

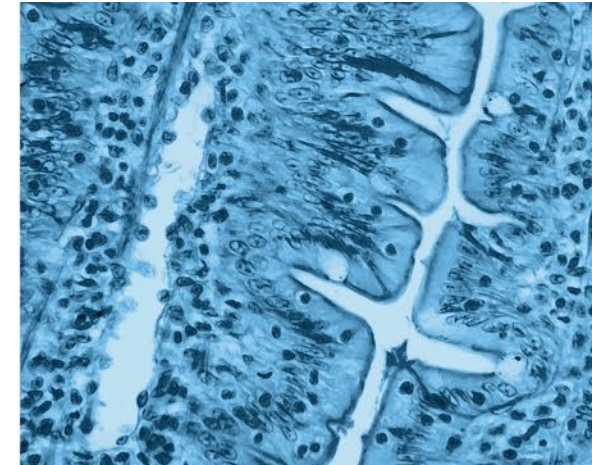


SCHOTHORST FEED RESEARCH



75th EAAP Annual Meeting

Nutrition management to reduce methane emission and environmental impact, Part 1



Effect of β -mannanase on growing-finishing pig performance, economics, and carbon footprint

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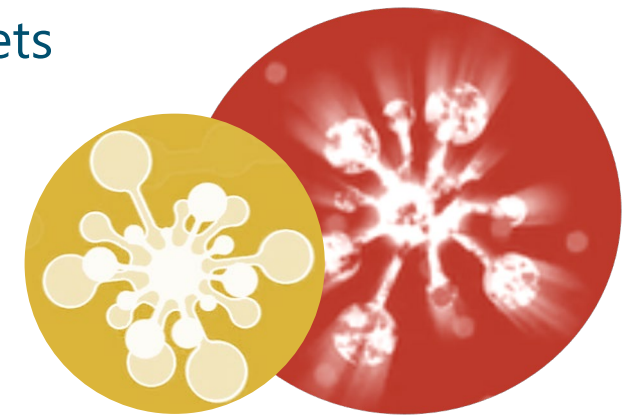
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Knowhow to feed

Introduction



- β -Mannans are considered ANFs
- Addition of β -mannanase could potentially lead to an improvement in technical performance
 - The effect is larger in growing-finishing pigs than in weaned piglets
- Energy (E) sparing effect?
 - Studies showing positive effects → didn't reduce E content of the diets



Kipper et al., 2020; Kiarie et al., 2021; Jeon et al., 2019; Kim et al., 2017; Pettey et al., 2002

Objective

- The specific objective of this experiment was to evaluate the efficacy of Hemicell™ XT (Elanco AH, Indianapolis, IN) on growth performance, carcass characteristics, economic viability (IOFC), and carbon footprint of growing-finishing pigs fed a diet lower in NE (i.e. -35 Kcal NE/ kg)



Experimental design

➤ 2 dietary treatments

Trt	Description	Diet per period		
		Starter (25-50 kg)	Grower (50-85 kg)	Finisher (85-120 kg)
1	Control diet	A	C	E
2	Control diet + Hemicell™ XT ¹	B	D	F

¹ Dose is 133 g/ton

➤ 12 replicates/ treatment (2 rounds with 6 replicates)

- Starting BW, around 25 kg
- 8 pigs per pen (4 gilts; 4 boars)
- Housing = 0.94 m²/pig



Dietary treatments

		Trt 1	Trt 2
NE-value, kcal/ kg	Starter	2450	2415
	Grower	2400	2365
	Finisher	2350	2315
SID Lys/ NE, ratio	Starter	4.20	4.26
	Grower	3.60	3.66
	Finisher	3.20	3.25

		Starter		Grower		Finisher	
		A	B	C	D	E	F
Barley	%	7.500	7.500	7.500	7.500	7.500	7.500
Rapeseed meal 00	%	5.876	5.876	5.000	5.000	5.000	5.000
Corn	%	25.000	25.660	25.000	25.663	25.000	25.663
Molasses beet	%	4.000	4.000	4.000	4.000	4.000	4.000
Palm kernel expeller (<20% CF)	%	1.000	1.000	5.000	5.000	4.500	4.500
Wheat	%	35.000	35.000	35.000	35.000	35.000	35.000
Wheat middlings	%	0.000	0.000	3.122	3.122	6.893	6.893
Monocalcium phosphate	%	0.337	0.337	0.000	0.000	0.000	0.000
Salt	%	0.241	0.241	0.243	0.243	0.244	0.244
Lysine HCl (79%)	%	0.479	0.479	0.458	0.458	0.418	0.418
Methionine L/DL (99%)	%	0.147	0.147	0.123	0.123	0.083	0.083
Threonine L (98%)	%	0.182	0.182	0.186	0.186	0.158	0.158
Tryptophane L (98%)	%	0.027	0.027	0.024	0.024	0.018	0.018
Choline-Chloride 75%	%	0.038	0.038	0.033	0.033	0.033	0.033
Soybean hulls (32-36% CF)	%	1.000	1.000	2.000	2.000	3.500	3.500
Animal fat - poultry	%	2.614	1.954	1.956	1.293	1.375	0.712
Soybean meal (>48% CP)	%	15.000	15.000	8.903	8.903	5.161	5.161
Phytase	%	0.005	0.005	0.004	0.004	0.003	0.003
Valine L (96.5%)	%	0.043	0.043	0.029	0.029	0.010	0.010
Vitamin and mineral premix ¹	%	0.500	0.500	0.500	0.500	0.500	0.500
Limestone (38% Ca)	%	1.011	1.011	0.921	0.921	0.606	0.606

Analysis of the experimental diets

Diet code	Moisture		Ash		CP		CFat (AH)		Starch (AM)		CF	
	Ana	Calc	Ana	Calc	Ana	Calc	Ana	Calc	Ana	Calc	Ana	Calc
A	117	124	45	46	168	168	50	51	400	408	37	35
B	<u>115</u>	125	43	46	167	168	45	45	415	412	35	35
C	<u>111</u>	124	39	41	148	147	49	47	416	413	45	46
D	<u>109</u>	125	40	41	148	147	43	41	409	417	46	46
E	<u>116</u>	126	38	37	138	134	46	42	<u>403</u>	420	52	53
F	<u>116</u>	127	36	37	138	135	40	36	416	424	51	53

β -mannanase activity was for all Trt 2 diets >49110 U/kg

Animal health and mortality



- In total 10 animals (5.21%) had to be medically treated
 - Total number of medical treatments and doses administered were not significantly different between experimental treatments (i.e. $P = 0.69$ and $P = 0.47$ respectively)
- In total 7 pigs had to be removed of which 3 pigs were found dead (1.56%)



Animal performance

Treatment	1	2	SEM	P-value
Description	Control diet	Control diet + Hemicell		
Duration, days				
Finisher	30.8	30.1	0.65	0.46
Total	96.3	95.6	0.65	0.46
Body weight, kg				
Start	25.4	25.4	0.002	0.14
End starter	51.6	52.5	0.45	0.23
End grower	84.4	86.5	1.10	0.21
End finisher	120	121	0.8	0.33
ADG, g/day/pig				
Starter	801	817	12.1	0.38
Grower	1013	1051	25.8	0.32
Finisher	1164	1157	22.4	0.83
Total	986	1007	12.8	0.28

Animal performance

Treatment	1	2		
Description	Control diet	Control diet + Hemicell	SEM	P-value
ADFI, kg/day/pig				
Starter	1.45	1.44	0.020	0.74
Grower	1.93	2.01	0.047	0.28
Finisher	2.65	2.73	0.052	0.30
Total	1.99	2.04	0.030	0.25
FCR, g/g				
Starter	1.79	1.76	0.017	0.21
Grower	1.90	1.88	0.025	0.73
Finisher	2.31	2.39	0.057	0.38
Total	2.01	2.02	0.024	0.74
Faecal consistency ¹				
Starter	6.64	6.61	0.052	0.68
Grower	6.64	6.70	0.038	0.25
Finisher	6.75	6.79	0.029	0.40
Total	6.67	6.70	0.026	0.48

Also carcass characteristics were not significantly influenced ($P > 0.05$)

IOFC

Treatment	1	2
Description	Control diet	Control diet + Hemicell
BW, in kg	120.0	121.0
Revenues, in Euro	262.8	265.0
Feed costs, in Euro	141.4	143.0
IOFC, in Euro/pig	121.4	122.0
Difference, in Euro/pig		0.58

Treatment	1	2
Description	Control diet	Control diet + Hemicell
BW, in kg	120.5	120.5
Revenues, in Euro	263.9	263.9
Feed costs, in Euro	142.4	142.0
IOFC, in Euro/pig	121.5	121.9
Difference, in Euro/pig		0.49

*Averaged
performance*

Carbon footprint

Period	Control diet			Control diet + Hemicell			Difference	
	Baseline (kgCO ₂ eq.)	LUC ¹ Baseline (kgCO ₂ eq.)	Peat Baseline (kgCO ₂ eq.)	Hemicell (kgCO ₂ eq.)	Hemicell LUC ¹ (kgCO ₂ eq.)	Hemicell peat (kgCO ₂ eq.)	Abs	%
Starter	1489	456	36	1475	454	36	-14	-1.00%
Grower	1170	304	44	1157	302	44	-13	-1.00%
Finisher	966	216	44	953	214	43	-13	-1.4%

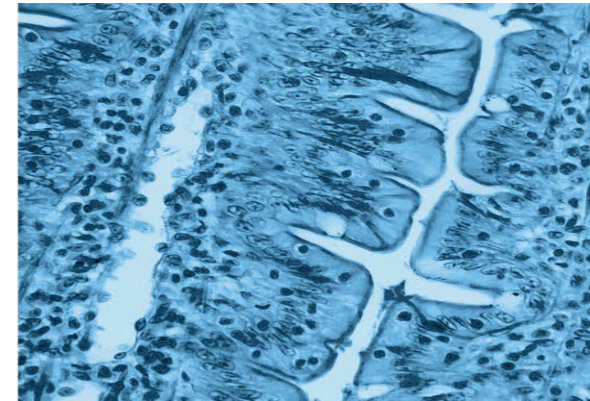
¹ LUC = Land use change



Conclusion

- The results of current study suggests that using Hemicell® is possible to reduce the energy content by -35kcal NE, and the CO2 footprint by 1% without affecting productive parameters.





Thank you for your attention

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