Effects of calciferol and calcitriol intake on plasma and bone traits of weaned piglets

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Aims of the study

1) Is the maximum authorised dose of vitamin D_3 (calciferol, 50 µg/kg feed) necessary for maximum bone mineralisation?
2) What are the effects of increasing dietary doses of **Panbonis®*** (*Solanum glaucophyllum,* which contains calcitriol, the active metabolite of calciferol)?

Experimental protocol

-10 Large White piglets per treatment
-9.7 g Ca, 5.5 g P, 500 FTU phytase per kg feed
-7 treatments (**calciferol/calcitriol, µg per kg diet**): **25/0; 50/0**; 25/5; 50/2.5; 50/5; **50/10**; **50/20**.

Experimental parameters
Feed intake, body weight, plasma calcitriol, Ca and P concentration.

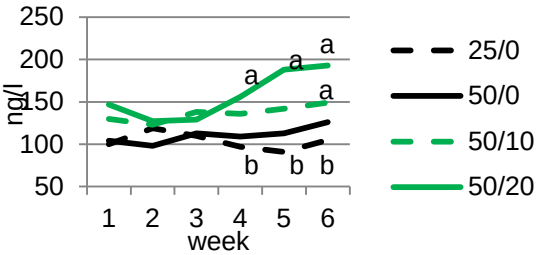
Bone mineralisation (ashing) and bone breaking strength (three point bending method) in treatments 25/0, 50/0, 50/10 and 50/20 only.

ANOVA (initial plasma values used as covariates); pairwise comparisons between treatment 25/0 and each other treatment.

Growth performance

There was no treatment effect (P > 0.1) on average daily feed intake (700 g, SEM 3) and weight gain (390 g, SEM 27) during the 6 weeks.

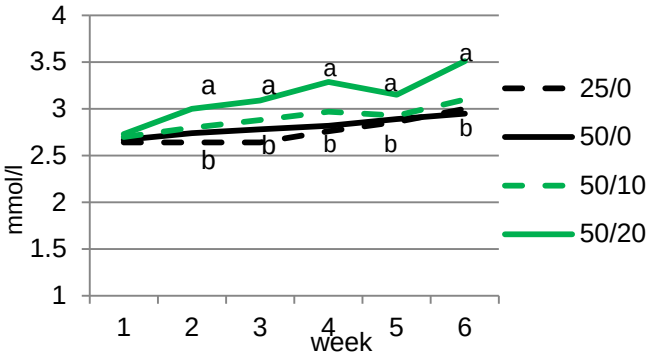
Plasma calcitriol concentration



Only diets 50/10 and 50/20 increased plasma calcitriol towards the end of the experiment (P < 0.05).

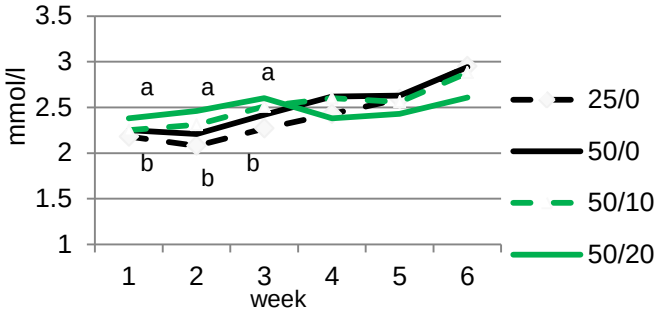
-* Produced by Herbonis Animal Health (Basel, Switzerland), which financed part of the experiment and analysed plasma calcitriol. Dietary calcitriol concentration recommended by Herbonis: 2.5 µg/kg.

Plasma Ca concentration



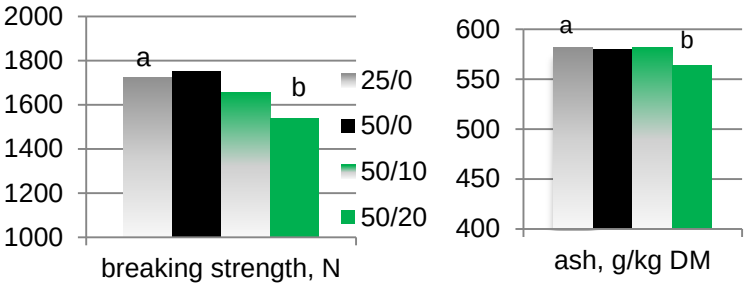
Diet 50/20 caused hypercalcemia.

Plasma P concentration



The reduction in plasma P concentration after weaning was mitigated by all diets containing calcitriol.

Bone traits



Diet 50/20 reduced bone strength and bone ash.

Doubling the dietary calciferol concentration had no effect on any experimental parameter studied.
Calcitriol (2.5 to 20 µg/kg diet) mitigated the postweaning reduction of plasma P concentration.
10 µg/kg calcitriol did not influence any experimental parameter except plasma calcitriol and plasma P,
At 20 µg/kg calcitriol plus 50 µg/kg calciferol, hypercalcemia as well as a reduction in bone ash and breaking strength occurred as signs of a hypervitaminosis.

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