

OASES - Abstract: preview

Abstract # 40321

Does Zn hydroxychloride supplementation improve intestinal integrity in dairy cows?

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The objective of this study was to answer the question “Does the substitution of Zn sulfate by Zn hydroxychloride affect positively gut permeability, metabolism, and inflammation during feed restriction? Holstein cows (n=24; 159±8d in milk; parity 3±0.2) were enrolled in a 2×2 factorial design and randomly assigned to 1 of 4 treatments: (1) ad libitum fed (AL) and CON (ALCON; 75 mg/kg Zn from Zn sulfate; n=6); (2) ad libitum fed and HYD (ALHYD; 75 mg/kg Zn from Zn hydroxychloride; n=6); (3) 40% of ad libitum feed intake and CON (FRCON; n=6); or (4) 40% of ad libitum feed intake and HYD (FRHYD; n=6). Trial consisted of 2 experimental periods (P) during which cows continued to receive their respective dietary treatments. P1 (5 d) served as the baseline for P2 (5d), during which cows were fed AL or FR of P1 feed intake. In vivo total-tract permeability was evaluated on d4 of P1 and on d2 and 5 of P2, using Cr-EDTA as marker. All cows were euthanized at the end of P2 to assess intestinal architecture. FR cows lost body weight (46 kg), entered into calculated negative energy balance (-13.86 Mcal/d), and had decreased MY. Circulating glu, ins, and gluc decreased, and NEFA and BHBA increased in FR relative to AL cows. Relative to AL cows, FR increased LPS-binding protein, SAA, and Hp concentrations (2-, 4-, and 17-fold); and peak SAA and Hp concentrations were observed on d5. Circulating SAA and Hp from FRHYD tended to be decreased (47 and 61%) on d5 relative to FRCON. Relative to FRCON, ileum villus height tended to increase in FRHYD cows. Feed restriction tended to decrease jejunum and ileum mucosal surface area, but the decrease in the ileum was ameliorated by dietary HYD. In summary, FR induced gut hyperpermeability to Cr-EDTA, and feeding HYD appeared to benefit some key metrics of barrier integrity.

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