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## Energy metabolism of the lactating sow : preliminary results

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## ALIMENTATION FEEDING

### Contribution to the definition of an optimum level of energy restriction during gestation

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Three daily feed restriction levels during gestation were compared : 7.15, 7.95 and 8.75 Mcal D.E., i.e. 2.3 kg feed per day (diet I), 2.5 kg feed per day (diet II) and 2.7 kg feed per day (diet III), the daily crude protein supply being similar. During lactation, all the sows were fed the same 15 p. 100 protein diet. Results recorded until 7 reproductive cycles concerned a total of 360 litters per diet.

*Weight variation* was directly related to the amounts of energy ingested during gestation. The mean live weight of sows at the fourth weaning was 196, 217 and 232 kg. It was always lower with the lowest energy supply since the net weight gain during gestation was significantly lower. Weight balances (mating-weaning) decreased through the reproductive cycles but remained always positive with diets II and III (feed restriction levels 2.5 and 2.7 kg, respectively). With diet I (2.3 kg) they were null from the third cycle in particular for the lightest sows at the first mating.

*Litter size at birth* was little affected by the feed restriction levels during gestation. On the other hand, piglet mortality between birth and weaning was lower with 2.3 kg/day and large losses were observed from the fourth cycle, especially with 2.5 and 2.7 kg/day.

*Growth of piglets* during suckling was not affected by the experimental treatments. The number of sow cullings was higher with diet III (2.7 kg/day), in particular due to : non return to heat and locomotor disorders.

It may be concluded that the increase in the energy supply during gestation improved the sow weight, but reduced the reproductive performance.

A feed restriction level of 8.75 Mcal D.E., i.e. 2.7 kg feed/day is not advisable. It leads to a high sow weight with a larger culling percentage and a reduced piglet production.

A feed restriction level of 7.95 Mcal D.E., i.e. 2.5 kg feed/day is recommended when young animals are to be bred; it leads to a satisfactory weight gain of sows without reducing the piglet production.

A feed restriction level of 7.15 Mcal D.E., i.e. 2.3 kg feed/day is particularly well adapted to older and heavier gilts mated at the second oestrus (220 days and 136 kg). However, this feed restriction level leads to negative cycle results from the third cycle in the case of light sows (115 kg) used in reproduction. This confirms the results of the first trial.

### Energy metabolism of the lactating sow : preliminary results

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Energy metabolism of the lactating sow was studied in primiparous sows maintained in respiration chambers from farrowing to weaning at 21 days. For each replicate, 2 litter-mates were considered : they received either 16.6 (H) or 11.7 (B) Mcal DE per day, the

daily amounts of proteins (700 g/day), amino-acids, vitamins, minerals being equivalent. Measurements of milk production were carried out on days 1, 5, 9, 13, 17 and 21. O<sub>2</sub> consumption and CO<sub>2</sub> production were measured the other days of the lactation period. Energy, protein and fat deposition (or mobilization) in maternal tissues, energy and protein in milk and heat production of the sow were measured. Results concern the first 4 replicates.

Sows on treatment B had a higher body weight loss (22.6 vs 10.5 kg), the milk production being equivalent in the 2 groups. However, milk composition was slightly different : 18.24 and 19.14 p. 100 dry matter, 11.83 and 12.68 Cal/g. 7.12 and 7.59 p. 100 lipids for groups H and B, respectively. Heat production was higher in group H (7.8 vs 7.1 Mcal/day), but total energy retention was significantly lower for group B (2.7 vs 6.7 Mcal/day). Since energy produced in milk was equivalent for both treatments (7.2 and 6.7 Mcal/day), sows of group B mobilized higher amounts of body reserves (4.0 vs 0.6 Mcal/day). This mobilization was larger during the second part of lactation : 0.2 and 3.0, 1.6 and 4.9 Mcal/day from days 5 to 12 and 13 to 21, respectively. Protein supplies (700 g/day) met the requirements for lactation. Consequently, the mobilization of body reserves only concerned the fat reserves of the sow (60 and 440 g lipids/day for groups H and B respectively). However, this loss of lipids was lower than the body weight loss of the animals. The whole experiment (10 replicates) will provide more accurate information about the composition of the weight loss (dissection and chemical analysis of the carcass) and precise estimates of the energy requirements of the lactating sow (maintenance requirements, efficiency of food and body reserves for milk production).

### **Comparative utilization of wheat and rye by the bacon pig during the growing-finishing period**

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Two experimental diets containing either wheat or rye and soyabean meal, with the same lysine/DE balance (2.7 g per 1 000 Kcal DE) were compared in this trial. Both diets were fed restricted to *Large White* pigs between 27 and 101 kg live weight. The trial was made on 84 animals (42 per diet).

Rye was well accepted by the pigs.

The feed restriction scheme used theoretically supplied the same amounts of DE and lysine in the two diets and should lead to the same growth rate with the two cereals.

Only a slight difference was observed in favour of wheat (2 p. 100). The feed conversion ratio was 5 p. 100 higher with rye as compared to wheat. Moreover, rye led to a 0.75 point reduction in the carcass yield.

It may be concluded that rye can be used without any problem as sole cereal in fattening pig diets. A less severe feed restriction should be adopted than with wheat in order to counterbalance its lower energy concentration (about 3 650 Kcal DE/kg D.M.). This leads to the same growth rate, but the feed conversion ratio is deteriorated by about 5 p. 100.

### **Prediction of the energy value of oats from cell wall content**

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A digestibility experiment was made with 12 *Large White* castrated male pigs to estimate the feeding value of different types of oats and to define more accurately the effect of changes in their chemical composition on the energy value. The animals with a