

V Quality

Phibro Animal Health Corporation ensures the quality of our mineral products through utilization of our DQA process. Our Vistore products are monitored for efficacy and safety through detailed, routine analysis which helps ensure our customers receive a high quality, consistent product every time.

Routine Assays Performed Yearly:

- Heavy metal contaminants
- Physical analysis
- Crystalline structure
- Secondary elements
- Dioxins and Furans
- 162-point fingerprint elemental scan

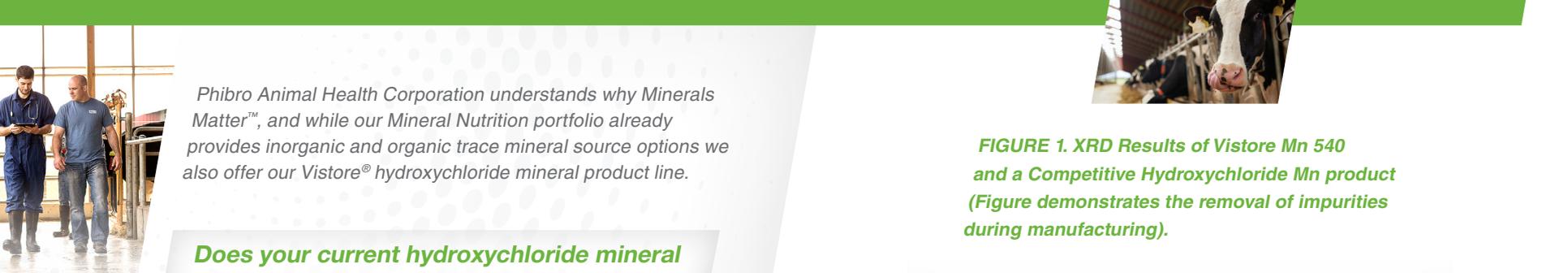


Learn more about the services that may be right for your operation.

Call a Phibro Representative: 800.677.4623

Visit our website: pahc.com





Phibro Animal Health Corporation understands why Minerals Matter™, and while our Mineral Nutrition portfolio already provides inorganic and organic trace mineral source options we also offer our Vistore® hydroxychloride mineral product line.

Does your current hydroxychloride mineral check all the boxes that Vistore does?

Purity

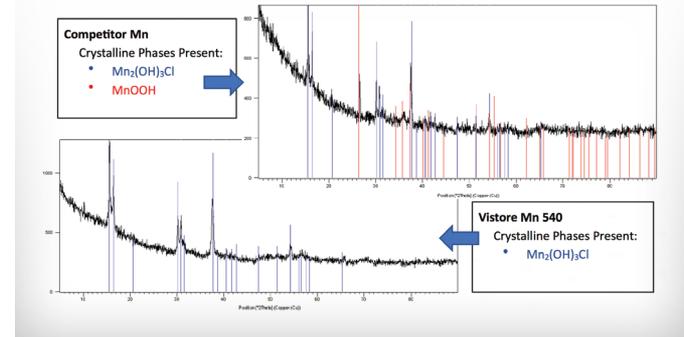
The manufacturing process of hydroxychloride minerals is critical to the removal of impurities. Elemental analysis and X-ray diffraction (XRD) of our chloride minerals are monitored through our Dynamic Quality Assurance® (DQA®) process to ensure purity of our Vistore products. The reduction of secondary elements and heavy metal contaminants during manufacturing allows Phibro to provide highly concentrated hydroxychloride minerals to the market.

TABLE 1: Hydroxychloride and Metal Specifications of Vistore Copper, Manganese and Zinc.

| | Specifications | |
|----------------|----------------|---------------|
| Vistore Cu 580 | 58% min Cu | 17.0-19.0% Cl |
| Vistore Mn 540 | 54% min Mn | 16.0-19.0% Cl |
| Vistore Zn 590 | 59% min Zn | 11.0-14.0% Cl |



FIGURE 1. XRD Results of Vistore Mn 540 and a Competitive Hydroxychloride Mn product (Figure demonstrates the removal of impurities during manufacturing).



Blue lines indicate presence of manganese hydroxychloride. Red lines indicate presence of manganese oxide.

Stability

Understanding how mineral sources react to pH changes in the animal's digestive tract is key to maximizing animal performance. Sulfate ingredients are soluble throughout the digestive track of all species, at both low and high pH. The crystalline structure of Vistore products limits its solubility at neutral pH, helping to reduce antagonist effects. Vistore becomes very soluble as the pH drops (in the abomasum for example), delivering biologically available mineral supplementation where it is needed.

TABLE 2: Solubility Testing of Vistore Cu, Mn and Zn Under Simulated Animal GI Tract Conditions Using a Weak Acid

| | Vistore CU | Vistore Mn | Vistore Zn |
|-----------------------------------|------------|------------|------------|
| Specification Minimum | 58% Cu | 54% Mn | 59% Zn |
| Total Digestion Assay | 58.3% Cu | 56.0% Mn | 61.3% Zn |
| Weak Acid Soluble Assay | 58.1% Cu | 53.3% Mn | 60.6% Zn |
| % of Mineral Soluble in Weak Acid | 99.7% | 95.2% | 98.9% |

Bioavailability

Improved bioavailability of hydroxychloride minerals over inorganic sourced minerals has been reported for Vistore products (Figure 2). Mineral bioavailability refers to a mineral's ability to be absorbed and utilized. Improving bioavailability of trace mineral sources may lead to improved animal performance.

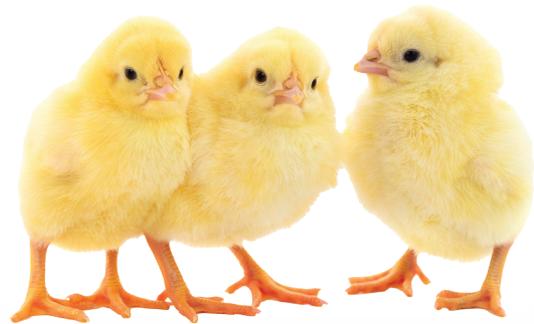
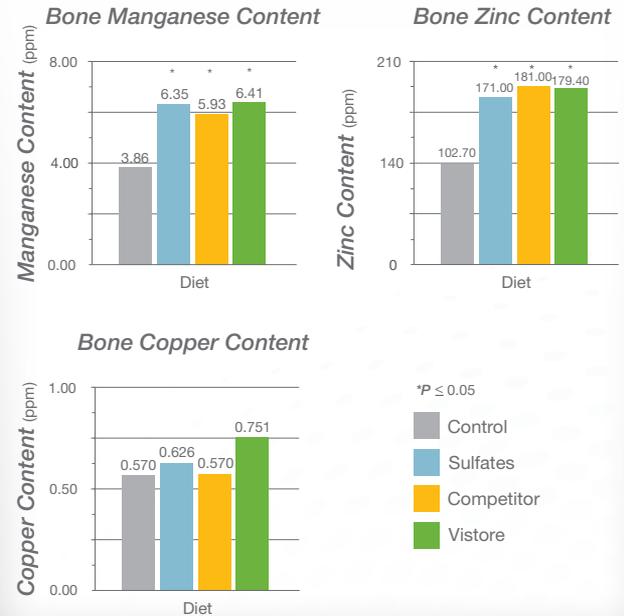


FIGURE 2. Bone Copper, Manganese and Zinc Concentrations of Broiler Chicks Fed Different Trace Mineral Sources



Information from Phibro Technical Services, Effects of Different Zinc Mineral Sources on Nutritional Bioavailability and Performance of Broilers (2020).