

THE EFFECTS OF SEX AND OF ENERGY INTAKE ON RATE OF
PROTEIN DEPOSITION IN GROWING PIGS

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The Agricultural Research Council (ARC, 1981) suggest that under conditions of protein adequacy the relationship between energy intake (EI) and rate of protein deposition (RPD) is linear for pigs between 30 and 90 kg live weight (LW). However, whilst the linear model is supported by results of experiments with pigs between birth and 45 kg (e.g. Campbell and Dunkin, 1983) there is less information on the response of RPD to EI for heavier pigs.

In the present experiment, comparative slaughter was used to study the effect of EI on RPD for pigs growing from 48 to 90 kg LW. Twenty four entire male (EM) and 24 female (F) pigs were allocated at 48 kg LW to an initial slaughter group comprising four pigs of each sex and among 10 treatments in 2 x 5 factorial arrangement. The respective factors were sex (EM and F) and five levels of intake of a protein adequate diet ranging from 22.6 MJ ME/d to ad libitum.

The results (Table 1) showed that EM pigs deposited protein at a faster rate, exhibited better growth performance and contained less fat in the empty body at 90 kg LW than females. Initially there was a linear ($P < 0.001$) improvement in RPD with increasing EI. However, for both sexes the response reached a plateau at approximately 31.7 MJ ME/d. Further increasing EI resulted in marked increases in feed:gain and body fat content (Table 1).

TABLE 1 Effects of energy intake between 48 and 90 kg LW on rate of protein deposition and the performance of entire male (M) and female (F) pigs

		Energy intake (MJ ME/d)				Ad lib [†]	SEM
		22.6	26.4	31.7	36.0		
Protein deposition (g/d)	M	69.4	94.8	129.5	130.0	132.0	6.5
	F	63.4	84.5	103.0	102.0	99.0	
Daily gain (g)	M	418	576	793	842	884	20.2
	F	358	552	656	742	795	
Feed:gain	M	3.9	3.4	2.9	3.1	3.5	0.7
	F	4.6	3.6	3.4	3.5	3.6	
Body fat (g/kg)	M	203	249	257	315	332	5.2
	F	293	332	353	368	397	

[†] 39.8 MJ ME/d for M and 37.9 MJ ME/d for F ($P < 0.05$)

The results suggest that between 48 and 90 kg LW the pigs' capacity for protein accretion lies within the limits of appetite and is determined by intrinsic factors such as sex and not only by EI as suggested by the ARC (1981). Raising EI above that at which maximal RPD occurred (31.7 MJ ME/d) resulted in marked increases in feed:gain and body fat content as extra energy available for growth was partitioned to fat. Clearly if applied to pigs of similar LW the linear model proposed by the ARC (1981) would overestimate growth rate at high levels of feeding and would fail to predict the adverse effects of high levels of EI on feed:gain and carcass fatness.

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