

Trace minerals in the dry period associated to postpartum metabolic and reproductive disorders in Dairy Cattle.

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The objective was to examine the relationship between plasma trace mineral concentrations during the dry period and the incidence of postpartum 1) metabolic disorders (MD) [i.e. milk fever (MF), ketosis, displaced abomasum (DA), fatty liver, and 2) reproductive disorders (RD) [i.e. retained fetal membranes (RFM), metritis, anestrus, ovarian cysts, and endometritis] in dairy cattle. Holstein cows (n=227) from 11 Alberta dairy herds were involved in the study. Blood was sampled once between 6 and 14 days before calving to determine the plasma concentrations of manganese (Mn), iron (Fe), cobalt (Co), copper (Cu), zinc (Zn), selenium (Se), molybdenum (Mo). Data from farm and veterinarian records, and metabolic profiles (blood sampled collected 2 to 14 days after calving) were analyzed to determine the incidence of MD and RD. Plasma concentrations of Co, Cu, Se and Mo differed ($P<0.01$) among farms. Based on reference intervals for each mineral, 20 and 48% of cows had high and low plasma concentrations of Cu and Se, respectively. Within-herds, the percentage of cows with low Se ranged from 0 to 100% and the percentage of cows with high Cu ranged from 0 to 38%. A large within-cows variability was observed for plasma concentrations of Mo, with 11 and 58% of cows classified as high and low, respectively. Cows with RFM had greater ($P<0.05$) plasma concentrations of Mo (19.8 vs. 15.9 ng/mL) and lower concentrations of Fe (2.1 vs. 2.5 ug/mL). Ketotic cows had lower ($P<0.05$) plasma concentrations of Mn (1.5 vs. 1.8 ng/mL), Cu (0.8 vs. 0.9 ug/mL) and Se (0.07 vs. 0.08 ug/mL) but greater concentrations of Mo (19.0 vs. 16.5 ng/mL) compared to healthy cows. The incidence of MF was also associated ($P<0.05$) with reduced plasma concentrations of Se and increased plasma concentrations of Mo. Cows diagnosed in anestrus (at approximately 5 weeks after calving) had lower ($P<0.05$) plasma concentrations of Mn (1.6 vs. 1.9 ng/mL) and Co (1.1 vs. 1.3 ug/mL).

Take Home Message: Plasma concentrations of trace minerals in dry cows were highly variable among farms. Half of cows were deficient in Se and this deficiency was associated to ketosis and milk fever. Little is known about Mo, but its association with PD warrants more investigation. The excess of Cu also needs to be considered because its liver toxicity.

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