

## Contribution to the study of lysine feeding standards for bacon pigs

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Four feeds based on barley and soybean meal were compared. Their lysine concentration were: 0.62-0.66-0.78 and 0.84 p. 100, i.e. 2.0-2.15-2.5 and 2.7 g Lysine/1 000 digestible Kcalories.

These feeds were offered simultaneously to females and castrated males, either *ad libitum* or according to a progressive feed restriction plan which varied according to sex (maximum 2.5 kg/day for males and 2.9 kg for females).

Restricted feeding led to a decrease in growth rate and to a marked improvement of body composition.

The sex influence appeared above all on the carcass quality.

There was a significant interaction between these two factors. It was due to a larger improvement of body composition in castrated males subjected to restricted feeding. For these animals, the feed restriction was more important than for females.

In *ad libitum* feeding, the optimal lysine level was inferior or equal to 2.0 g/1 000 digestible Kcal during the finishing period. During the growing period it was 2.15 for castrated males and 2.5 for females.

With a restricted feeding, Lysine levels of 2.5 and 2.0 g/1 000 digestible Kcalories seem to be correct for growing and finishing periods in females and castrated males respectively. These results justify the use of the same lysine feeding standards for the two sexes in relation to the energy level of the ration.

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## Optimal dietary level of balanced protein after amino acid supplementation in growing pigs between 20 and 50 kg weight

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An experiment was designed to study the possibility of reducing the dietary protein level in growing pigs between 22 and 52 kg live weight, after correcting the deficiencies in essential amino acids. Six groups of 12 animals each (half females and half castrated males) in individual pens were fed maize-soybean meal diets containing one of the following crude protein levels (18.7, 17.7, 15.5 and 13.4 p. 100 air dry diet). At the two lowest protein levels (15 and 13 p. 100) the diets were supplemented with L-lysine, with or without addition of supplementary L-lysine, with or without addition of supplementary L-tryptophan. The animals were moderately restricted to the same scale of feeding according to live weight and received pelleted diets. They were slaughtered at 100 kg body weight after receiving a common finishing diet beyond 52 kg live weight.

A positive response to supplementary tryptophan, after addition of lysine (first limiting amino acid), in castrated males like in females, was only found at the level of 13 p. 100 protein, which appeared to be suboptimal for growth performance. That means that the level of non essential nitrogen is the second limiting factor for growth, after lysine and before tryptophan, in the case of a maize-soybean meal mixture. Lysine supplementation is enough by itself for providing a maximal saving of protein supplement in this type of diet.

Lysine supplementation in the diet of castrated males allowed to decrease the protein level to 15 p. 100 in a diet containing 89 p. 100 dry matter, corresponding to 45 g crude protein per Mcal digestible energy.

The optimal level of balanced protein for growth in females between 20 and 50 kg body weight could not be determined due to a linear straight relationship between growth performance and protein level, after supplementation with lysine (13 and 15 p. 100 protein). Any way it may be excepted that this level is slightly higher than that observed with castrated males. An experiment is conducted for further information.

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### **Digestibility of amino acids in the pig. Comparison of two methods of determination used in the case of wheat and barley**

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The apparent digestibility of crude protein and the different amino-acids of two cereals (wheat and barley, 97 p. 100 in the diet) was measured in 8 pigs with a mean weight of 49 kg during an experimental period of 10 days. In this trial where the intake level was the same for both cereals (1 438 g dry matter/day) the apparent digestibility of crude protein was higher for wheat (88 p. 100) than for barley (76.1 p. 100).

Arginine, histidine, glutamic acid or proline showed a higher apparent digestibility than nitrogen. On the contrary the apparent digestibility of threonine, valine, alanine, aspartic acid and particularly lysine was lower than that of nitrogen (the ADC of lysine was 76.2 p. 100 for wheat and 61.95 p. 100 for barley).

The previous results were confirmed by calculation of the true digestibility taking into account the composition of the endogenous faecal nitrogen after feeding of a protein free diet.

The results of the balance trials were compared with the absorption coefficients of the different amino-acids, calculated after a protein intake of 100 g from recordings in the portal vein of the amounts of aminoacids absorbed during a post-prandial period of 8 hours. This method also showed that the digestion of wheat is more rapid and efficient than that of barley (absorption coefficients = 60.1 p. 100 versus 39.5 p. 100) but a certain number of differences appeared when it was compared with the balance method principally based on non essential nitrogen.

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### **Obtention and composition of rich protein wheat and its utilization by bacon pigs**

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Wheat represents an excellent source of starch for bacon pigs and can be used without any physiological restrictions (CASTAING and LEUILLET, 1973). Diets based exclusively on a current wheat variety supply already 50 p. 100 of the proteins and 30 p. 100 of the lysine. Thus, use of rich protein varieties should lead to larger soybean savings.