

LACTIC ACID IN THE RUMEN REDUCES FEED INTAKE IN CATTLE

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Acidosis is a prominent production problem in feedlot cattle. Although the condition has been widely documented (Owens *et al.* 1998; Rowe 1999), there is still conjecture over the relative importance of VFA and lactic acid in the severity of acidosis. This study was designed to create a carbohydrate overload acidosis model that could more fully elucidate the relationship between changes within the rumen and the subsequent effect of acidosis on feed intake.

Eighteen, two year old Angus heifers were housed in individual pens (100m²) with a weighable feed bin and free access to water and a diet comprising of 85% hay and 15% barley. Ground wheat was administered into the rumen via a stomach tube at a rate of 20g/kg live weight at 0 and 24 hours. Cattle continued to be offered the pre-challenge diet *ad libitum* during the challenge and for the following 5 days. Daily feed intake was recorded. Rumen fluid was sampled immediately prior to the administration of the first dose of wheat (0 h) and again at 12, 24, 36, 48 and 72 h. Samples were analysed for pH, lactic acid and VFA concentration. Results are based on the 11 animals that did not require any sort of treatment for ill-health over the 5 days following administration of the grain.

Figure 1 indicates that animals with a higher rumen lactic acid concentration or lower pH at 48 h were likely to have a reduced feed intake. There was no relationship between VFA or total acid concentration in the rumen and feed intake. A rumen pH <5.5 at 48 h was commonly associated with a lactic acid concentration of at least 50 mmol/L. At this time, pH was highly correlated with lactic acid concentration ($R^2=0.9$, $P<0.01$) and poorly correlated with VFA concentration ($R^2=0.3$, $P>0.05$). Our results contrast with the findings of Reinhardt *et al.* (1997) who used a sub-clinical acidosis model to demonstrate that low rumen pH (<5.0) was associated with high concentrations of VFA and relatively low levels of lactic acid (<5 mmol/L).

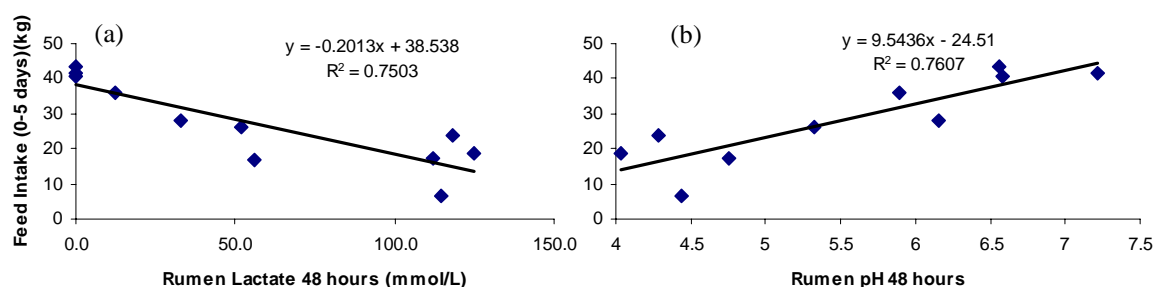


Figure 1 Relationships between 48 hour rumen lactic acid concentration (a) and pH (b) with total feed intake from the day of the challenge (day 0) to day 5 after the challenge. Both correlations are highly significant ($P<0.01$).

In this acute carbohydrate overload model, lactic acid concentration was significantly more important than VFA in terms of reducing rumen pH and feed intake. The relative importance of lactic acid and VFA is likely to depend on the size of the carbohydrate overload and the level of adaptation to a concentrate diet. It would be interesting to investigate the response of adapted cattle and to explore the effects of a single, smaller grain challenge in terms of acid accumulation and feed intake.

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