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Alterations in the Abundance of Ruminal Microbial Species during the Peripartal Period in Dairy Cows

Authors : S. Alqarni, J. C. McCann, A. Palladino, J. J. Loor

Abstract : Seven fistulated Holstein cows were used from 3 weeks prepartum to 4 weeks postpartum to determine the relative abundance of 7 different species of ruminal microorganisms. The prepartum diet was based on corn silage. In the postpartum, diet included ground corn, grain by-products, and alfalfa haylage. Ruminal digesta were collected at five times: -14, -7, 10, 20, and 28 days around parturition. Total DNA from ruminal digesta was isolated and real-time quantitative PCR was used to determine the relative abundance of bacterial species. Eubacterium ruminantium and Selenomonas ruminantium were not affected by time ($P>0.05$). Megasphaera elsdenii and Prevotella bryantii increased significantly postpartum ($P<0.001$). Conversely, Butyrivibrio proteoclasticus decreased gradually from -14 through 28 days ($P<0.001$). Fibrobacter succinogenes was affected by time being lowest at day 10 ($P=0.02$) while Anaerovibrio lipolytica recorded the lowest abundance at -7 d followed by an increase by 20 days postpartum ($P<0.001$). Overall, these results indicate that changes in diet after parturition affect the abundance of ruminal bacteria, particularly M. elsdenii (a lactate-utilizing bacteria) and P. bryantii (a starch-degrading bacteria) which increased markedly after parturition likely as a consequence of a higher concentrate intake.

Keywords : rumen bacteria, transition cows, rumen metabolism, peripartal period
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