# DIETARY MANIPULATION OF SWINE DYSENTERY

**P.M. Siba, D.W. Pethick, K.A. Nairn*, and D.J. Hampson**

School of Veterinary Studies, Murdoch University, Murdoch, WA 6150. *Milne Feeds, Welshpool, WA 6106.

Swine dysentery is the most economically-significant endemic disease affecting the Australian pig industry (Cutler and Gardner, 1988). The condition is a mucohaemorrhagic colitis, which results from infection with the anaerobic spirochaetal bacterium, *Serpulina hyodysenteriae*. Disease is mainly seen in grower pigs, which may suffer severe loss of production. Despite there being serological evidence that the infection is common in Australia (Mhoma *et al.*, 1992), severe disease is not reported frequently. A virulent strain of the bacterium has also been isolated from a herd that appeared to be free of clinical swine dysentery (Hampson *et al.*, 1992). The reason for lack of disease in this herd was not clear.

It has been suggested that fermentable diets which result in acidic conditions in the large intestine may inhibit the growth of *S. hyodysenteriae*, and prevent the development of disease (Prohaszka and Lukacs, 1984). We tested the effect of pH on growth of *S. hyodysenteriae* in a chemostat; a pH of 6.0 was shown to be inhibitory, while the organism grew vigorously in the same medium at pH 6.85.

In an attempt to obtain similar pH values in the large intestine, we fed groups of pigs either a highly fermentable unpelleted commercial diet, based on wheat and lupins (15%), or an experimental diet based on cooked rice and animal proteins. As a result of fermentation, the mean (± SEM) pH of caecal contents in pigs (n = 7) on the wheat/lupin diet was 5.37 (± 0.03), and was 6.54 (± 0.12) in pigs (n = 6) on the readily-digestible rice diet.

We then used cultures of *S. hyodysenteriae* to orally challenge eight pigs fed one or the other of these two diets. The two groups were mixed for four hours each day in the week following the first signs of disease, to increase the opportunity for transmission of infection. Pigs in both groups developed antibody titres to *S. hyodysenteriae*, but, unexpectedly, only the four fed the wheat/lupin diet developed swine dysentery. The presence of acidic conditions in the large intestine therefore did not protect these pigs from swine dysentery. The rice diet was, however, protective. Pigs on this diet also had much smaller and less well-developed large intestines than did those on the wheat/lupin diet. Mean weight of the large intestine and its contents as a percentage of total body weight for the pigs on the wheat/lupin diet was 4.50 (± 0.24), compared to 1.76 (± 0.10) for pigs on the rice diet. Since there is evidence that *S. hyodysenteriae* requires the activity of other anaerobic bacteria to colonise the porcine large intestine and to cause lesions (Whipp *et al.*, 1979), we postulate that the large intestinal flora altered in pigs fed the highly-digestible rice diet, and hence they were less susceptible to disease.

In conclusion, the expression of swine dysentery can be manipulated by dietary means. This may explain some of the clinical variability of the disease that is seen in the field.

## References

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