

Using faecal measurements to estimate fermentation and acid accumulation in the caecum and colon

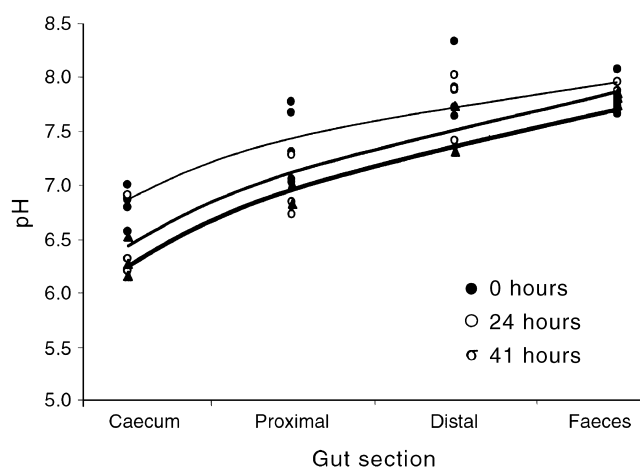
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Until recently, the only way to accurately assess hind gut fermentation and acid accumulation in the caecum and colon has been by the use of cannulation or autopsy. Faecal pH has previously been shown to be representative of pH in the caecum and colon (1). The relationship between pH and organic acid concentrations in the caecum and faeces has not been explored in situations where the diet is changing. The aim of the current experiment was to examine the change in pH, volatile fatty acids (VFA) and lactic acid along the hind-gut of sheep when changing from a diet promoting low levels of hind-gut fermentation to a diet promoting high levels of hind-gut fermentation.

Twenty five Merino ewes were fed a basal diet consisting of Ewe and Lamb Pellets (12 MJ ME/kg DM, 13% CP, Millmaster, NSW) and lucerne chaff (8.5 MJ ME/kg DM, 15% CP) fed at 600 and 200 g/hd per day respectively. Twenty animals were fed 800 g/hd of rolled barley in addition to the basal ration. Animals were euthanased for collection of gut contents, either 0, 3, 8, 12, 16, 24 or 41 hours after feeding 800 g barley (n = 5, 2, 5, 4, 3, 3 and 3 respectively). Samples of digesta from the rumen, caecum, proximal colon, distal colon and rectum of each sheep were collected and analysed for pH and VFA and lactic acid concentration.

Caecal pH and faecal pH did not differ between sheep at 0, 3, 8, 12 or 16 hours after feeding (data not shown). Caecal pH was significantly (P < 0.05) lower at 24 hours and 41 hours after feeding barley (Figure 1). Analysis showed that the intercepts of the regression lines were significantly (P < 0.05) different between 0 and 24 or 0 and 36 hours after feeding barley (Table 1). Lactic acid and VFA analysis will be completed and reported separately.



Time after feeding	Line equation ¹	R ²
0 hours	y=0.78 ^a Ln(x)+6.85 ^a	0.73
24 hours	y=1.06 ^a Ln(x)+6.41 ^b	0.79
41 hours	y=1.07 ^{a2} Ln(x)+6.26 ^b	0.93

¹Slopes or intercepts with different superscripts differ significantly (P < 0.05)

²Trend for 0 and 41 hour slopes (P=0.08)

These data indicate that faecal pH can be used as an indicator of caecal pH when assessing hind-gut fermentation in a group of animals. However, when the diet is changing, care must be taken in the assessing the pH relative to the time after introduction of the diet when trying to assess an absolute value for pH in the caecum.

1. Clayton, EH. Predicting caecal pH. Rec Adv Anim Nutr Aust 1999; 23: 68.