

Chromium Supplementation in Dairy Cattle Diets

Usually, dairy cows need more nutrients than are available in typical forages and roughage. Farmers want their cows to be as healthy as possible and thus perform on an optimal level. With all of the different supplements available, it can be hard to figure out which ones are best for specific needs and when they should be applied.

Many diverse and important cellular activities are constantly happening inside the cow and are important for her everyday production. Supplementing chromium, one of nine trace elements that cows need, is a great way to positively affect metabolism and production by improving glucose utilization. There is only one chromium supplement approved by the FDA (chromium propionate) for use in dairy cattle diets. Studies recommend supplementing cows about 3 weeks pre-partum until about 3 weeks post-partum, but exact time periods vary. The

addition of chromium can enhance milk production, fertility, immunity and the producer's bottom line.

Chromium, Insulin Link

Insulin is a hormone made by the pancreas that helps the cow turn blood glucose (sugar) into instant energy or store it. Post-calving and early lactation cows have lower blood glucose levels and thus decreased insulin levels.

Jerry Spears, professor emeritus of Animal Science at [North Carolina State University](#), explains that, "Chromium functions by making the animal more responsive to insulin. Cows become resistant to insulin in late gestation and this continues into early lactation.

Chromium can reverse some of the insulin resistance resulting in increased feed intake and milk production in early lactation."

Chromium helps increase the availability of glucose within the animal

so it has more energy for maintenance, reproduction, growth, performance and immunity. Since insulin resistance decreases in sensitivity during late pregnancy and early lactation, more glucose is available to the udder, improving milk yield and quality.

Chromium Effects on Fertility

Besides milk production, chromium supplementation can have beneficial effects on fertility. There are many different influences that contribute to fertility, including management, cow, bull/inseminator and environmental factors. Adding chromium to a farm's TMR has shown significant reduction of subclinical endometritis incidences.

Jim Ferguson, professor of clinical nutrition at the [University of Pennsylvania School of Veterinary Medicine](#), shows how chromium works to not only increase milk production, but also fertility. "Chromium binds to the

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glucose-4 insulin receptor increasing sensitivity to insulin and increasing glucose entry into cells. This effect is likely to have beneficial effects on reproductive tissues, as insulin is important in regulation of the reproductive axis."

Ferguson also explains that the more negative energy a cow has, the more difficult it will be to get her pregnant and have a healthy reproductive axis. Reduction of insulin, reduced follicular



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development, delayed ovulation and reduced output of productive hormones can all contribute. Since fertility is dependent on energy balance, it is important for the cow to have optimal feed intake. Spears adds that, "Chromium can improve reproduction by increasing feed intake, which results in greater energy balance in cows due to increased energy intake." Ferguson also pointed out that with increased intake, there is

also the reduction of serum non-esterified fatty acids (NEFA), which could suggest less body fat mobilization and improved energy status, which would improve reproduction.

Studies have also shown that supplementing chromium can have immune benefits by increasing antibody and blastogenic responses, as well as reducing the rate of retained placentas.

Of course, chromium supplementation can't compensate for poor management practices. Each farm will want to evaluate their milk production and reproduction strategies before considering chromium supplements. Chromium supplements do have an overall high return/cow/year with good management. Returns can be as much as 5-7:1, which is extremely high and can increase a farmer's bottom line.

