

## The Effect of Insulin Sensitivity on Efficient Reproduction

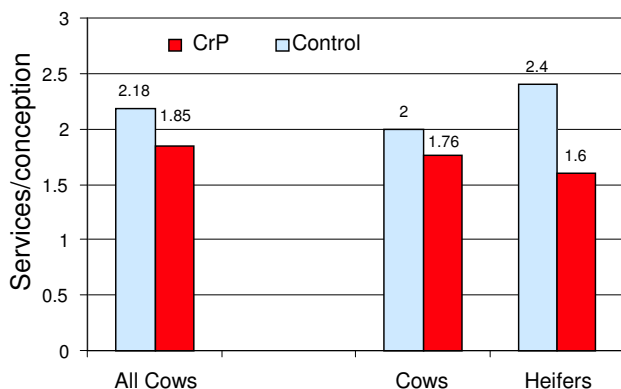
Around parturition, tissue sensitivity to insulin decreases in response to the repartitioning of glucose supply by the cow, ultimately causing a mobilization of body reserves (non-esterified fatty acids) to compensate for lost energy. The mobilization of body reserves increases leptin, a hormone responsible for controlling feed intake, causing a consistent suppression of feed intake and insulin insensitivity.<sup>1</sup> Suppressed feed intake and insulin resistance contribute to a large reduction in available energy, the most important nutritional parameter affecting reproduction.

**Chromium Propionate** is a highly bioavailable chromium source, shown to improve insulin sensitivity and promote glucose uptake. Greater sensitivity of tissues to insulin likely increases clearance of glucose from the blood sooner, partitioning more energy to body reserves and decreasing the interval between meals.<sup>1</sup> Improved sensitivity drives reinstatement of positive energy balance, which is critical for efficient reproduction.

### What is the value of improving reproductive efficiency?

- Cows that lose less weight during early lactation traditionally have a **higher conception rate** and need **less services per conception** compared to those losing greater amounts of weight or in poor body condition.<sup>2</sup>

**Value:** \$1 for each 0.1 services/conception >1.5 (using 1.5 services/conception as a standard).<sup>3</sup>



**Figure 1.** Services per conception of cows bred fed chromium from KemTRACE® Chromium Propionate.<sup>4</sup>

**Example:** In Figure 1, services/conception for all cows improved from 2.18 to 1.85 when supplemented with chromium propionate, an improvement of 0.33 services/conception.<sup>4</sup> Using the value calculation above, a standard of \$1 for each 0.1 services/conception greater than 1.5 equates to a cost savings of \$3.30/cow in this study.<sup>3</sup>

- Cows that limit the loss of fat stores during early lactation may have shorter **intervals to first ovulation and first estrus** (heat period), **higher first service conception rates** and **less days open**.<sup>2</sup>

**Value:** 1) Cost of calving interval > 365 days = \$1/day<sup>(3)</sup>

2) Cost of calving interval > 395 days = \$30 + \$3/day<sup>(3)</sup>

- Improvements in a cow's energy balance will likely initiate **ovaries to start cycling**.<sup>2</sup>
- Energy balance may also influence development of ova (eggs).<sup>2</sup>



## References

1. Allen, M.S. and B.J. Bradford. Nutritional Control of Feed Intake in Dairy Cattle. 2009.
2. Grummer, R. R. Energy Status and Reproductive Function in Dairy Cattle.
3. Dairy Cattle Reproduction Council, 2009. "Putting a Price on Reproductive Losses."
4. Lavin-Garza, B., A. Garza. 2007 J. Animal Sci. 85:Supp 1, Abs. T370.