

Dietary Net Energy is Affected by Diet Protein Concentration or Gender in Pigs

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At the same intake of protein and energy, barrows, gilts and boars have different rates of protein and lipid deposition. This was hypothesized to affect dietary net energy value because protein and lipid deposition have different energetic efficiencies. The objective of this experiment was to determine whether dietary net energy was affected by gender and dietary protein level.

Using a repeated Latin square design, one male, female and castrated male pig, from each of 6 litters (n=18), were offered ad libitum 3 isoenergetic (14.2 MJ/kg metabolizable energy) diets differing in crude protein (CP) levels. Diets were: HP, 20.2% CP, 1.1% lysine; MP, 16.1% CP, 0.8% lysine; and LP, 12.7% CP, 0.5% lysine. Pigs were adapted to each diet for 7 days before 7d N-balance and 24 h energy expenditure by indirect calorimetry. Body weight increased from 46 to 95 kg during the experiment. Gender, protein and period effects, including interactions, were tested using procedure 'mixed' (SAS 2002). Mean BW (64.6 kg \pm 3.9) and feed intake (2297 g/d \pm 58) were not different among diets. Daily gain increased with feed intake and protein level (P = 0.001). Gain:feed ratio increased with protein level (P = 0.001). Gain:feed increased more sharply in boars and gilts than barrows as dietary protein increased. Protein deposition (PD) increased with BW and dietary protein (P < 0.03) was greater (P < 0.05) for boars and gilts than for barrows. PD in boars increased up to the 3rd period, reached a plateau in the 2nd period in barrows and remained constant in gilts. Heat production increased with body weight (P = 0.001) but was not affected by protein level. Retained energy increased with BW (P = 0.002) and tended (P = 0.07) to decrease with increasing dietary protein content. Determined NE increased with BW (P = 0.001). The interaction between gender and protein level approached significance (P < 0.1) for gain:feed and determined NE. The decrease in determined NE with increasing protein level was greater in barrows than gilts and boars.

Implications: Dietary NE values should be increased as BW increases in pigs. Excess dietary protein reduces dietary NE and the effect is greater in barrows than gilts and boars. Supported by Alberta Pork and Agriculture Funding Consortium