

Health and production related benefits of chromium supplementation in the ration of dairy animals

Opinion

Chromium is a trace element that is essential for human and animals because it is a component of glucose tolerance factor. Glucose tolerance factor is made up of trivalent chromium, nicotinic acid, glutamic acid, glycine and cysteine¹ and it enhances the action of insulin and uptake of glucose by organs and muscles. Chromium is also enzyme activator involved in the production of energy from carbohydrates, fats and protein. Cows and buffaloes in the periparturient period are in a state of negative energy balance. The body stores of fat are utilized to meet this energy deficiency. This breakdown of fat (lipolysis) predisposes high producing dairy animals to a variety of health problems (e.g. ketosis, fatty liver syndrome, and abomasal displacement). Different kinds of supplements and feed additives are added in the ration of cows and buffaloes in the periparturient period to maintain proper energy level required for optimum production and reproduction. Chromium is known to decrease the rate of lipolysis as indicated by decreased blood levels of non-esterified fatty acids.

Clinically important actions of chromium supplementation include improvement in insulin binding, increase in the number of insulin receptors on the cell surface, increase in insulin sensitivity and improvement in cell mediated immunity^{1,2}. In addition, it also reduces the effect of heat stress in lactating cows^{2,3}. Reported that feeding of 1 and 1.5 mg of chromium chloride ($\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$) per kg of dry matter from day 60 prepartum to day 150 postpartum to dairy buffaloes fed a total mixed ration (40% concentrate, 40% maize fodder and 20% wheat straw; TMR) led to improvement in body condition, blood glucose levels, milk yield, nutrient utilization and reproductive performance. Milk yield, 6% fat-corrected milk, energy-corrected milk, solids-corrected milk, milk fat and total solids were significantly higher ($P < 0.05$) in chromium fed buffaloes than in control. KemTRACE™ Chromium (Chromium Propionate; Kemin Industries Inc., USA) can be added to the ration of dairy animals to drive the above described benefits of chromium. Some of the large progressive dairy farmers in Pakistan have adopted the practice of chromium supplementation.

Volume 1 Issue 6 - 2017

Ghulam Muhammad,¹ Imaad Rashid,¹ Sehrish Firyal,² Tean Zaheer,¹¹Department of Clinical Medicine and Surgery, University of Agriculture, Pakistan²Institute of Biochemistry and Biotechnology, University of Veterinary and Animal Sciences, Pakistan**Correspondence:** Tean Zaheer, Department of Clinical Medicine and Surgery, University of Agriculture, Faisalabad, Pakistan, Email teanzaheer942@gmail.com**Received:** December 22, 2017 | **Published:** December 28, 2017

Acknowledgements

None.

Conflict of interest

Authors declare that there is no conflict of interest.

References

1. Kegley EB, Spears JW, Brown TT. Immune response and disease resistance of calves fed chromium nicotinic acid complex or chromium chloride. *J Dairy Sci.* 1996;79(7):1278–1283.
2. Deka RS, Mani V, Kumar M, et al. Effect of additional chromium supplementation on health status, metabolic responses, and performance traits in periparturient Murrah buffaloes (*Bubalus bubalis*). *Biol. Trac Element Res.* 2015;163(1):132–143.
3. An Qiang L, Zhi Sheng W, An Guo Z. Effect of chromium picolinate supplementation on early lactation performance, rectal temperature, respiration rates and plasma biochemical response of Holstein cows under heat stress. *Pak J Nutr.* 2009;8(7):940–945.