



Effect of Ca levels on performance, bone ash and ileal digestibility of Ca and P in broilers fed phytase and endo-β-1,4-xylanase

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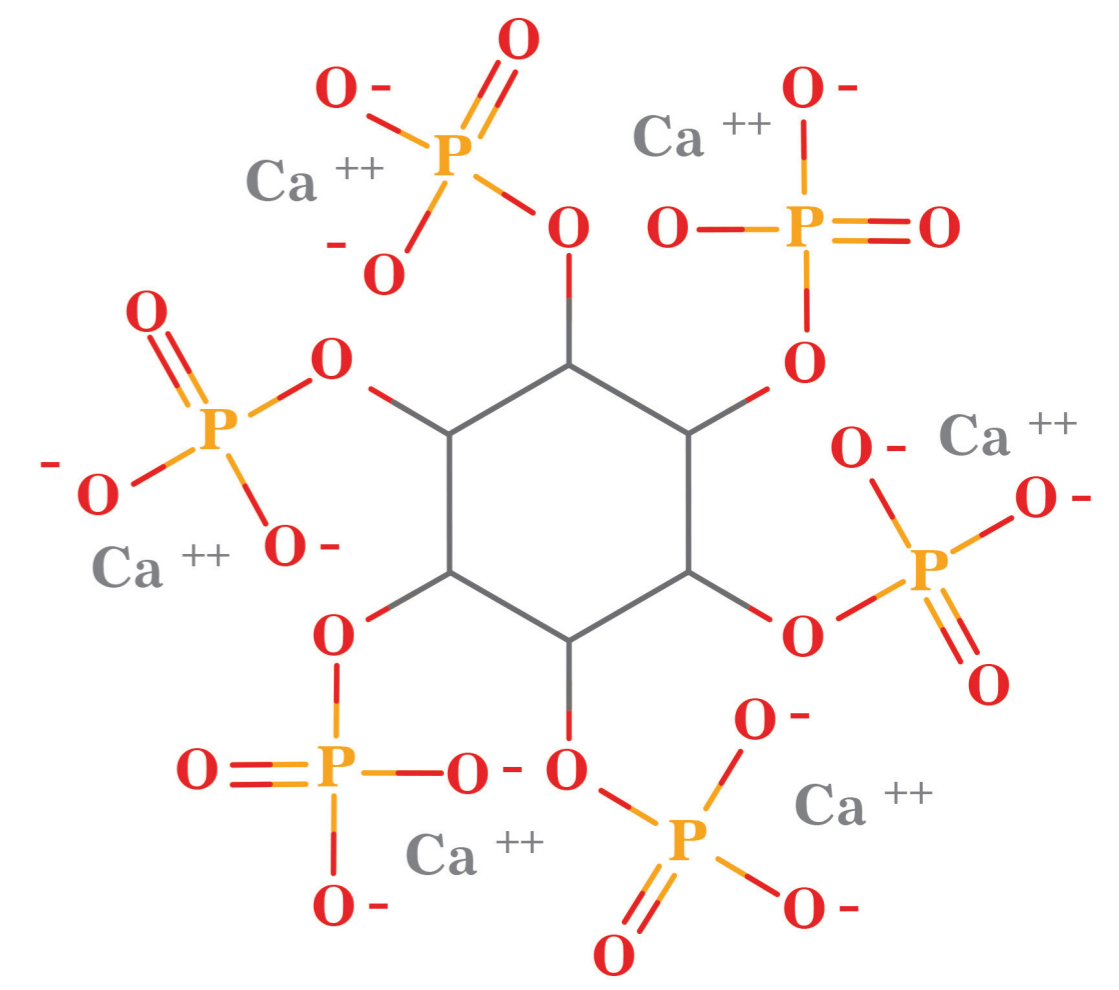
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Summary

Reducing the Ca levels had a large positive impact, not only on animal performance, but also on Ca and P digestibility, and thereby on the efficiency of OptiPhos[®] Plus, yielding higher P matrix values. Reducing Ca levels might impact bone formation slightly, showing that Ca requirements for bone formation might be higher than Ca requirement for optimal animal performance.

Method

- 33 pens (11 pens per treatment) with 12 broilers (male, Ross 308)
- Feed (wheat/corn/soybean meal; pelleted at 80°C (starter crumbled))
 - Starter (0-8 d): 22.4 % CP, 1.24 % dig. lys, 0.43 % aP, 2870 kCal/kg ME
 - Grower (9-21d): 20.5 % CP, 1.13 % dig. lys, 0.37 % aP, 3020 kCal/kg ME
 - Finisher (21-35d): 18.5 % CP, 1.0 % dig. lys, 0.32 % aP, 3090 kCal/kg ME
 - All feeds contained 1000 FTU/kg of OptiPhos[®] Plus 5000 G; formulated with an aP of 1.76 g/kg (no Ca matrix values applied) and 1500 EPU/kg of Hostazym[®] X 15000 (added on top)
- Treatments
 - Normal Ca: formulated at 8.5, 7.0 and 6.0 g/kg in starter, grower, and finisher resp.
 - Reduced Ca: formulated at 7.0, 6.0 and 5.0 g/kg in starter, grower, and finisher resp.
 - Low Ca: formulated at 6.5, 5.0 and 4.0 g/kg in starter, grower, and finisher resp.
- Measurements: technical result, tibia ash (day 21) and Ca and P digestibility (day 35).



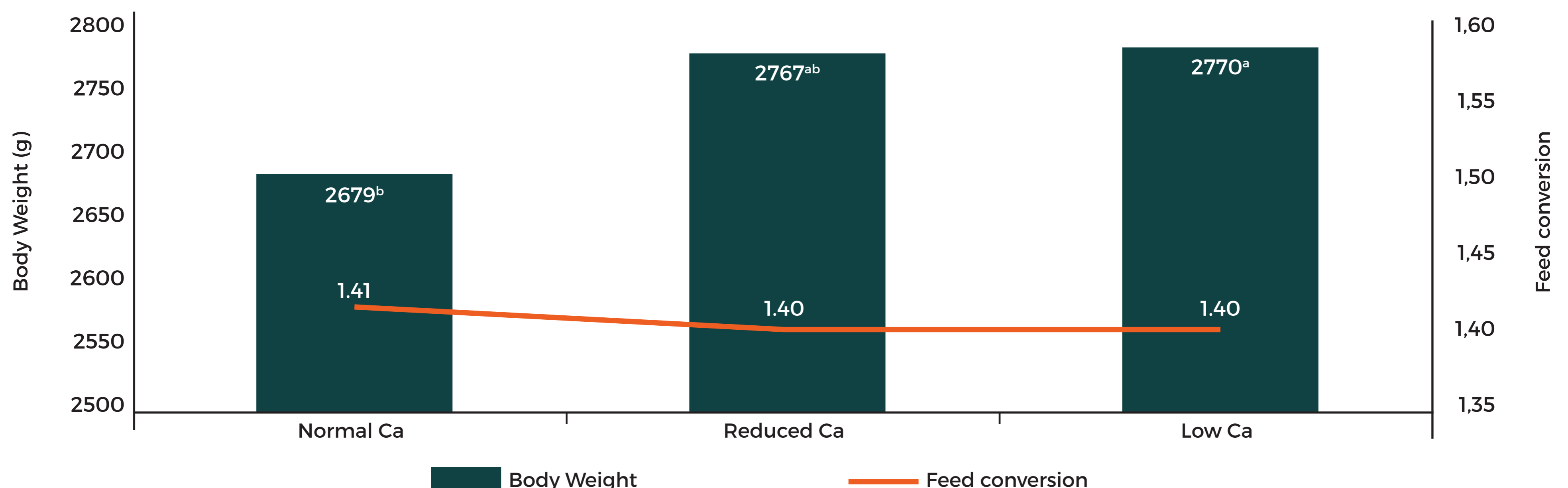
Results

- Reducing the Ca levels led to an increased technical performance, with the lowest Ca level giving a significantly higher end weight vs the normal Ca level (p< 0.05, Fig. 1)
- FCR was not impacted despite the higher end weight at reduced and low Ca levels.
- The Ca digestibility was highest at the lowest Ca inclusion level (p< 0.05, Table 1).
- The P digestibility was also highest at the lowest Ca inclusion level.
- Tibia ash, and Ca and P level in tibia ash, decreased with decreasing levels of Ca; this demonstrates that Ca availability, but not P availability, limits the bone formation.
- The fact that low Ca levels optimised technical performance, but tended to reduce bone ash, demonstrates that the Ca requirement for optimal bone growth is higher than the Ca requirement for optimal performance.

Table 1. Ileal Ca and P digestibility, tibia ash content, and Ca and P content in tibia ash

Treatment	Ileal digestibility (%)		Tibia ash (% of DM)	Ca in tibia DM (%)	P in tibia DM (%)
	Ca	P			
Normal Ca	50.2 ^b	54.5 ^{ab}	48.4 ^a	18.6 ^a	10.1 ^a
Reduced Ca	53.9 ^b	51.3 ^b	47.6 ^{ab}	18.2 ^{ab}	9.9 ^{ab}
Low Ca	64.1 ^a	60.6 ^a	46.8 ^b	17.8 ^b	9.8 ^b

(^{a,b} significant P < 0.05)



(^{a,b} values with a different superscript are significantly different at P<0.05))

Figure 1. Effect of lowering Ca levels on body weight and feed conversion at day 35