

Isoleucine requirement for pregnancy in adult sows

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Pregnant adult sows show little maternal growth so that accelerated conceptus growth in the 3rd trimester can cause large differences in nutrient requirements between early (EG) and late (LG) gestation. The objective of this study was to determine the Ile requirement in EG (d 37 to 61) and LG (d 89 to 109) using the indicator amino acid oxidation (IAAO) method. Seven 4th parity sows received 6 diets each based on corn, corn starch and sugar in both EG and LG at a constant intake of 2.5 kg/d. Diets in EG contained Ile at 20, 40, 60, 80, 100 and 120 % of the current Ile requirement and 60, 80, 100, 140, 160 and 180% in LG. Sows were fed 2 mg/(kg BW·h) of L[1-¹³C]Phe over 4 h in 8 ½-hourly meals. Requirements were determined as breakpoints in IAAO using 2-phase nonlinear models. Sows, 232.0 ±4.9 kg at breeding, gained 19.1 ±4.4 kg in gestation and had litters of 17.7 ± 0.75 piglets weighing 22.6 ± 0.87 kg. The Ile requirement was greater in LG than EG (P = 0.001) at 3.6 g/d vs. 9.7 g/d. The increased (P = 0.001) in Phe retention (-0.48±0.55 g/d in EG vs. 3.34 ±0.55 g/d in LG) was caused by accelerated fetal growth. Energy and lipid retention decreased (P < 0.003) from EG to LG and were negative in LG. This indicates that Ile requirements were driven mainly by maintenance in EG and by fetal growth in LG. Both Ile and energy intake must be increased in LG but the greater change in Ile than energy requirement shows that amino acid supply is more critical in LG for adult sows.

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