A Case for Phase Feeding Pregnant Sows

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Sow body weight, leanness and litter size have improved over the last 10 years, indicating increased amino acid and energy requirements. In addition, fetal weight and protein gain increase in late gestation so that requirements for amino acids and energy must change over the course of gestation. Models for amino acid and energy requirements of pregnant sows (Kim et al. 2009; GfE 2008) agree that requirements in late gestation are greater than in early gestation.

Our research group studied requirements in early and late gestation using the indicator amino acid oxidation technique with concurrent indirect calorimetry in sows given constant feed allowance in their 2nd to 4th pregnancies. The requirements for all amino acids studied (lysine, threonine, tryptophan and isoleucine) decreased from early to late gestation, and from 2nd to 4th parity. Our data also show that the ideal ratios between amino acids change as pregnancy progresses and as sows age, probably caused by the changing contributions of requirements for maintenance and maternal and fetal growth to total amino acid requirements. That means that lysine may not be the first-limiting amino acid for older sows and that the familiar order of limitation in growing finishing pigs may not apply to pregnant sows.

Energy requirements increase as pregnancy progresses because of sow weight gain and exponential growth of fetuses. We consistently found a decrease in energy retention from early to late gestation, regardless of parity. To maintain maternal and fetal growth, feed intake in late gestation should be increased in late gestation. This increase needs to be greater for gilts compared to older sows. The additional feed given in late gestation can be compensated for by a slight reduction of feed allowance in early and mid gestation to maintain similar mean feed intake as for single-phase feeding.

Feed restriction for pregnant sows places energy intake as the limiting factor. Thus, feed allowance needs to be considered first when devising a sow feeding regimen. Our estimates are 1.8, 2.2 and 2.4 kg/d of a corn-soybean meal diet for day 1 to 84 of gestation and 2.4, 2.7 and 2.8. kg/d for day 85 to farrowing for 1st, 2nd and 3rd parity and older sows, respectively. These feed amounts should be modified for sows that are too lean or too fat, heavier or lighter than average, and more or less efficient in their nutrient utilization. The necessary total lysine contents drop from 0.83% to 0.34% from the 1st to 3rd parity in early, and from 1.00% to 0.54% in late gestation. The total threonine content of diets should be 0.32% and 0.21% in early and 0.62% and 0.51% in late gestation of the 2nd and 3rd parity, respectively. A single diet cannot supply the needed amino acids satisfactorily. Therefore, we suggest to feed a 'high' and a 'low' diet that contains the highest and lowest amino acid concentrations needed. For the intermediate amino acid concentration the 'high' and 'low' diets are then mixed in the appropriate ratios.

Conclusions

Parity-segregated phase feeding of pregnant sows supplies the amino acids and energy necessary to match the sows' requirements. This can result in reduced feed cost, better sow condition at farrowing, better rebreeding success and prolonged productive life of sows.

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