



Dose response of OptiPhos® Plus in piglets

Trial description

1 Set-up

- **Location:** University of Ghent, Belgium
- **Trial period:** November 2018 – January 2019
- **Animals:** Pietrain x Danbred 20 piglets mixed-sex balanced. Six pens per treatment.
- **Feeds:** (Table 1, pelleted):
 - Weaner (day 0 – 14; 18.4 % CP, 1.15 % dig. Lys; 2480 kCal/kg NEpigs):
 - Positive control: 6.5 g/kg Ca, 6.2 g/kg total P, 3.5 g/kg dig. P.
 - Negative control: 5.5 g/kg Ca, 4.4 g/kg total P, 2.0 g/kg dig. P.
 - Starter (day 15 – 41; 18.0 % CP, 1.05 % dig. Lys; 2400 kCal/kg NEpigs):
 - Positive control: 6.5 g/kg Ca, 6.2 g/kg total P, 3.2 g/kg dig. P.
 - Negative control: 5.5 g/kg Ca, 4.3 g/kg total P, 1.7 g/kg dig. P.

2 Treatments

- Positive control
- Negative control
- Negative control + OptiPhos® Plus at 250, 500, 750 or 1000 FTU/kg

3 Measurements

- Technical performance (body weight & daily gain (individual piglet), feed intake & feed conversion (per pen))
- Digestibility: at 5 weeks post weaning, faecal samples were rectally collected per pens, pooled and frozen till analysis. Faecal samples were dried and analysed for marker (TiO₂), dry matter, organic matter protein, ash and total P.

Table 1. Feed composition and analysis (g/kg)

Ingredient	Weaner		Starter	
	Positive control	Negative control	Positive control	Negative control
Wheat	206	218	266	279
Barley	300	300	300	300
Corn	150	150	150	150
Soybean meal HiPro	125	125	165	162
Sunflower meal (HP)	50	50	60	60
Potato protein	30	28	0	0
Whey powder (sweet)	75	75	0	0
Soy oil	24	21	17.5	14
Premix	5	5	5	5
Lime fine	2.3	3.5	9.4	10.5
MCP	11.1	2.8	10.8	2.6
Others*	21.7	21.8	19.7	16.8
Nutrients				
Crude protein	184	184	180	180
Ash	51	44	55	48
Dig. Lys	11.5	11.5	10.5	10.5
Ca	6.5	5.5	6.5	5.5
P total	6.2	4.4	6.2	4.3
Dig P	3.5	2	3.2	1.7
NE Pigs (Kcal/kg)	2480	2481	2401	2401

* NaHCO₃, salt, acids, synthetic amino acids, minerals, vitamins and digestibility marker

Results

- Adding OptiPhos® Plus to the negative control brought back performance to the positive control level (Fig. 1)
- OptiPhos® Plus at 250 FTU/kg improved not only P, but also Ca and ash digestibility, while higher doses increased the digestibility even further (Table 2).
- All levels of OptiPhos® Plus improved significantly the faecal protein and organic matter digestibility vs the positive control (Table 2).
- Based on the dig. P value measured, and considering the feed intake and the P level in the feed, the impact of 250 to 1000 FTU/kg OptiPhos® Plus on ash, Ca and P digestibility could be calculated (Table 2). The inclusion of 250, 500, 750 and 1000 FTU/kg OptiPhos® Plus gave an improvement of dig. P of 0.96, 1.06, 1.18 and 1.33 g/kg respectively.

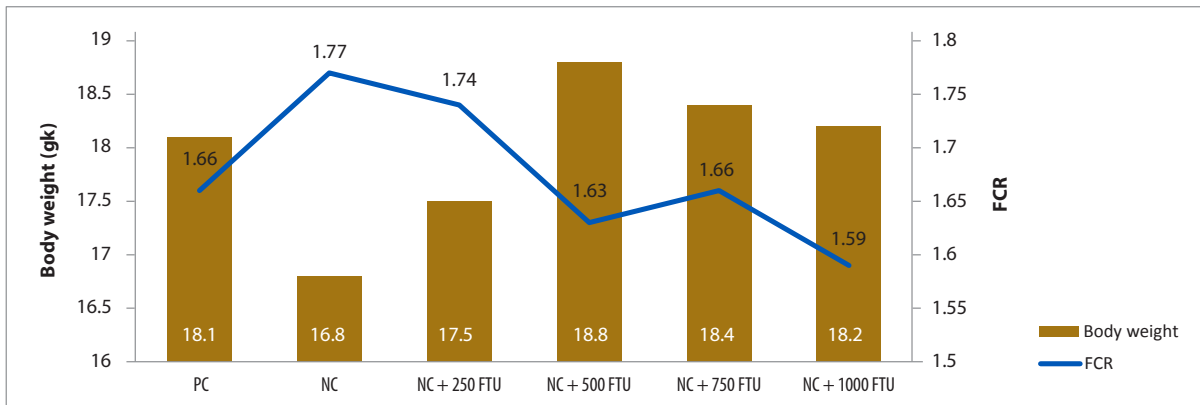


Figure 1. Effect of increasing levels of OptiPhos® Plus on technical performance

Table 2. Effect on improvement of faecal digestibility of protein, ash, Ca, P and organic matter (OM)

	Protein	Ash	Ca	P	OM
Pos. control	72.8 ^b	47.7 ^b	47.7 ^b	44.8 ^b	79.9 ^b
Neg. control	77.1 ^a	45.5 ^b	45.5 ^b	33.4 ^c	83.4 ^a
Neg. control + 250 FTU	77.3 ^a	53.8 ^a	53.8 ^a	54.7 ^{ab}	82.9 ^a
Neg. control + 500 FTU	77.5 ^a	54.7 ^a	54.7 ^a	57.0 ^a	82.2 ^{ab}
Neg. control + 750 FTU	76.6 ^{ab}	55.7 ^a	55.7 ^a	59.6 ^a	82.0 ^{ab}
Neg. control + 1000 FTU	78.0 ^a	57.0 ^a	57.0 ^a	62.9 ^a	82.9 ^a

a,c: values win a column with different superscript are sign. diff. P < 0.05

Table 3. Improvement on faecal digestibility of P, Ca and ash vs the negative control

	Ca	P	Ash
250 FTU	0.86	0.96	0.40
500 FTU	0.72	1.06	0.44
750 FTU	0.91	1.18	0.49
1000 FTU	1.03	1.33	0.55

Conclusion

- OptiPhos® Plus added to a P deficient feed at 250 to 1000 FTU/kg
 - Brought technical performance back to the positive control.
 - Improved not only P digestibility, but also Ca and ash digestibility significantly.
- Reformulating with OptiPhos® Plus also significantly increased the protein digestibility vs the positive control.
- A digestible P value of 0.96, 1.06, 1.18 and 1.33 g/kg could be calculated for 250, 500, 750 and 1000 FTU/kg OptiPhos® Plus respectively.