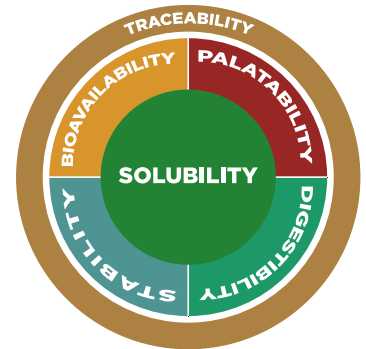


THE ABILITIES OF INTELLIBOND TRACE MINERALS

STABILITY

Trace Minerals and Nutrient/Additive Stability

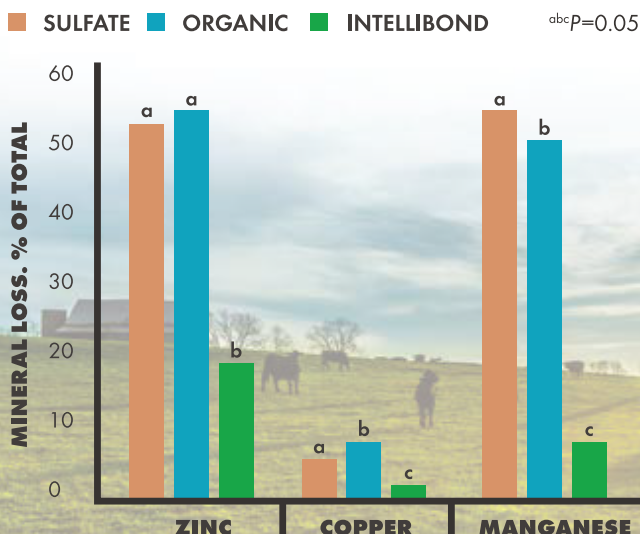
- Weak ionic bonds from copper sulfate and zinc sulfate cause solubility and dissociation of free metal ions when exposed to moisture.
- Soluble minerals can leach out of feed when exposed to precipitation.
- Mineral premixes that contain water soluble sources of trace minerals are more hygroscopic (absorb water).



LEACHING

Simulated rainfall experiments took place over 5 days with a rain event occurring every other day for a total of 3 rain events. Rainfall amounts studied were totals of 2, 4, and 6 inches spread evenly amongst the 3 days of rain. Each rainfall experiment yielded similar results (Wiebusch et al., 2015).

MINERAL RELEASE IN A 4-INCH SIMULATED RAINFALL SPREAD OVER 3 DAYS



CLUMPING

Premixes that contain sulfates and water soluble organic trace minerals tend to have more clumping issues than premixes made with IntelliBond. IntelliBond-formulated premixes have less clumping issues than premixes containing sulfate trace minerals. Samples of premixes containing either sulfates and organic trace minerals (control) or IntelliBond were placed into a humid chamber for 24 hours, then removed and weighed to determine moisture accumulation. Premixes that contained sulfates and organic trace minerals absorbed more water from the environment than the IntelliBond premix (Micronutrients trial #2018BF128USCZM)

CONTROL

CuSO₄
Organic Zn/ZnSO₄
MnSO₄

➔ **6.71% increase in weight from moisture**

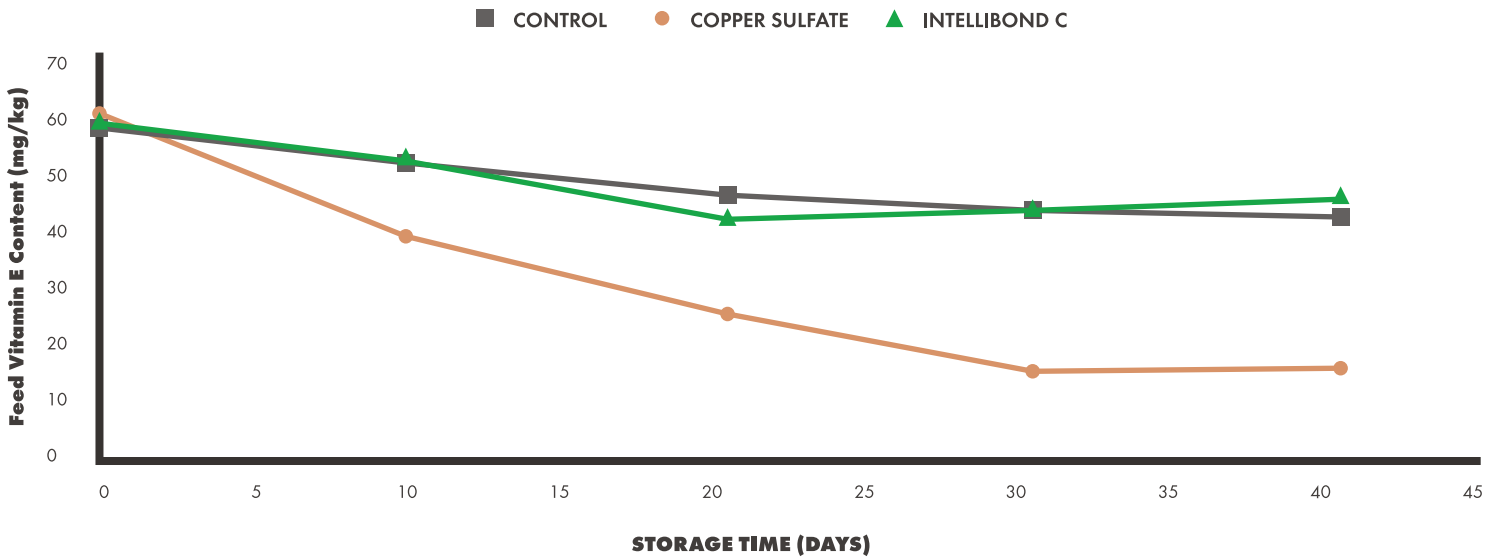
INTELLIBOND

IntelliBond C
IntelliBond Z
IntelliBond M

➔ **1.44% increase in weight from moisture**

FREE COPPER IONS ACCELERATE NUTRIENT OXIDATION

Free copper ions from CuSO_4 are pro-oxidant and accelerate oxidation of lipids (Miles et al., 1998), vitamins (Lu et al., 2010; Luo et al., 2005), and enzymes (Liu et al., 2005; Pang and Applegate, 2006).



ANTIMICROBIAL FREE METAL IONS AND PROBIOTICS

Free copper and zinc ions are antimicrobial. An experiment showed that source of copper can affect the viability of probiotics (Klasing, unpublished data).

