

Combination of Bacterial and Yeast Probiotics for Lactating Cows Submitted To a Sub-Acute Rumen Acidosis Challenge

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Subacute rumen acidosis (SARA) is the most important digestive disorder occurring in dairy cows during the transition period. It is characterized by low rumen pH and is caused by an imbalanced microbial flora. Following a grain-based SARA challenge, an extremely potent toxin, also known as lipopolysaccharide (LPS) was reported to translocate into the peripheral circulation and trigger an inflammatory response. Four ruminally fistulated Holstein dairy cows (81 days in milk) were assigned to the following experimental treatments in a 4 × 4 Latin square design: 1) *Enterococcus faecium* (EF); 2) EF + *Saccharomyces cerevisiae* (EFSC); 3) EF + *Lactococcus lactis* O 224 (EFO); 4) No probiotics (Ctrl). Each experimental period consisted of 18 d of adaptation, 3 d of SARA challenge and 7 d of rest (same total mixed ration than during adaptation but without probiotics). The objectives were to determine the effect of nutritional phases (adaptation, SARA and rest) and the effect of probiotics on: 1) dry matter intake and milk yield; 2) rumen pH, redox potential, vitamin B₁₂, rumen LPS and plasma LPS binding protein. During SARA, dry matter intake and milk yield decreased (9 and 4%, respectively). Milk yield drop during SARA was lower when cows received probiotics (- 0.9 kg of milk) compared with Ctrl (- 7.5 kg of milk). Rumen pH characteristics were indicative of SARA conditions following the challenge. Mean pH values recorded over a 24-h period were greater with EFSC (5.55) and EFO (5.66) compared with mean pH when cows were Ctrl (5.43). Rumen LPS and plasma inflammatory proteins were increased during SARA, as opposed to the adaptation phase. Concentrations in inflammatory proteins were numerically lower when cows received EFSC compared with other treatments. During SARA, concentrations in vitamin B₁₂ were greater with EFSC than with the other treatments.

Implications: Larger studies conducted on farms could confirm the benefits provided by specific probiotics observed in the present study.