DESIGNED FOR OPTIMAL SOW PERFORMANCE
**THE FIRST OF ITS KIND.**

**THE FIRST IN ITS CLASS.**

Benefits for sows: Fewer non-productive sow days, greater feed intake, improved body condition and increased wean weights.14

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**INSULIN: KEY TO MAXIMIZING SOW PRODUCTION**

Insulin plays a key role in optimum cell function, unlocking the door to the cell, so blood glucose can enter and be used for energy. Chromium improves insulin function by increasing insulin receptor activation, leading to efficient clearance of glucose from the bloodstream.15 By increasing the availability of glucose, the sow has more energy for body condition, maintenance, milk production and reproduction.

**INCREASED FEED INTAKE**

A significant driver in sow production is feed intake during lactation, which can impact several performance metrics such as litter wean weights, non-productive sow days and sow longevity.15 Maintaining enough feed intake to support maintenance in addition to milk production can be a challenge. A reduction in feed intake creates loss in body mass that can be difficult to recover for the next reproductive cycle. In addition, sows can become insulin-resistant during gestation and lactation, which reduces the amount of glucose cleared from the blood, inhibiting sows from reaching their full genetic potential.16

**DECREASED NON-PRODUCTIVE SOW DAYS**

Non-productive sow days were reduced by five days when sows were fed chromium propionate.16 In addition to improving non-productive sow days, average herd parity was increased from 2.7 to 2.9 per year as more animals remained in the herd after parturition.19

**INCREASED PIGS BORN AND WEAN WEIGHTS**

Other studies evaluating chromium supplementation to sow found increases in total pigs born per sow and number of pigs weaned per sow. Sows fed chromium propionate on average had 0.6 more pigs born per sow and weaned 0.3 more pigs per sow.16 Additionally, sows were able to wean pigs 0.7 pounds heavier, setting them up to be higher performers over their lifecycle.16

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**REFERENCES**


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**RESPONSE BASED ON HIERARCHICAL NEEDS**

Chromium mobilizes more blood glucose into tissues, allowing for improved performance based on the animal’s hierarchy of needs. As the primary source of energy for cells, glucose is critical to an animal’s performance and is used in several key metabolic functions.

Key uses of cellular energy for a sow include maintenance, reproduction and muscle or fat deposition. Depending on a sow’s needs, chromium supplementation can result in fewer non-productive sow days, greater feed intake during lactation and improved body condition, ultimately resulting in heavier weaned pigs.14

**IMPROVED BODY CONDITION**

Studies feeding 200 ppb of chromium propionate to sows during gestation and lactation resulted in sows with decreased back fat loss compared to sows fed a control diet without chromium propionate.15 The reduction in back fat loss indicates the sows did not have to rely as heavily on fat stores to provide their required amount of energy during lactation. Improvements in body condition also led to a reduction in non-productive sow days.

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**FEATURES AND BENEFITS:**

- KemTRACE® Chromium—OR is an OMRI Listed, organic-compliant form of chromium propionate, and is also available in the U.S. for use in organic diets.
- KemTRACE Chromium and KemTRACE Chromium-OR are manufactured in the U.S., sourced from U.S.-based raw materials and are available in two product concentrations:
  - 0.04% (for use in complete diets)
  - 0.4% (for use in a premix)
- The first organic trace mineral approved in the U.S. for broiler diets in more than 40 years.
- Designed for optimal absorption to the U.S. for broiler diets in more than 40 years.
- KemTRACE Chromium and KemTRACE Chromium-OR are manufactured in the U.S., sourced from U.S.-based raw materials and are available in two product concentrations:
  - 0.04% (for use in complete diets)
  - 0.4% (for use in a premix)
- The first organic trace mineral approved in the U.S. for broiler diets in more than 40 years.
- Highly bioavailable, organic source of chromium.
- Designed for optimal absorption to maximize performance.
- Capable of improving performance, based on an animal’s hierarchy of needs.
- Able to reduce cortisol and mobilize more blood glucose into tissue.
**WHY BIOAVAILABILITY MATTERS**

The chemical form of a nutrient impacts the degree to which it can be absorbed and used to support important metabolic processes in an animal. In order for an animal to absorb minerals — such as chromium — the mineral must either solubilize or dissociate in the digestive system of the animal. KemTRACE Chromium is a highly bioavailable, organic source of chromium propionate.

**SOWS AND STRESS**

Stress has a tremendous impact on sow performance. Many factors such as health, environment, management practices, stocking density and nutrition contribute to the overall stress load that a sow faces daily. When a sow is experiencing stress conditions, cortisol (a stress hormone) is released, resulting in behavioral, metabolic, immunological and intestinal changes.

Studies have shown that cortisol can have a negative impact on sow performance. Chromium has been shown to reduce the levels of cortisol, thereby reducing the negative impacts of stress.

**FEEDING INSTRUCTIONS:**

KemTRACE Chromium fed at 200 ppb has been shown to increase glucose clearance by 45% over the control pigs, thus allowing more energy to reach target tissues to maintain and improve performance.

**KemTRACE® CHROMIUM**

**ACTIVATES INSULIN RECEPTORS**

**MORE GLUCOSE ENTERS CELLS**

**MORE ENERGY AVAILABLE**

**IMPROVED SOW PERFORMANCE**

**KemTRACE Chromium, chromium (Cr) propionate, has been shown to be three times more soluble than other sources of chromium, such as chromium picolinate. In addition, chromium propionate has a Pka (the unit of dissociation equilibrium) of 4.8 compared to chromium picolinate at 1.5, resulting in a higher dissociation and availability of chromium for absorption within the intestines.**

**Studies in mice have shown chromium propionate has an absorption value of 51-78% compared to only 0.4-2% for chromium picolinate.** This indicates chromium propionate is a higher value product. Higher absorption ensures more of the nutrient is available in a form the animal can use for optimal benefits.

Blood glucose clearance provides further evidence that chromium propionate delivers a higher value than chromium picolinate. In an insulin challenge study, pigs were given 0.1 IU porcine insulin/kg of body weight to determine the bioavailability and resulting insulin sensitivity (Figure 1). Pigs fed chromium propionate showed a 45% increase of glucose clearance compared to the control and an 18% increase compared to chromium picolinate — providing more glucose for the pig to use.

**CHROMIUM PROPOionate VS. CHROMIUM PICOLINATE**

**Pka: pH at which 50% of the compound is dissociated and 50% is still associated**

<table>
<thead>
<tr>
<th>Chromium Source</th>
<th>Pka KemTRACE® Chromium</th>
<th>Pka Cr Tripiolate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>2.14</td>
<td>2.05</td>
</tr>
<tr>
<td>Chromium Picolinate (200 ppb Cr)</td>
<td>2.29</td>
<td>2.71</td>
</tr>
<tr>
<td>Chromium Propionate (200 ppb Cr)</td>
<td>2.17</td>
<td>2.29</td>
</tr>
</tbody>
</table>

**Figure 1: Effect of dietary chromium source on glucose kinetics during an intravenous insulin challenge test (IVICT) in growing barrows (0.1 IU porcine insulin/kg BW)**

**References:**

Insulin stimulates glucose uptake by cells. Readily available chromium propionate from KemTRACE® Chromium optimizes the activation of the insulin receptor. The cell increases glucose uptake. The additional glucose allows for more energy to be available for proper cell function, which can boost sow immunity, maintenance and reproductive performance.

1. Insulin stimulates glucose uptake by cells.
2. Readily available chromium propionate from KemTRACE® Chromium optimizes the activation of the insulin receptor.
3. The cell increases glucose uptake.
4. The additional glucose allows for more energy to be available for proper cell function, which can boost sow immunity, maintenance and reproductive performance.
Only Kemin has invested more than 20 years and millions of dollars toward scientific research, validating the benefits of chromium propionate while bringing this essential trace mineral to millions of animals around the globe. Kemin has conducted more than 50 peer-reviewed chromium research trials in order to add further assurances regarding product safety, efficacy and traceability. Our rigorous regulatory approach demonstrates our commitment to safety and science.

COMMITMENT TO QUALITY
KemTRACE Chromium is manufactured from materials sourced entirely from the United States, under strict quality control specifications that meet the food additive standards published in 21 CFR 573.304. Kemin also maintains a Food Safety System Certification (FSSC) 22000 — recognized under the Global Food Safety Initiative — for its manufacturing facility in Des Moines, Iowa.

CONFIDENCE STARTS IN THE LABORATORY
The quality and safety of our products are paramount at Kemin, and processes are in place for testing not only our final products, but also our raw materials. With our quality control program, customers can have confidence we understand our technology, how our molecules work and that the ingredients are safe and efficacious.

TECHNICAL EXPERTISE AT EVERY TURN
At Kemin, we are devoted to ensuring customers receive trusted nutritional advice when evaluating animal performance. KemTRACE Chromium is supported by our technical service team comprised of respected Ph.D. nutrition and animal health experts with an array of valuable experience in research and production.

KemTRACE Chromium is the only FDA-reviewed source of chromium propionate on the market today.

Learn more about how KemTRACE Chromium can optimize sow performance at kemin.com/chromium.

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