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## Energy utilization and energy requirements in pregnant and lactating sows

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► **To cite this version:**

J. Noblet, M. Etienne. Energy utilization and energy requirements in pregnant and lactating sows. Annales de zootechnie, 1987, 36 (3), pp.308-309. hal-00888559

**HAL Id: hal-00888559**

**<https://hal.science/hal-00888559>**

Submitted on 11 May 2020

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### Detection of Aujeszky's disease using blood samples collected on Whatman paper disks

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A commercialized enzyme-linked immunosorbent assay (ELISA) was used to detect antibodies to Aujeszky's disease in 525 blood samples collected on Whatman paper disks. A sensitivity of 98 % and a specificity of 100 % were obtained compared to an ELISA applied to individual serum samples. Parallel to that, 200 groups of 5 disks including at most one disk impregnated with blood from a seropositive pig were analysed. This led to modify the level of positiveness recommended by the producer to adapt it to the study of disk groups. In these conditions, a sensitivity of 97 % and a specificity of 100 % were obtained compared to the analysis of individual sera.

### Utilization in the practice of an experimental vaccine against atrophic rhinitis in the pig : effect on nasal lesions and performance

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The efficiency of an experimental vaccine including *Bordetella bronchiseptica* and *Pasteurella multocida* (capsular group D) was tested in two herds exhibiting clinical signs of atrophic rhinitis. Administration of the vaccine to pregnant sow induced seral antibodies transmitted to piglets via the colostrum. The sanitary status of the herd was found to affect the efficiency of the vaccine. Indeed, in the first herd (good sanitary status), vaccination reduced by 60 % the number of pigs with nasal lesions, whereas in the second one (where most parameters were negative), the efficiency was less marked since the number of pigs with turbinate atrophy was only reduced by 19 %. However, in both cases, vaccination reduced the extent of turbinate damage. The vaccination did not affect either the performance or the pulmonary lesions which concerned a high proportion of animals.

## IV. — FEEDING

### Energy utilization and energy requirements in pregnant and lactating sows

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Energy and nitrogen balances were carried out in respiration chambers in 32 pregnant gilts (90 balances) and 20 lactating sows (lactation length : 21 days, 40 balances). During pregnancy, animals were fed 6.6 (24 gilts) or 8.0 (8 gilts) Mcal ME per day. During lactation, mean ME

intakes were 14.2 (n = 10) or 10.4 (n = 10) Mcal per day, but daily supply of protein and amino acids was similar for all sows. Results were used to estimate maintenance requirements (MEM) and efficiency of ME utilization. During pregnancy, MEM averaged 100 kcal ME per kg metabolic weight ( $\text{kg}^{0.75}$ ) and the efficiency of ME utilization for energy deposition was 76.6 %. Efficiencies of ME utilization for deposition of energy in uterine and maternal tissues were 48 and 85 %, respectively. During lactation, MEM was 109 kcal ME per  $\text{kg}^{0.75}$  and efficiency of utilization of ME and of energy of body reserves (mainly fat) for milk synthesis were 72 and 85 to 88 %, respectively. ME given during pregnancy for body reserve storage was used for milk synthesis with a 67 to 71 % overall efficiency. These values are close to the efficiency of utilization of ME supplied during lactation for milk production (72 %). The interest of these results for prediction of energy requirements of sows by a factorial approach is discussed.

### **Weight gain partition in the pregnant sow : prediction by energy and protein intakes**

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A simulation model was used to predict weight gain partition in the pregnant sow according to energy and protein intakes. It is based on recent information concerning energy metabolism in the pregnant sow and on a comprehensive analysis of the main factors affecting nitrogen retention.

The model was validated using numerous literature data concerning the influence of feeding on weight variation during pregnancy. It allows a good prediction of total and net pregnancy weight gain (R = 0.85 and 0.83, respectively) and gives the partition of that gain.

The different simulations emphasized the risk of establishing the feed requirements of the pregnant sow only on a weight gain basis without taking into account the effects on body composition. The development of this model also showed the lack of information about some of the factors affecting nitrogen deposition and about the effect of housing conditions.

### **Effects of feeding wheat, maize or barley-based diets during pregnancy on reproductive performance of sows**

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An experiment was carried out in 96 Large White sows to study the effects of pregnancy diets based on cereals on reproductive performance. Females were distributed into 4 groups and fed the same diet during the first two pregnancies. In the control group, animals were fed a diet including 86 % barley and 10 % soybean meal. In the other groups, diets contained 96 % barley, wheat or maize without supplementary protein. Females ingested about 7 Mcal DE/day during pregnancy. The control diet was fed in restricted amounts during the three-week lactation period (5 kg/day during the first cycle and 5.2 kg/day during the second one).

Weight changes of sows were related to the pregnancy diet. Total and net pregnancy weight gains were higher in the control group (mean of the two cycles : 58.3 and 41.4 kg for total and net gain, respectively), lower in the maize group (39.4 and 25.1 kg) and intermediate in the barley (48 and 32.5 kg) and wheat groups (47.3 and 31.7 kg). Weight losses of the sows during lactation were all the more marked as weight gain was high during gestation (- 13.9, - 6.0, - 4.0, and - 7.1 kg in the control, barley, wheat and maize groups, respectively).