Assessment of hindgut microbial functional shift related to nutritional diarrhea in postpartum dairy cows

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Nutritional diarrhea is an easily neglected health issue in postpartum dairy cows (PDC) and as a result, some cows can develop enteritis. Our study aimed to identify the physiological and metabolic changes when PDC developed nutritional diarrhea and to assess whether it affects their milking production performance. Twenty-four cows were selected from 200 PDC and separated into two groups based on the difference in their fecal scores: low fecal score (LFS) group (1.33 ± 0.42, mean ± SD, n = 12) and high fecal score (HFS) group (3.00 ± 0.29, n = 12), and ruled out of the bovine viral diarrhea and paratuberculosis. All these cows had similar body weights, parity, and days in milk. The fecal dry matter content in LFS (9.32 % ± 1.22) was lower ($P < 0.01$) than that in HFS group (13.55 % ± 0.70). Milk yield during the postpartum period was significantly higher ($P < 0.05$) in LFS than that in HFS cows, which was affected by the interaction between cow's diarrhea and days in milk. Milk β-hydroxybutyric acid (BHBA) and acetone concentrations as well as ruminal propionate concentration were higher ($P < 0.05$) in LFS cows than those in HFS. The apparent digestibility of crude protein in LFS cows trended to be lower ($P < 0.10$) than that in HFS cows. In addition, LFS cows had higher ($P < 0.05$) fecal ammonia nitrate concentration, isobutyrate, and isovalerate molar proportions and lower ($P < 0.05$) acetate and total volatile fatty acid concentrations than HFS cows.
Take home message: Our results suggest that the dysbiosis in hindgut microbiota may contribute to diarrhea in PDC, resulting in altered protein digestibility and milk BHBA and acetone concentrations, which warrant future research. Take home message: Although the cow's performance may not be affected by nutritional diarrhea, the observed altered microbial fermentation parameters suggest the changes in the gut microbiota, which may have long-term consequences for the cow's performance and health.

Effect of iodine source on dairy cow colostrum production and growth and health of their calves

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There is limited research on how high iodine (**I**) concentrations in seaweed meal affects prepartum cow colostrum production and development of their calves. The objectives of this study were: (1) evaluate the effects of incremental amounts of *Ascophyllum nodosum* (**ASCO**) meal supplementation to prepartum cows on colostrum production and the growth and blood metabolites of their calves, and (2) compare ASCO meal versus an inorganic I source (ethylenediamine dihydroiodide) on the same variables under objective 1. Forty Holstein cows were blocked by lactation number and calving date and assigned to 1 of 4 treatments 28 d prior to parturition: 0 g/d ASCO meal (**CON**), 57 g/d of ASCO meal (**LO**), 113 g/d ASCO meal (**HI**), and EDDI (124.8 mg/d) matching the amount of I in HI (**EDDI**). Colostrum was harvested within 1 h of calving. Forty-one calves were blocked based on their dams' treatments. Calves were fed 300 g IgG via colostrum replacer. At 24 h, calves were offered 676 g/d dry matter of milk replacer (**MR**) until 49 d, where they were offered 338 g of MR. Free choice textured starter and water were offered ad libitum starting from 24 h of age. Colostral fat concentration was greater in HI than EDDI cows, and there was a tendency for fat concentration to decrease linearly with ASCO meal supplementation. Colostral I was unaffected by treatment. Calves born to HI dams had larger birth weights than EDDI calves and calf body weight gain over 8 wks tended to decrease linearly with ASCO meal. Plasma concentration of total T_4, and beta-hydroxybutyrate responded quadratically to ASCO meal supplementation. There was a tendency for IgG apparent efficiency of absorption to be lower in EDDI versus HI calves.
Take home message: addition of ASCO meal to the dams' diet did not negatively impact calf growth and metabolism or colostrum production. Additionally, ASCO may benefit colostrum composition and calf passive transfer when used as an I source compared to EDDI.