

**The effect of supplementary lysine on growth performance in the pig :  
comparison of industrial L-lysine HCl and sulfate**

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A growth trial was conducted on 120 growing-finishing pigs between 28 and 100 kg live weight in order to study the effect of supplementary industrial lysine on growth performance and carcass characteristics according to the form of L-lysine (HCl and sulfate) and the level of supplementation. Five treatments were compared with 12 *Large White* females and castrated males in each. The level of lysine in the basal diet containing maize, wheat, soyabean meal and maize gluten (treatment 1) was adjusted to 0.68 and 0.49 p. 100 within the live weight intervals 28 to 60 kg and 60 to 100 kg, respectively; the protein level was maintained at 17 p. 100 and the DE content was 3.3 Mcal/kg. Supplementary additions of L-lysine in the pure form (0.10 or 0.20 p. 100) were made throughout the experiment either with L-lysine HCl containing 78.5 p. 100 pure lysine (treatments 2 and 3) or with L-lysine sulfate containing 42.7 p. 100 pure lysine (treatments 4 and 5). The pigs were fed according to a scale adjusted at a level close to appetite. The results were the following :

1) The average growth performance provided by L-lysine sulfate was equivalent to that obtained with L-lysine HCl. During the whole experiment, the addition of 0.10 p. 100 lysine allowed an improvement of the average daily gain (ADG) of 49 and 57 g with HCl and sulfate forms, respectively while feed conversion ratio (FCR) decreased by 0.25 in both cases.

2) Under the conditions of lysine deficiency a supplementary supply of 0.10 p. 100 of the limiting amino acid (lysine base) provided an average increase in ADG of 53 g over the entire period associated with 0.25 decrease in FCR. This corresponded to 18 kg feed saving between 28 and 100 kg live weight. The muscle content in the hot carcass (with head) increased by 1.2 point, while the fat percentage in the carcass (without head) was 1 point lower.

3) The castrated males like the females issued from a rapidly growing lean genotype, responded favourably to a supplementary lysine supply, although to a less extent up to a level exceeding 0.8 and 0.7 p. 100 within the weight intervals 28 to 60 and 60 to 100 kg, respectively under the conditions of feed restriction at a level slightly below *ad libitum* feeding.

**Influence of ambient temperature and meal frequency on the efficiency  
of lysine supplementation**

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Two experiments were conducted to study the factors likely to affect the efficiency of free lysine supplementing a diet deficient in this amino acid.

Experiment A compared the performance of growing-finishing pigs (from 25 to 95 kg) fed three different diets containing 16.5-15.0 or 13.5 p. 100 crude protein, but with the same lysine content (0.80 p. 100). The last two feeds were supplemented with a new form

of lysine (Lysine R.P., a product containing 18.5 p. 100 of lysine base). These diets were successively compared in winter (ambient temperature maintained at 15 °C in the pig house) and in summer (25 °C).

In addition to classical differences related to the sex of the animals (castrated males vs females), there were others depending on the temperature, i.e. a lower feed conversion and a higher growth rate in summer, but with a greater adiposity during this season.

Whatever the season, the three diets provided a similar performance.

The purpose of experiment B was to study the influence of three factors : the feeding rhythm (the same daily diet was offered in one or two meals per day), the nature of the basal diet (either containing a high fibre level and inducing a fast transit or containing a low fibre level and inducing a slower transit), the type of lysine supplementation (either fully natural or partly in the free form).

Feeding of a single meal per day led to a significant increase in feed conversion without altering the growth rate and body composition.

A better performance was noticed with diets containing a low fibre level (more energy).

The form of lysine supplementation (natural or natural + lysine HCl or natural + lysine R.P.) had no effect on the performance. In particular no interaction between this factor and the feeding rhythm was observed.

#### **Utilization of field beans by the weaned piglet. Comparison of different levels of incorporation and varieties**

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Results of several trials made in similar experimental conditions were compared to define the maximum level of incorporation of field beans in diets for weaned piglets. The different varieties cultivated in France and exhibiting different tannin contents (0, 4 and 5 g/kg DM) were also compared. In all the trials, piglets (a total of 2216) were weaned at the mean age of 27 days (7.5 kg). Two weeks after weaning they were fed the experimental diets for 4 weeks (from 10.0 to 25.3 kg). Diets were offered *ad libitum* as pellets.

Free tannin selected varieties (with white flowers) did not prove to be better than classical varieties with tannin (coloured flowers) contrary to what was expected after the digestibility trials.

A level of incorporation of 10 p. 100 field beans led to growing performances quite similar to that of the control diets.

A higher level of incorporation (more than 10 p. 100) led to variable growing performances according to trials. However, a decreased feed intake was observed during the first two weeks of experiment as well as a reduced feed efficiency. The daily mean gain was reduced by 4 and 11 p. 100, respectively with 20 and 30 points of field beans.

Further trials should be made to define the effect of field beans at different levels of incorporation (from 10 to 20 p. 100) taking into account the antitryptic factors, tannin and vicin contents of the varieties used.