

Effect of high levels of incorporation of spring peas into maize or barley based diets and as a supplement of rapeseed meal

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Utilization of spring peas by the bacon pig between 25 and 100 kg was studied in 2 trials. In both trials 48 castrated males and 48 females of the *Large White* breed were tested in restricted feeding conditions. In the 1st trial diets including 0 - 20 - 25 or 30 p. 100 peas were compared to determine the maximum level of incorporation into diets based on barley and soyabean. In the second trial, the association of spring peas with rapeseed meal, was studied. The rapeseed meal was originated from simple 0 seeds, but exhibited very low glucosilicate contents (34.8 moles/g DM) because of a double toasting. The peas and rapeseed meal levels of the 4 diets were 0 and 0, 25 and 0, 0 and 8 and 25 and 8, respectively.

In the 1st trial made during the growing period, diets including 25 and 30 p. 100 peas led to lower performances than the others. During the finishing period, the 4 diets led to similar performances, so that the 4 diets led to the same results over the whole fattening period. As regards the carcass and fatness, results were identical whatever the diet. In the second trial, during the growing period, the diet including 25 p. 100 peas without rapeseed meal led to lower performances than the other three diets. This difference was smaller during the finishing period so that growth performances were the same with the 4 diets over the whole fattening period. The two diets including rapeseed meal led to a slight increase in liver weight (140 g). This did not affect the carcass yield. The carcass quality was nearly the same whatever the diet.

Long term effects of the level of feeding between 10 and 25 kg live weight on pig growth performance and body composition

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A factorial experiment 2³ (3 factors at 2 levels) involving 96 pigs was performed in order to assess the effects of sex and feed restrictions at two successive stages (10 to 27 kg live weight (LW) = A₁; or 27 to 101 kg LW = A₂) on growth rate, feed conversion ratio and lean meat production. The 2nd (S × A₁ × A₂) and the 1st order interactions between the 2 restriction stages (A₁ × A₂) were not significant.

At stage A₁, *ad libitum* fed females were less efficient than castrated males in terms of daily weight gain (562 vs 597 g/day, P < 0.10) and feed conversion ratio (1.93 vs 1.77, P < 0.01). The feed restriction, 23.5 p. 100 on average, reduced the growth rate but cancelled the differences between sexes by increasing the feed efficiency in gilts. No effect of this restriction was noticed on subsequent daily weight gain, preventing any compensation of the delay in growth. However, the feed conversion ratio was depressed again in *ad libitum* fed gilts and a reverse trend appeared in barrows (interaction S × A₁, P < 0.10).

At stage A₂, feeding the animals according to a schedule close to the *ad libitum* level resulted in higher growth rate (867 vs 825 g/d) and feed conversion ratio (2.95 vs 2.79)

in castrated males than in females. In barrows, more restricted than gilts (16 vs 7 p. 100), the lower feed efficiency was associated with a lower growth rate. Feed restriction slightly increased the feed conversion ratio in both sexes (2.91 vs 2.83, $P < 0.05$).

At slaughter (101 kg LW) the earlier feed restriction (A₁) resulted in an increase in muscle weight (+ 1.45 p. 100, $P < 0.10$) and a decrease in the weight of fatty tissues in the half carcass (— 3.2 p. 100, $P < 0.10$) regardless of the sex. The later feed restriction was much more efficient in promoting the muscle development (+ 5.4 p. 100 vs + 1.3 p. 100) at the expense of the fatty tissue (— 11.7 p. 100 vs — 3.5 p. 100) in castrated males than in females.

These experimental data do not substantiate the economic advantage of a feed restriction in growing-finishing gilts. In contrast, by improving feed efficiency in addition to carcass quality, the early feed restriction technique might be more attractive in females than in castrated males.

Compared utilization of wheat, maize and barley by pregnant sows

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An experiment was carried out on 46 *Large White* gilts in order to measure energy value and protein utilization of the main cereals during pregnancy. Animals were divided into four groups, each of them receiving the same diet during two successive pregnancies. Animals in the control group were fed a diet containing 86 p. 100 barley and 10 p. 100 soyabean oil meal. In the other three groups, diets contained 96 p. 100 barley, wheat or maize without supplementary protein. Feeding levels were the same during the two pregnancies, between 2.2 and 2.35 kg/day according to the diet in order to supply a similar amount of digestible energy to all females (around 7 Mcal/day). A control diet was supplied to all animals during three-week lactations at the maximum level of 5 kg/day during the first cycle and 5.2 kg/day during the second one. First mating occurred at a mean age of 229 days and a mean weight of 119 kg. Animals were maintained in metabolism crates during early and late pregnancy and total urine and faeces were collected during 5-day periods and subsequently analysed.

No significant difference was observed between first and second pregnancy for all criteria concerned and results were pooled for the two pregnancies. Apparent digestibilities of dry matter and energy increased when the crude fibre content of the diet decreased (81.4, 79.1, 87.2 and 88.6 p. 100 for apparent digestibility of energy in the control, barley, wheat and maize groups, respectively). Digestibility of nitrogen followed similar variations, except in the maize group where the proportion of endogenous nitrogen in total faecal nitrogen was relatively high. In all cases, digestibilities were significantly higher at the beginning than at the end of pregnancy. Consequently, energy values of the diets decreased by 1.1 to 1.6 p. 100 between 39 and 94 days of pregnancy. Digestible energy contents of cereals measured in the present experiment were similar to values obtained with growing pigs : 3410, 3790 and 3920 Kcal DE/kg dry matter for barley with 6.1 p. 100 crude fibre, wheat and maize, respectively. Energy apparent digestibility of diets with a low or medium crude fibre level was not improved in older and heavier pigs.

Nitrogen retention was about 11 g/day with diets containing 6 p. 100 cereals and significantly lower than with the control diet (15.9 g/day). Only females in the control group had an improved nitrogen retention when pregnancy advanced, because of a lower urinary nitrogen excretion. Thus pregnant gilts and sows need diets with well balanced proteins, especially regarding the lysine content, to obtain a protein anabolism specific to gestation.