

Basic amino acids and cations
Interrelationships between lysine/arginine and lysine/potassium/sodium

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The purpose of these two experiments was to study the relationships between dietary lysine and arginine levels. One hundred and eighty 6-week-old piglets (mean weight : 11 kg) were divided into 5 groups corresponding to the *ad libitum* feeding of one of the five experimental diets. The components, lysine and arginine levels and arginine/lysine ratio were :

- (1) Maize - skimmed milk - groundnut meal - 0.96 - 1.53 - 1.59.
- (2) (1) + lysine - 1.56 - 1.53 - 0.98.
- (3) Maize - skimmed milk - groundnut meal - 0.95 - 0.95 - 1.00.
- (4) Maize - skimmed milk - 0.98 - 0.72 - 0.73.
- (5) (4) + arginine - 0.98 - 0.93 - 0.95.

Improvement in the performance was due to the lysine level or to the milk percentage in the formula rather than to the arginine/lysine ratio.

The second experiment was carried out with pigs weighing 21 kg and fed one of the following 5 diets for 42 days :

- (1) Basal diet : 0.60 p. 100 lysine - 0.79 arginine - A/L = 1.32.
- (2) (1) + 0.24 p. 100 lysine - A/L = 0.94.
- (3) (1) + 0.60 p. 100 arginine - A/L = 2.32.
- (4) (1) + 0.24 p. 100 + 0.60 p. 100 arginine - A/L = 1.65.
- (5) (1) + 0.48 p. 100 lysine + 0.60 p. 100 arginine - A/L = 1.29.

Growth rate and feed efficiency were significantly improved when lysine was added (groups 2 - 4 - 5). The addition of arginine had no effect.

In the third experiment, carried out with 6-week old piglets (10.6 kg), six diets containing the following levels of lysine, potassium and sodium were compared :

- (1) 0.60 - 0.47 - 0.15.
- (2) 0.60 - 1.04 - 0.15.
- (3) 0.60 - 0.47 - 0.56.
- (4) 0.90 - 0.47 - 0.15.
- (5) 0.90 - 1.04 - 0.15.
- (6) 0.90 - 0.47 - 0.56.

The best performance was obtained with a lysine level of 0.90 p. 100. Increase in the potassium or sodium level had no effect, in particular when the lysine level was low : these cations seem not to be lysine « saving » factors.

Nutritional value and originality of tryptophan

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The first experiment (A) was carried out to study the effect of a tryptophan deficiency on feed intake of finishing pigs.

Fourty pigs, between 60 and 95 kg live weight, were fed one of the 4 diets containing the following amounts of lysine and tryptophan :

- (1) 0.55 and 0.09 p. 100.
- (2) 0.68 and 0.09 p. 100.
- (3) 0.55 and 0.11 p. 100.
- (4) 0.68 and 0.11 p. 100.

Addition of tryptophan led to a marked increase in the feed intake (groups 3 and 4). Addition of lysine to a tryptophan deficient diet increased the sub-consumption of feed.

In two experiments (B and C), 6-week old piglets (11 kg) receiving a tryptophan deficient and a tryptophan balanced diet *ad libitum* and in free choice, showed a clear preference for the second one ; 87 and 74 p. 100 of the total feed intake in experiments B and C, respectively. This difference was less marked in the case of a free choice between a lysine deficient and a lysine balanced diet.

In an experiment (D) conducted like the previous ones with weaned 6-week old piglets, the results obtained with an *ad libitum* feeding of the following 5 diets, were compared :

- (1) Control diet containing 0.11 p. 100 tryptophan.
- (2) (1) + 0.03 p. 100 - L-tryptophan.
- (3) (1) + 0.06 p. 100 L-tryptophan.
- (4) (1) + 0.09 p. 100 L-tryptophan.
- (5) (1) + 0.12 p. 100 L-tryptophan.

The highest daily weight gain and the lowest feed conversion ratio were obtained with diet (3) containing 0.17 p. 100 tryptophan.

In the last experiment (E) carried out with the same basal diet as in the previous one, the effects of a supplementation with L-tryptophan (0.03 and 0.06 p. 100) and DL-tryptophan (0.06 and 0.12 p. 100), were compared. As similar performances were obtained with diets supplemented with 0.06 p. 100 L or DL-tryptophan, it was concluded that the efficiency of D-tryptophan ranged around 100 p. 100.

Total replacement of soyabean in fattening pig diets by spring peas and synthetic tryptophan

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Total replacement of soyabean meal by spring peas (37 p. 100) in a diet for fattening pigs based on maize (50 p. 100) and wheat led during the « starter » period to significantly poorer growth rates and feed conversion ratios in both sexes and to a marked reduction of the feed intake in the females.

During the finishing period, the feed intake and performances were lower in females, while the results of males were similar to those obtained in the controls.

For the whole fattening period, growth and feed efficiency decreased by 10 and 7 p. 100, respectively.

Supplementation of the « pea » diet with 0.03 or 0.06 synthetic tryptophan allowed, even with the lower level of incorporation, to restore a normal feed intake in the females. Performance, slightly lower during the first month, were improved during the finishing period, so that they were equivalent to those of the controls, which were excellent in absolute value.