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In-depth mineral review provides foundational resource for dairy scientists

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Life is dependent on minerals. Accordingly, the diets of animals must contain certain minerals in both large amounts, via marcrominerals, and small amounts, via microminerals. In a thorough and wide-ranging review published in the *Journal of Dairy Science*, Jesse Goff, DVM, PhD, professor and Anderson Chair in Veterinary Medicine at Iowa State University, examined necessary minerals as well as the mechanisms for their absorption in cows, providing insight into these vital elements.

"By understanding the mechanisms involved in movement of minerals from the diet into the blood of the animal, I hope the reader might gain some insight into factors that impair or enhance mineral utilization by animals," Dr. Goff said. "With that knowledge, a nutritionist may have a better idea of when the diet needs more or less minerals, and whether the form of the mineral used in the diet needs to be altered to better meet the needs of the cow."

In the review, Dr. Goff summarizes each of the seven macrominerals, calcium, phosphorus, sodium and chloride, potassium, magnesium, and sulfur, as well as several important microminerals, including cobalt, copper, iodine, iron, manganese, molybdenum, selenium, zinc, and chromium, that together contribute to a complete dietary nutrient profile for the cow. Two mechanisms of mineral absorption, paracellular absorption and transcellular absorption, are also discussed in great detail. Importantly, Dr. Goff also reviews factors such as the complex interactions that can interfere with mineral uptake and compromise the effectiveness of a diet in promoting health and productivity of cows.

Others in the field have already hailed Dr. Goff's work as a foundational piece of scholarship. For instance, David Beede, PhD, professor emeritus in the Department of Animal Science at Michigan State University, described the review as a unique piece of research with no equivalent as up to date.

"This invited review is a go-to reference for mineral nutrition and dietary factors affecting fundamental physiology and mineral status of the animals serving mankind. The nine pictorial models illustrating gut transport mechanisms of different mineral ions are especially helpful to the fundamental understanding of mineral nutrition," Dr. Beede said.

More information: Jesse P. Goff, Invited review: Mineral absorption mechanisms, mineral interactions that affect acid–base and antioxidant status, and diet considerations to improve mineral status, *Journal of Dairy Science* (2018). DOI: 10.3168/jds.2017-13112

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