Relationship between the ileal and faecal digestible energy content of pig diets containing Australian barley cultivars

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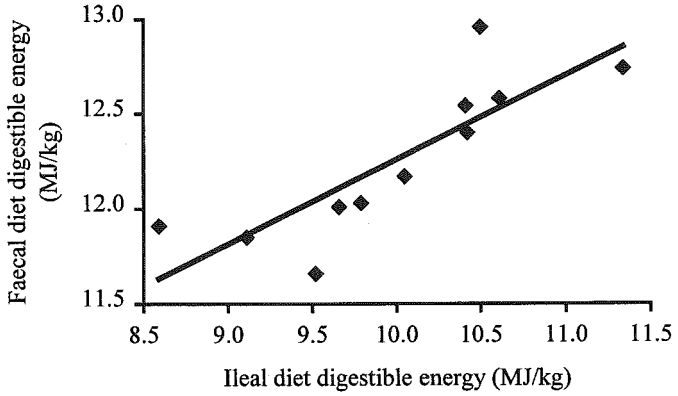
Significant variation has been shown to exist between the digestible energy content of barley cultivars fed to growing pigs (1), but due to extensive fermentation in the hind gut, digestible energy measurements may be underestimating the net energy contributions to the animal. To demonstrate the influence of hind gut fermentation on energy digestion in the pig, the ileal diet digestible energy (IDE) and faecal diet digestible energy (FDE) content of diets containing Australian barley cultivars were compared.

Eleven samples of barley were collected from across Australia representing 10 cultivars, one of which (Schooner) was obtained from two sites (Junee and Forbes). Diets were formulated to contain 940 g/kg of the test grains, the remainder consisting of dicalcium phosphate, salt, minerals, vitamins, choline chloride and celite®. IDE and FDE was determined in 4 separate experiments (2-3 test grains/experiment) using Large White male pigs (35-40 kg body-weight) fitted with simple T-piece ileal cannulas. Tantangara barley was used as a control in each experiment and diets were provided based on a 5x5 Latin square design. Diets were fed for 7 d (3 x maintenance ie 0.5Liveweight$^{0.75}$) prior to 8 h digesta and faeces collections over 2 consecutive days. IDE and FDE content of the diets was calculated using celite® as an indigestible acid-insoluble ash marker.



A range of 2.75 MJ/kg was determined in IDE content compared to a range of 1.08 MJ/kg for FDE. Differences in IDE and FDE were significant ($P<0.05$) as was the relationship between IDE and FDE ($R^2=0.69$). Hind-gut fermentation promoted higher FDE levels and reduced the measurement range. IDE, or IDE:FDE may be a more appropriate basis for detecting differences in energy contributions from grains and the subsequent net energy contribution to the pig.

1. van Barneveld RJ, Aust J Agric Res 1999;50:667-687.