MINERALS MATTER™

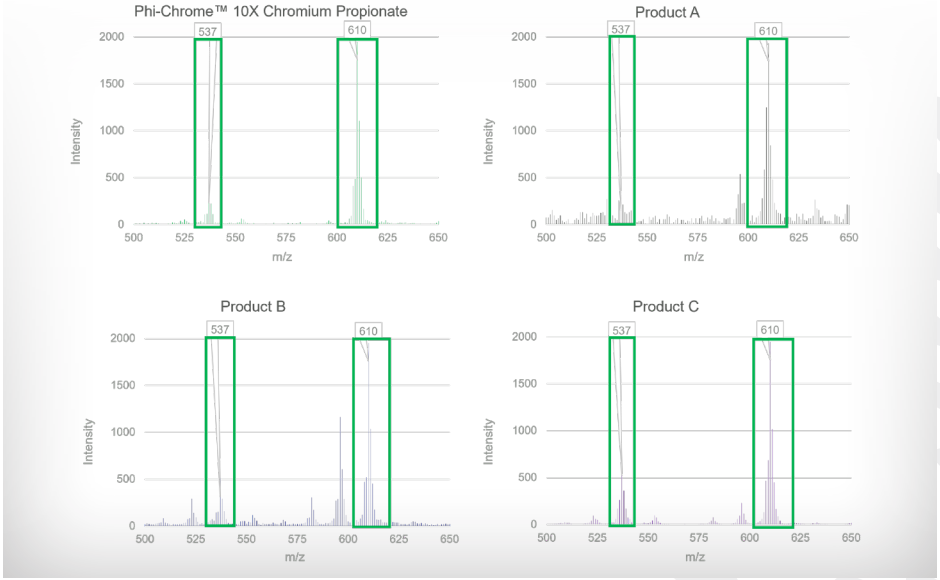
PHI-CHROME®

Understanding the Effects of Chromium Source and Quality in Sow Applications

At Phibro, quality matters at every stage of manufacturing and production. Phi-Chrome® chromium propionate and chromium tripicolinate 0.4% and 0.04% products are all produced in the United States. In combination with decades of manufacturing expertise and our Dynamic Quality Assurance® (DQA®) process, Phibro ensures a high quality, consistent product is delivered to our customers every time.

Time-of-Flight Secondary Ion Mass Spectrometry (TOF-SIMS) data is the primary analysis performed on organic chromium products to identify the target compound using its unique mass. Chromium propionate was confirmed in all samples tested using TOF-SIMS analytical methods.

Figure 3. TOF-SIMS of Different Chromium Propionate Sources for Identification of Compounds and their Components by Mass



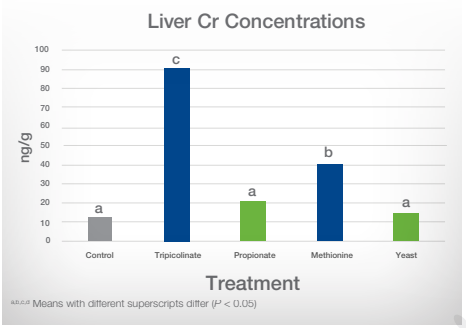
Eurofins EAG, 2020

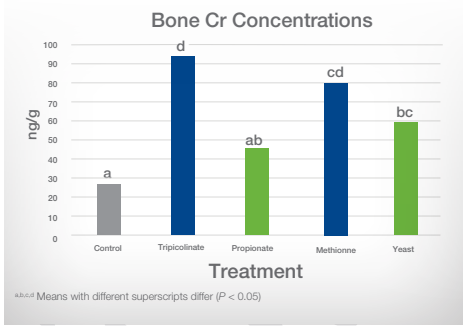
Peaks outside the chromium propionate peaks (identified by green boxes) indicate the presence of other compounds. A reduced number of peaks outside the chromium propionate mass were reported in the Phi-Chrome chromium propionate sample. The reduced peaks in Phi-Chrome indicate increased stability and purity of Phibro's chromium propionate product versus the competitive products available in the market.

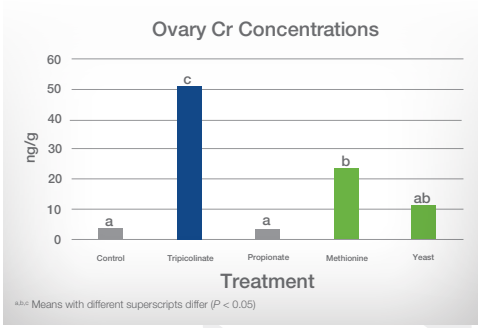
Research demonstrates the impact chromium (Cr) may have on metabolic responses. When an organic, bioavailable source of Cr is fed, it may help improve insulin sensitivity and promote glucose uptake. Increased sensitivity to insulin may increase the clearance rate of glucose from the blood, allowing more efficient utilization of energy by the various tissues. Glucose uptake is essential in maintaining normal metabolism of carbohydrates, proteins and lipids (Anderson, 2003).

Different organic Cr sources have been reported to respond differently, depending on species (Linderman et al. 2008). Although chromium propionate is also approved for use in swine, we see the figure below demonstrates increased absorption in the tissue of sows when fed Cr tripicolinate versus other organic Cr sources (Figure 1).

Figure 1. Chromium Concentrations in the Liver, Ovary, and Bone of Sows Fed Different Sources of Organic Cr





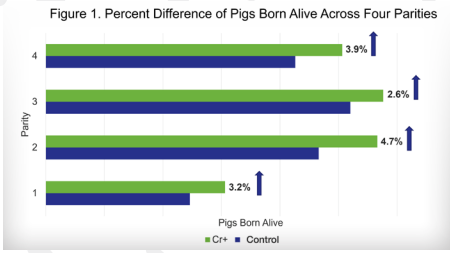


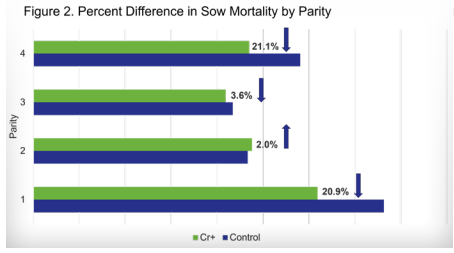
Described as a response mineral versus a required mineral by the National Research Council (NRC), Cr has demonstrated improved performance in sows fed diets supplemented with organic Cr. Managing stress responses associated with sow production is critical to maintaining peak performance. As various stress events deplete the body's store of Cr (Anderson, 1994), it becomes important to supplement the diet with organic Cr to replenish these depletions, adding an additional layer of support for the sow.

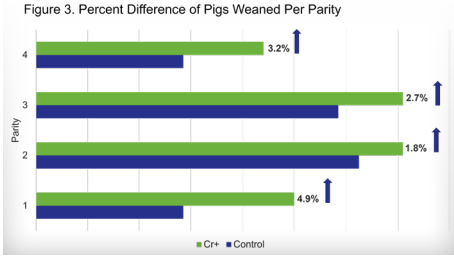
The impact of supplementing organic Cr in sow diets has been extensively researched due to the negative impacts glucose control problems may have during this stage of production. For example, research demonstrated lowered ability of sows to control blood glucose levels during pregnancy, which resulted in higher mortality rates of newborn pigs (Kemp et al., 1996).

When sows were supplemented with Cr tripicolinate, the number of pigs born alive and weaned per litter significantly increased ($P = 0.02$), along with a reduction in sow mortality rates ($P = 0.11$; Hagen et al., 2000; Figure 2). These results demonstrate the positive impact Cr supplementation may have on improving the sow production phase.

Figure 2. Percent Difference in Sows Supplemented with Cr Tripicolinate Versus No Cr Supplementation







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