RELATIONSHIPS BETWEEN DIETARY FIBRE CONTENT AND DRY MATTER INTAKE OF PIGS AFTER WEANING

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The pathways that control appetite in the weaned pig are not understood, but involve complex interactions between signals originating from different body organs and diverse regions of the brain. Several gut-derived hormones, such as glucagon-like peptide-1 (GLP-1), have been suggested as candidates for appetite control, with elevated concentrations of GLP-1 decreasing food intake (Gunn *et al.*, 1997). Fermentation of dietary fibre (DF) in the ileum and large intestine is thought to enhance GLP-1 release (Tappenden *et al.*, 1996; Reimer *et al.*, 1997). The aim of this experiment was to examine the influence of dietary DF content on voluntary food intake and fermentation indices in weaner pigs, where low food intake is a major production problem.

Thirty male (Large White x Landrace) pigs aged 26-29 days and weighing 5.6 ± 0.18 kg (mean ± SE) were allocated in a completely randomised design to receive one of five diets. These were: (i) cooked white rice (R) plus an animal protein supplement (R+AP); (ii) R+HiMaize® (high-amylose corn starch; Starch Australasia Ltd.); (iii) R+Lupin isolate; (iv) R+HiMaize®+Lupin isolate; and (v) weaner diet based on wheat (45.9%), barley (20%), lupins (15%), and animal protein sources (15%). All diets contained similar levels of calculated digestible energy (14.1 MJ/kg) and available lysine (0.8 g/MJ DE). Measured total DF levels (AOAC 991.43, 1995) were 53, 110, 229, 171 and 282 g/kg dry matter for diets (i) to (v), respectively. Pigs were fed on an *ad libitum* basis for 14 days. On the final day pigs were euthanased, and weights and samples were collected. Data were analysed by one-way analysis of variance and regression. Dry matter intake (DMI) was calculated for all diets.

Table 1. Dry matter intake (DMI) and indices of fermentation in pigs fed rice based (R+) or a control diet for 14 days after weaning.

Diet	DMI (g/d)	Caecum (grams)	Colon (grams)	VFA[1] pool in caecum	VFA[1] pool in colon
R+Animal protein	623[a]	28	152[a]	7.9	19.0[a]
R+HiMaize	559[ab]	31	196[bc]	17.8	44.4[b]
R+Lupin isolate	516[abc]	30	226[c]	14.6	44.6[b]
R+HiMaize®+Lupin isolate	421[c]	28	173[ab]	11.8	27.4[ac]
Weaner diet	468[bc]	36	198[bc]	11.1	35.5[bc]
SED[2]	74.1	4.4	24.0	3.77	6.64
P-value	0.037	0.241	0.027	0.064	<0.001

[1]VFA, Volatile fatty acids (mmol). [2]SED, Standard error of difference. [a,b,c]Means in the same column with different superscripts differ significantly (P≤0.05).

Pigs offered R+HiMaize®+Lupin isolate and the Weaner diet ate less (P=0.037) dry matter than pigs offered diet R+AP. Pigs fed diet R+AP had the lowest colon weight and colon VFA pool (P≤0.05). No relationships were found between DMI and the indices of fermentation. However, there was a tendency for total DF content to explain a proportion of the decrease in DMI after weaning (R^2=0.513, P=0.173). These data suggest that the DF content of the diet might influence food intake after weaning. Gut-derived hormones such as GLP-1 may mediate food intake through processes such as gastric emptying.

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