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Reducing conditions varied with diets and bacterial communities in the rumen of dairy cows. By C. JULIEN¹, J.P. MARDEN², E. AUCLAIR², L. CAUQUIL¹, R. MONCOULON¹ AND C. BAYOURTHE¹, ¹*Université de Toulouse, INRA, UMR 1289 INRA/INPT/ENVT TANDEM, 31326 Castanet-Tolosan, France,* ²*Lesaffre Feed Additives, 59520 Marquette-Lez-Lille, France.*

This study aimed at characterizing both the change in ruminal bacterial population and physico-chemical conditions of four dairy cows fed two maize silage (67 %) and soybean meal (17%)–based diets completed with either 16 % of ground wheat (WD) or 16% of crushed maize (MD), on a DM basis.

Ruminal pH and redox potential (E_h) were recorded (Marden et al., 2005) and the Clark's Exponent (rH) was calculated. Ruminal content was sampled for bacterial profiling by means of Capillary Electrophoresis Single-Strand Conformation Polymorphism (CE-SSCP).

Average ruminal pH was significantly lower with WD (6.12) than MD (6.25). Ruminal E_h and rH were also lower with WD than MD: – 186 mV, 6.04 and – 152 mV, 7.43, respectively. Results suggested that dietary composition influenced ruminal reducing conditions. CE-SSCP profiles showed that the bacterial communities varied with diet composition (R-ANOSIM = 0.173, $P = 0.051$): there was 20 % of difference between the average profiles of the 2 diets. Furthermore, there was a correlation between CE-SSCP profiles and both pH and rH ($P \leq 0.05$, $r^2 = 0.19$ and $r^2=0.13$, respectively). It confirmed the well-known link between bacterial communities and ruminal pH and also put forward a relationship between bacterial communities and ruminal reducing conditions. It seemed that ruminal rH and E_h were specifically correlated to the richness of bacterial communities ($P \leq 0.05$, $r^2 = 0.25$ and $r^2=0.25$, respectively).

In conclusion, this study addresses the possibility to modulate ruminal E_h via feeding in ruminants to stimulate the adequate microflora for better use of dietary material.

Marden, J. P., C. Bayourthe, F. Enjalbert, and R. Moncoulon. 2005. A new device for measuring kinetics of ruminal pH and redox potential in dairy cows. *J. Dairy Sci.* 88:277-281.