

THE BIOLOGICAL PERFORMANCE OF PIGS AT HIGH TEMPERATURE

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Livestock in Australia are frequently subjected to temperature stress. Limited data are available on the influence of high temperature on the biological performance of pigs. The results of a preliminary study on the effects of manipulating dietary energy and protein concentrations on the performance of pigs kept at high temperatures are reported here.

Six groups of five Landrace x Large White entire males, initially weighing 45 kg, were grown to 90 kg. Four groups were kept in a hot room diurnally variable: 12 h at 35°C and 12 h at 25°C, and two groups were held at 22°C as controls. Individual feeding stalls allowed recording of feed intake for each pig. The four diets offered *ad lib.* to the pigs in the hot room were (a) high energy-high protein (HH), (b) high energy-low protein (HL), (c) low energy-high protein (LH) and (d) low energy-low protein (LL). Diets (b) and (d) were also offered to two groups of pigs held at 22°C.

To determine digestible energy (DE) of the diets, faecal output was estimated using Cr₂O₃ as an inert marker in the feed. The chemical composition of samples of feed and faeces was determined using standard procedures. Results are shown in Table 1.

TABLE 1 Dietary analysis and effects of temperature treatment on groups of five pigs on different dietary regimes

Group and diet	Treatment (°C)	Diet		Performance				
		Digestible energy (MJ/kg)	Crude protein (%)	Gain (g/d)	FCR (g/g)	Energy conversion (MJ/kg)	Dressing out (%)	Back-fat (mm)
1 HH	35/25	14.26	18.8	502 ^a	2.87	41.0	72.3 ^a	20.8
2 HL	35/25	14.71	15.1	511 ^a	2.90	42.7	75.0 ^{ab}	22.7
3 LH	35/25	13.54	17.4	548 ^a	3.00	40.6	74.6 ^{ab}	20.0
4 LL	35/25	13.04	13.6	488 ^a	3.25	42.3	73.8 ^a	22.7
5 HL	22	14.96	15.1	716 ^b	2.79	41.8	77.2 ^b	23.9
6 LL	22	12.77	13.6	690 ^b	2.92	37.3	75.3 ^{ab}	21.1

* Within a column values with a different superscript are significantly different (P<0.05).

Although there was no effect (P>0.05) of diet on weight gain of pigs in the hot room, pigs in groups 2 and 4 on diets HL and LL grew more slowly (P<0.05) with a poorer (P<0.05) FCR, and a lower (P<0.05) dressing percentage, than pigs at 22°C on the same diets. Conversion of dietary energy (DE) to gain was better (P<0.05) at 22°C than at 35/25 for pigs on diets HL and LL, and on the high-, compared to the low-energy diets irrespective of temperature. There are at least three reasons for the few significant nutritional effects: (a) wide variation in response of individual pigs to high temperature, (b) slight leg injuries sustained by three pigs in prototype feeding stalls reduced groups 2, 4 and 5 to four pigs per group, and (c) variation among similar diets in DE concentration. The work is proceeding with particular attention to these problem areas.

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