

Faecal and urine acidity in a commercial piggery

J.B. Rowe¹, E. Clayton¹, E. Hansch¹ and J. Braun²

¹Animal Science, University of New England, Armidale NSW 2351

²Myora Farm, Mt Gambier SA 5291

Fermentative acidosis is widely recognised as a problem in ruminants fed high levels of cereal grain; it causes reduced feed intake, decreased production, lameness, morbidity and mortality. In horses fed grain or grazing lush pasture, fermentative acidosis in the hind gut is associated with founder and lameness. The accumulation of acid in the hind gut of pigs has recently been identified as a potential problem in connection with increased risk of swine dysentery (Pluske 1997). The question we ask in this paper is whether fermentative acid production in the hind gut of pigs is likely to be a problem in a commercial piggery.

Samples of faeces and urine were collected from pigs of various ages and stages of growth and reproduction. Animals were selected at random from large groups. Faecal samples were taken from the rectum, and urine was collected from female pigs during urination. Samples of faeces and urine were not always from the same animals. The formulation of diets for each class of pig was based on least cost formulation and industry 'best-practice' using barley and lupins as the major ingredients. Pre-farrowing diets were designed with high levels of insoluble non-starch polysaccharide together with a deliberate imbalance in acidic anions. The pH of faecal and urine samples was measured immediately using a portable pH meter. Titratable acid in urine was measured using a radiometer auto-titrator with the end point set at pH 7.42. Ammonium concentration was measured by titration following steam distillation.

The results summarised in the Table show acidic urine at all stages of the reproductive cycle. The faecal pH of all grower pigs averaged 6.02 and faeces of weaners on cooked cereal diets averaged 6.5. There was more titratable acid and a higher concentration of ammonium in the urine of sows fed lower fibre 'lactation' diets than when on the higher-fibre farrowing diet. Faecal pH was also lower in sows on the lactation diets. It appears that the higher urine acid excretion may be associated with higher faecal acid concentration, indicating an additional metabolic acid load as a result of fermentative acid production in the hind gut. The mild metabolic acidosis is almost certain to alter mineral metabolism and other processes. Whether these changes are sufficient to affect productive efficiency or herd health is under investigation.

We acknowledge the support of Pfizer Animal Health and the ARC Collaborative Research Grant scheme for financial support. EC was in receipt of an APAI Scholarship.

Pluske, J.R., Pethick, D.W., Durmic, Z., McDonald, D.E., Mullan, B.P. and Hampson, D.J. (1997). Diseases and conditions in pigs horses and chickens arising from incomplete digestion and absorption of carbohydrate. *Recent Advances in Animal Nutrition in Australia 1997*, pp. 33–41 (eds. J.L. Corbett, M. Choct, J.V. Nolan and J.B. Rowe). University of New England, Armidale NSW.

Table 1 Mean values \pm SE for urine pH, titratable acid and ammonium concentration, and faecal pH, measured in female pigs at various stages of the reproductive cycle in a commercial piggery.

	Urine pH	Urine titratable acid (mmol/L)	Urine ammonia (mmol/L)	Faecal pH
Pre-farrowing	5.3 \pm 0.18	8 \pm 2.7	30 \pm 10.3	7.1 –
Farrowing	5.0 \pm 0.05	20 \pm 2.2	49 \pm 4.6	7.6 –
Post farrowing (7 d)	5.2 –	48 \pm 14.0	83 \pm 14.1	6.4 \pm 0.22
End of lactation	5.0 \pm 0.09	23 \pm 3.5	93 \pm 14.7	6.1 \pm 0.05
Dry sows	– –			6.4 \pm 0.07