

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 hypercalciuria 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<sub>3</sub> (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  $\mu$ moles 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.