mg/kg Zn, Cu, Mn, respectively) and lastly a deficient control diet w/o added Zn-Cu-Mn. A total of 1800 Ross 308 d-old male broilers were randomly allotted to one of six treatments (12 reps/trt) to floor pens (25 birds/pen). All experimental diets (starter and grower phase) were semi-purified in nature (corn-corn grits-potato protein concentrate-soy isolate basal) and fed for 21 d. The control starter diet was analyzed to contain 11, 11 and 25 mg/kg Zn, Cu, Mn, respectively and all six treatments were iso-methionine. In order to simulate more commercial- type conditions, the following were utilized: 1) used wet litter, 2) high stocking density, and 3) unplanned; high humidity and a spike in temperature during the course of the trial. Multiple pair-wise comparison procedures (LSD) were used to compare treatment means using a one-way ANOVA analyses. With the exception of cumulative feed intake, significant differences between mineral sources were observed for d21 body weight (BW), cumulative feed conversion rate (cFCR), cumulative mortality (cMortality), cumulative performance index (cPerfidx), and for bone Mn and Zn concentrations ( $P<0.05$ ). Collectively, among the OTM sources evaluated, rankings based on cPerfidx were:

MMHAC>Glycinate>Proteinate corresponding to 171.9, 160.4, and 155.0, respectively ( $P<0.05$ ) which were higher than the commercial and low ITM treatments (147.7 and 150.6, respectively). Similar rankings were observed for cFCR and BW ( $P<0.05$ ). Chicks fed the deficient control had the highest cMortality (3.0%) and only MMHAC was significantly lower than control (0.0%;  $P<0.05$ ). Likewise, chicks fed the control diet has the lowest bone Mn and Zn concentrations; all trace mineral sources increased bone Zn ( $P<0.05$ ), but only chicks fed ITM at commercial levels and MMHAC significantly increased bone Mn ( $P<0.05$ ). Under antagonistic conditions, higher addition of minerals may not improve performance. MMHAC performed better than proteinate, glycinate and ITM sources.

**Key words:** MINTREX®, zinc, copper, manganese, broilers