

A comparative study on the utilisation of 3 cereals (barley, wheat, maize) in early weaned piglets

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Four consecutive experiments, each one lasting from 28 to 39 days, were carried out with early weaned piglets in order to compare the feeding value of different "cereal-diets" (barley, wheat, maize) used separately or mixed.

Each trial involved 120 piglets set out in compartments of ten (5 ♂, 5 ♀) on a flat deck.

The results gave the following indications :

— the intake of the wheat diets was not as favourable as that of the other ones, but the feed conversion ratio was better; the "barley-diets" presented a higher intake level, but a lower feed conversion ratio; the "maize-diets" were located between the two preceding ones.

According to the growth rates obtained there was no difference in the feeding value of the 3 cereals and moreover no replication of the data was possible.

Economic reasons are therefore determinant in the choice of cereals, since any substitution between high quality cereals seems to be possible.

Waxy versus normal maize : Energy value for growing pigs and piglets

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Three experiments were performed on growing pigs and piglets in order to determine the feeding value of amylopectin rich waxy maize.

A *digestibility trial (A)* was realized on growing pigs (5 castrated Large White males per group) placed in balance cages with total collecting of excreta for 10 consecutive days. The diets consisted exclusively of maize, either normal (group 1) or waxy (group 2), only re-balanced with minerals, vitamins and essential amino acids. The results obtained showed a better utilization of the energy of waxy maize (group 2):

ADE 90.3 versus 88.4 ($P < 0.05$) digestible energy 3,980 \pm 28 vs 3,914 \pm 13 ($P < 0.10$), apparent metabolisable energy: 3,887 vs 3,832 ($P < 0.10$) or corrected ME_n: 3,839 vs 3,787 ($P < 0.10$) Kcal per kg dry matter. The utilization of crude protein was slightly in favour of waxy maize: ADN 86.3 vs 85.6 (NS) retained nitrogen: 15.2 vs 14.2 g/d ($P < 0.10$).

In *trial B*, utilization of two types of maize of the same variety and isogenic except for the waxy gene was studied in piglets weaned at 21 days (24 animals per treatment). These two types of maize (the same as those tested in trial A), were introduced into isonitrogenous diets (22.5 % CP) at a level of 60 per cent. The performances obtained in the animals did not depend on the experimental diet (daily mean gain 366 g, feed conversion ratio 1.62 between 3 and 9 weeks of age). This was also the case for the apparent digestibility of the main ingredients of the ration (DM, OM, N) measured by means of an indirect method using a chromium oxyde marker. However, a great variability in the responses was observed, notably between replications.

In *trial C*, the same type of comparison was made on a larger stock of animals (a total of 128 piglets weaned at 35 days). The normal maize (group 1) or waxy maize (group 2) belonged

to the same variety and were introduced at the level of 70 per cent into isonitrogenous diets (20 % CP) offered till the age of 9 weeks. In these conditions, a marked effect was noticed in favour of waxy maize:

Daily mean gain: 470 g (group 2) *versus* 434 g (group 1), i.e. a significant increase of 8 per cent ($P < 0.05$); feed conversion ratio 1.76 (group 2) *versus* 1.84 (group 1) ($P < 0.10$).

Parallel to that an *in vitro* digestibility assay was made with the two types of maize of trial C. The results showed that the breakdown of waxy maize starch was more rapid in the presence of piglet pancreatic juice, a fact suggesting that the energy of this type of maize is more available.

Influence of diet on respiratory quotients and fat deposition in growing pigs

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Short-lasting measurements of gaseous exchanges in total confinement repeated several times during the day were used to study variations in these exchanges and in the respiratory quotient (RQ) during 23 h after meal eating in growing pigs (35-65 kg).

RQ variations showed that lipogenesis took place during the first post eating hours, whatever the protein concentration of the diet, protein free normal or high protein level (25 % DM). In the latter conditions values inferior to 1 (0.85) were observed when lipogenesis was occurring.

Fat deposition W.75 was highly correlated with ingested carbohydrates/W.75 ($r = +0.99$, $P < 0.01$), and energy efficiency of fat deposition (kf) was 0.76. Any lowering of the carbohydrate supply compensated for by an increase in the protein supply slowed down the lipogenesis in growing pigs.

Ad libitum or restricted feeding of female pigs receiving a maize soya-bean diet in the form of meal or pellet during the growing-finishing period

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Four feeding schedules were studied in female pigs derived from Large White × Landrace dams and Landrace sires. The diets were based on maize and offered either in the form of meal or pellets:

— *feed restriction* during the whole growing period. The feed restriction plan was that usually applied in our previous trials. It was established according to the weight of the animals and involved a maximum supply of 80 kg feed (2.8 kg/day/animal).

— *ad-libitum* feeding until 60 kg live weight followed by a feeding plateau of 2.55 kg/day/animal.

— *ad libitum* feeding until 60 kg live weight then a feeding plateau of 2.8 kg/day/animal.

— *ad libitum* feeding until slaughter.

Considering the overall experimental period, the daily mean intakes regularly increased from the most restricted treatment 1 to the *ad libitum* treatment 4. The values obtained were