containing 3.6 g lysine/1 000 kcal DE were compared. The control diet was based on wheat, soybean meal and mineral and vitamin mixture. Diets 2, 3 and 4 contained wheat (about 80 %), only 14.8 % soybean meal and were supplemented with 0.53 % lysine HCl, 0.07 % methionine and 0, 0.10 and 0.20 % threonine. The four diets contained 23.8, 18.3, 18.2, 17.7 % crude protein and 0.85, 0.62, 0.71 and 0.79 % threonine, respectively.

Feed intakes were similar with the four diets (1 034, 1 043, 1 065, 1 072 g/day). Weight gains were 595, 567, 611 and 626 g/d. The feed conversion ratio of diet 2 (1.84) was significantly different from that of diets 1, 3 and 4 (1.74, 1.74 and 1,71). The threonine requirement of weaned piglets between 11 and 25 kg was therefore estimated at 0.70 % of the diet, i.e. 60 % of the lysine requirement.

Sulphur amino acid requirements of piglets and growing pigs

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Four trials were made to study the sulphur amino acid requirements of weaned piglets and growing pigs.

In trial A, 4 diets containing 0.41, 0.49, 0.57 and 0.66 % methionine + cystine were fed ad libitum to piglets weighing initially 10 kg. After 28 days of experiment the best performance were obtained with the diet containing 0.49 % methionine + cystine (1.42 g M + C/1 000 kcal DE).

In trial B, the digestibility of diets containing 0.41 and 0.57 % methionine + cystine was compared. Digestibility and N and methionine retention were higher with the diet containing 0.57 % M + C.

In trial C, diets containing 0.39, 0.47, 0.55 and 0.63 % M + C were fed ad libitum to 24 growing pigs (12 castrated males and 12 females) between 25 and 95 kg live weight. Between 25 and 45 kg, the best performance were obtained with the diet containing 0.47 % M + C (1.40 g/ 1 000 kcal DE). The sulphur amino acid content of diet 1 (0.40 %, 1.20 g/1 000 kcal DE) appeared sufficient above 45 kg live weight.

In trial D, a control diet (T) containing 0.16 % methionine and 0.15 % cystine was compared to a diet TM (T + 0.08 % DL-methionine) and a diet TC (T + 0.08 % L-cystine). The trial was made in piglets weighing initially 10 kg fed ad libitum for 21 days. Methionine supplementation significantly improved performance. Cystine supplementation neither improved weight gain nor feed conversion ratio and decreased feed intake. It was concluded that methionine should represent at least 55 % of sulphur amino acid supply.

Harmful effects of dietary calcium excess in pigs fed a plant-phosphorus-rich diet

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Dietary calcium excess may decrease phytic P digestibility in hamsters and rats and bone breaking strength in pigs. An experiment was made to compare Ca and P balances, mineral content, density and bending moment of bones in pigs fed either a high (1.4 %) or a normal (0.6 %) Ca diet for 2 months. No inorganic P was added and the total P (0.5 %), of which 70 % was phytic, and vitamin D_3 (1 000 IU kg) contents were the same in both diets.

The high CA diet had no effect upon phosphorus utilization. Daily amounts of excreted, absorbed and retained calcium were increased whereas Ca absorption relative to intake was not significantly decreased in high CA fed pigs.

All signs of phosphorus deficiency such as hypophosphatemia, hypercalcemia, hypophosphaturia and hypercalciura appeared with both high and normal Ca diets though some of them, especially hypophosphatemia and hypercalcemia, were aggravated by the high Ca diet. Pigs fed this diet also exhibited decreased density and bending moment of bones without changes in their mineral contents as expressed in percent dry weight. However, ash content relative to bone volume (tibia) was lower and thus, osteoporosis was patent. In addition, higher liver weights and a trend to lower performance were observed with the high Ca diet. It was concluded that harmful effects of phosphorus deficiency are intensified by dietary Ca excess which therefore should not be recommended.

Effect of high and low phosphorus diets upon bones in the growing pig

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In various species, phosphorus deficiency, but also phosphorus excess may develop mineral and bone disorders. These disorders were studied in the growing pig by comparing the effects of three dietary phosphorus levels (from deficiency to excess) on some mineral metabolism parameters : urinary Ca and P excretions, plasma and bone mineral contents, bone bending moment and density. The low P diet (0.4 % P) was not supplemented with mineral P, the high P diet (1.2 % P) contained 0.4 % plant P and 0.8 % mineral P and the control diet (0.7 % P) around 60 % plant P and 40 % mineral P. Ca (0.8 %) and vitamin D_3 (500 IU/kg diet) contents were the same for all diets. Animals were killed after a 7-week period.

P-deficient pigs exhibited hypophosphatemia, hypophosphaturia, higher plasma alkaline phosphatase, hypercalciuria as well as decreased mineral contents (about − 20 %), density and bending moment of all bones. The high P- diet did not change any plasma parameters, but provoked a very acute hyperphosphaturia, a severe nephrocalcinosis. It also decreased the strength of some bones (tibia, metatarsal), but did not change their mineral contents or density. In conclusion, the disorders in mineral metabolism are more marked with low than with high P diets. However, high P-related disorders should be taken into account in practical husbandry when formulating diets.

Utilization of tandem rapeseed by weaned piglets and growing-finishing pigs

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The feeding value of Tandem rapeseed (52 µmoles glucosinolate/g defatted dry matter) was studied in diets for 10-25 kg weaned piglets and for 27-102 kg growing-finishing pigs. Barley based diets containing either 0-5 or 10 % raw rapeseed or 20 % extruded rapeseed were compared. These diets were formulated to supply 3.6 g lysine/1 000 kcal DE to piglets and 2.6 g to growing-finishing pigs. They were fed ad libitum to piglets and according to a feeding pattern to pigs.

In the piglet trial, energy intake was reduced by 3.4 and 4.1 % with diets containing 5 and 10 % raw rapeseed. With extruded rapeseed, energy intake was reduced by 5 %. Feed conversion ratio was similar whatever the diet. Consequently, growth of piglets mainly depended on the level of energy intake.