Changes in rumen parameters during dietary transitions in feedlot cattle

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Introduction of grain–based diets to cattle can be associated with metabolic diseases such as lactic acidosis. Lactic acidosis is characterised by high concentrations of L– and D–lactate in the rumen, a decrease in rumen pH from approximately 6.4 to below 5.8, and an underlying change in rumen ecology (Owens *et al*. 1998). The main bacterial species responsible for increased concentrations of lactic acid is thought to be *Streptococcus bovis*, but other species such as lactate–producing *Lactobacilli* sp. and possibly *Selenomonas ruminantium* have also been suggested as playing an important role (Tajima *et al*. 2001). This paper reports changes in rumen pH and their relationship to L–lactate concentrations in feedlot cattle during transition to high energy diets.

Eight yearling animals from a March/April calving group of cattle and another eight from a June/July calving group were sampled during a period of introduction to high energy diets in feedlots at Vasse Research Station after they were all weaned in January. Sixteen cattle were also sampled from a commercial feedlot near Donnybrook which fed hay and grain separately. Rumen samples were taken via rumen tubes on days 0, 3, 7, and 14 after introduction to their feedlot diets. Rumen pH values were measured immediately and then the samples were stored at –80°C for rumen L– lactate analysis. There was no relationship between rumen L–lactate concentration and rumen pH in cattle from the commercial feedlot over the range of pH 5.8 to 7.2 (R^2 = 0.088). Rumen L–lactate concentrations were significantly lower over the introductory period in the March (early) versus June (late) calved cattle, fed under the same feedlot conditions (P<0.05; Figure 1). The lower L–lactate levels of for the March calving group may be related to the fact that they became functional ruminants on dry feed whereas the June calving group had green feed available during their transition to functional ruminants and were on a higher proportion of milk closer to weaning as well as a higher proportion of green pasture during the period from birth to weaning. Therefore they may have had higher concentrations of lactose and sugars from the green pasture, which promote lactate–producing bacteria such as *Streptococcus bovis* (Stewart *et al*. 1997). To follow on from this work, bacteria in the samples collected will be quantified using real time polymerase chain reaction to describe the changes in the rumen bacterial populations during this transition period.

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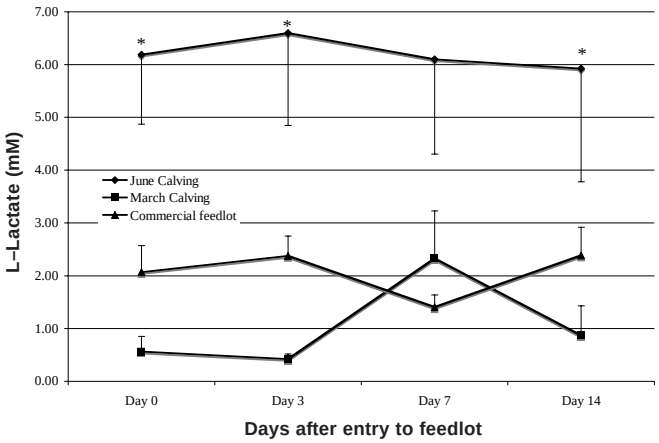

Figure 1 Changes in rumen L–lactate after introduction to grain based diets for feedlot cattle. * indicates a significant difference between March and June calved animals (P<0.05).