

**Utilization of horse beans
by growing finishing pigs after tryptophan supplementation**

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Utilization of whole horse-beans in growing-finishing pig diets was studied in two experiments including respectively 48 animals in collective pens (2 treatments) and 84 animals in individual pens (7 treatments). The aim of these experiments realized between 20 and 100 kg live weight was to examine the interest of supplementing a diet based on maize with free tryptophan in presence of niacin or not, in the case of partial or almost total replacement of soyabean meal by horse-beans.

For the growing period, the results obtained showed that introduction of 15 or 30 p. 100 horse-beans into the diet caused a decrease in the daily mean gain of 2 and 6 p. 100, respectively, while the feed conversion ratio increased by 3 and 9 p. 100.

Tryptophan supplementation (0.03 p. 100 during the growing period, 0.02 p. 100 during the finishing period) at the highest level of horse-bean incorporation (30 p. 100) in a diet containing 0.13 p. 100 tryptophan during growth and 0.11 p. 100 during finishing, brought about an improvement of growth rate and feed efficiency of 6-7 p. 100, particularly marked when niacin was absent from the mixture of vitamins, whereas the carcasses tended to be leaner. The performances obtained only slightly differed from those recorded with the control diet (maize + soyabean meal). At the level of 15 p. 100 horse beans, the supply of supplementary tryptophan (0.02 p. 100), over 0.16 p. 100 during growth, only caused a slightly favourable but non significant effect (2 p. 100) and only in the females.

Variation in the blood level of free amino acids (accumulation of lysine and threonine relatively to the sum of essential amino acids, in presence of tryptophan deficiency) confirms, to a great extent, the results observed on growth and feed efficiency.

In conclusion, supplementation of horse beans with tryptophan in growing pig diets contributes to removing some of the difficulties arising from a massive incorporation of this legume into the diet. Owing to this it is possible to replace almost all soyabean proteins by horse bean proteins, at an incorporation level of 30 p. 100.

**Comparative study concerning the use of peas
and horse-beans by growing pigs**

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This study was made on growing finishing pigs in order to compare the use of a productive variety of winter peas, A 86, (24.2 p. 100 crude protein in dry matter) and that of variety of horse-beans, ASCOTT, (28.9 p. 100 crude protein in dry matter), as supplementary source

of protein. The legume seeds were introduced at levels of 15 and 30 p. 100 into diets based on maize (16 p. 100 crude protein and 3 300 kcal digestible energy/kg) and rebalanced with tryptophan to satisfy the requirements (0.15 p. 100) by addition of soyabean meal.

Sixty *Large White* pigs were divided into 5 groups of 12 animals (6 castrated males and 6 females) according to the following experimental scheme :

- - Group 1 : control diet : maize (73 p. 100) soyabean meal (21 p. 100).
- Group 2 : maize (65 p. 100) peas (15 p. 100) soyabean meal (14 p. 100).
- Group 3 : maize (53 p. 100) peas (30 p. 100) soyabean meal (11 p. 100).
- Group 4 : maize (67 p. 100) horse beans (15 p. 100) soyabean meal (12 p. 100).
- Group 5 : maize (58 p. 100) horse beans (30 p. 100) soyabean meal (6 p. 100).

The pigs, kept in individual pens, received the feed in form of pellets in one only meal per day, according to a feeding schedule depending on live weight. The same diet was offered during the overall fattening period from 24 to 100 kg live weight.

Under our experimental conditions, introduction of peas or horse beans into the diets in a proportion of 15 and 30 p. 100 respectively, led to obtention of high performances as compared to those recorded with the control diet (maize-soyabean meal) : growth rate (g/d) and feed conversion ratio (kg air dry feed/kg gain), respectively : group 1 : 692, 3.08 — group 2 : 685, 3.11 — group 3 : 678, 3.17 — group 4 : 684, 3.12 — group 5 : 687, 3.08 from 24 to 100 kg live weight. Likewise, for all body composition criteria, the statistical analysis of the results did not show any significant difference between the groups.

The findings of this study show that the use of peas and horse beans shall not only be considered in terms of total replacement of soyabean meal as the legumes also substitute for large fraction of cereals. Besides, the presence of soyabean meal appeared to be necessary, notably as a source of tryptophan ; this supplementation leading to an optimum valorization of the legumes. Under these conditions, peas and horse beans can be used in pig diets at an incorporation level of 15 and even 30 p. 100 during the whole growing period.

Nutritive value of animal by-products (keratin, gelatin) for growing-finishing pigs

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This study was made in order to estimate the nutritive value of keratin (horn meal) and gelatin (pig skin meal) as partial replacers of soyabean meal in cereal based diets.

The horn meal used was a product dried in hot air (135-140°C) for 24 hours, ground and sifted. Part of the product was used in this form, the rest subjected to ultragrinding leading to reduction of the particle size from 320 to 80 μ .

The gelatin studied came from pig skin meal subjected to various treatments (acidification, cooking). The chemical and amino acid composition of these products is reported.

For the « keratin » trials, the experimental schedule included 3 groups of 14 *Large White* pigs (7 castrated males, 7 females) subjected to lot trials between 30 and 100 kg live weight and 3 groups of 4 growing castrated males (30-35 kg) for studying digestibility. The diets used were the following :