Supplementation of a β-mannanase enzyme to diets with a reduced NE content supports post-weaning piglet performance during a PRRSV outbreak under field conditions

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Introduction & Objectives

- β-Mannans - strongly anti-nutritive polysaccharide fibers - are found in many vegetable feed ingredients.
  - In common swine diets, the content of soluble β-mannans is estimated to range between 0.15 to 0.40%.
  - *In vitro* studies have demonstrated that as little as 0.05% of soluble β-mannan content in feed can elicit a strong innate immune response.
- Hemicell HT (Elanco Animal Health) is a β-mannanase enzyme to supplement animal feed which breaks down β-mannans.
- This field study compared pig performance on a control diet to a reformulated diet with lower energy content – 55-65 kcal/kg net energy (NE) reduction – including a β-mannanase enzyme during a PRRSV outbreak under field conditions.

Materials & Methods

- A six-week feeding trial was conducted on a commercial post-weaning facility
  - DanBred x Belgian Piétrain piglets
    - n = 1502
    - 30 piglets per pen
    - 24 replicates per treatment group
  - Piglets weaned at 21 days of age.
- Standard three-phase control diets (0.34% β-mannan) were compared to reformulated diets (0.35% β-mannan) with an energy reduction of 55-65 kcal NE/kg and inclusion of a β-mannanase enzyme (Hemicell HT™; Elanco) at 300 g/tonne.
- Standard production data were collected.
- The data were analyzed using JMP 15.0 statistical program.

Results

- Overall, performance data did not differ significantly ($P > 0.05$) between treatment groups during the post-weaning period.
- Mortality was only numerically, but not significantly higher in the Control (5.3%) as compared to the Enzyme-treated group (3.8%).
- The effect of Enzyme supplementation was beneficial in both light-weight and heavy-weight piglets to maintain ADWG and reduce mortality during a PRRSV outbreak.
- Hemicell HT had an overall benefit of € 3.59 per piglet (Table 2) and € 5.18 per tonne of feed (Table 3) due to the NE reduction.

Table 1. Summary of performance data from a feed trial with a 3-phase feeding strategy comparing standard Control diets to adapted Enzyme-treated diets.

	Control	Hemicell HT	P-value
# pens	24	24	-
Total # piglets d0	737	765	-
Total # piglets d44	709	736	-
Mortality (#)	39	29	0.23
Mortality (%)	5.3 ± 1.4	3.8 ± 1.3	0.19
Weight d0 (kg)	5.1 ± 0.3	5.1 ± 0.2	0.48
Weight d44 (kg)	19.2 ± 0.9	20.0 ± 0.8	0.19
Weight dead piglets (kg)	10.3 ± 2.0	7.8 ± 2.1	0.20
ADWG (g/d)	315 ± 14	333 ± 14	0.18
ADFI (g/d)	492	498	-
FCR (kg/kg gain)	1.53	1.48	-
Total feed (tonne)	15,725	16,485	
Total feed cost (€)	8615.48	8946.36	-
Feed cost (€/piglet sold)	12.15	12.16	-
Feed cost per kg gain (€/kg)	0.861	0.820	-

Table 2. Detailed calculation of economic benefit per piglet considering the reduction in feed cost, piglet price corrections (standard price at 25 kg) and opportunity cost of mortality.

Parameter	Control	Hemicell HT
Feed cost per piglet (0-42 d)	€ 12.15	€ 12.16
Benefit feed cost reduction		- € 0.01
Piglet price corrections (€ 75,- for 25 kg)	- € 17.40	- € 15.00
Benefit technical results		+ € 2.40
Mortality (#)	39	29
Total opportunity cost due to mortality (€)	€ 2,925	€ 2,175
Opportunity cost per marketed piglet (€/piglet)	€ 4.12	€ 2.92
Benefits mortality		+ € 1.20
Overall benefit per piglet		**+ € 3.59**

Table 2. Detailed calculation of economic benefit of feed cost per tonne of feed considering total feed costs and total amount of feed consumed.

Parameter	Control	Hemicell HT
Total feed costs (0-44 d)	€ 8,615.48	€ 8,946,36
Total amount of feed consumed (tonne)	15,725	16,485
Feed cost per unit (€/tonne)	€ 547.88	€ 542.70
Overall benefit per tonne of feed		**- € 5.18**

Discussion

- **The current trial demonstrated that the inclusion of Hemicell HT in reformulated diets with a lower energy content (55 – 65 kcal NE/kg of feed) was able to maintain production performance in post-weaned piglets, suffering from an active PRRSV circulation and secondary *S. suis* meningitis, with an economic benefit.**
- **The inclusion of Hemicell HT had an overall benefit of € 3.59 per piglet and € 5.18 per tonne of feed due to the 55 – 65 kcal/kg NE reduction.**

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