Presentation P4.37

AJINOMOTO EUROLYSINE

Reduction of the crude protein content in diets for growing-finishing pigs

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INTRODUCTION

Reducing the protein content of the diets for growing-finishing pigs contributes to reduce nitrogen excretion. However for this to be effective this reduction should not affect the performance of the animals. The present trial was conducted in order to study the effect of reducing the protein content with or without correcting the corresponding Thr:Lys and SAA:Lys ratios on the performance of growing-finishing pigs.

MATERIALS and METHODS

Animals and housing

- Ninety-six Landrace pigs, (48 males and 48 females)
- Initial body weight was 21.7 kg (SD 2.37)
- Twenty-four pens of 4 animals
- Distributed into 6 blocks of initial BW and sex

Diets and experimental treatments

- Grower diet (0.85% dig Lys, 2450 kcal NE), weeks 0-5
- Finisher diet (0.70% dig Lys, 2450 kcal NE), weeks 5-14
- All diets in pelleted form and offered *ad libitum*.
- Four experimental treatments
  - **T-1**: high-protein diet (HP)
  - **T-2**: low-protein diet (LP) without added Thr or Met
  - **T-3**: LP diet with added Thr (LP+Thr)
  - **T-4**: LP diet with added Thr and Met (LP+Thr+Met).

Table 1. Composition of the experimental diets (%, as fed).

	Grower				Finisher			
Ingredients	**T-1**	**T-2**	**T-3**	**T-4**	**T-1**	**T-2**	**T-3**	**T-4**
Wheat	34.0	45.0	45.0	45.0	36.9	39.4	39.4	39.4
Barley	30.0	34.3	34.3	34.3	38.0	48.0	48.0	48.0
SBM-44	28.8	14.5	14.5	14.5	19.1	7.13	7.13	7.13
Lard	5.04	3.37	3.37	3.37	4.04	2.99	2.99	2.99
$CaCO_3$	0.93	0.98	0.98	0.98	0.84	0.90	0.90	0.90
$CaHPO_4$	0.46	0.54	0.54	0.54	0.27	0.32	0.32	0.32
DL-Met	0.01	-	-	0.10	-	-	-	0.04
L-Lys-HCl	0.05	0.41	0.41	0.41	0.09	0.39	0.39	0.39
L-Thr	-	-	0.16	0.16	-	-	0.14	0.14
Salt	0.34	0.35	0.35	0.35	0.35	0.35	0.35	0.35
Sepiolite	-	0.26	0.10	-	-	0.18	0.04	-
Vit-Min mix	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Estimated nutrient composition (ileal digestible AA basis)								
C. Protein	19.4	15.2	15.4	15.4	17.8	14.4	14.5	14.5
Dig. Lysine	0.85	0.85	0.85	0.85	0.70	0.70	0.70	0.70
dSAA:dLys	0.60	0.49	0.49	0.60	0.65	0.54	0.54	0.60
dThr:dLys	0.65	0.46	0.65	0.65	0.65	0.46	0.65	0.65
NE (kcal)	2450	2450	2450	2450	2450	2450	2450	2450
Analysed nutrient composition (total AA basis)								
C. Protein	20.4	16.3	16.0	15.8	17.7	14.1	14.2	14.3
Lysine	1.00	0.96	0.95	0.94	0.85	0.84	0.82	0.85
SAA:Lys	0.59	0.51	0.52	0.60	0.66	0.55	0.56	0.58
Thr:Lys	0.71	0.55	0.68	0.70	0.71	0.55	0.73	0.69

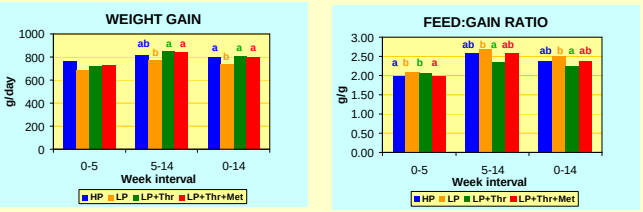
Measurements and statistical procedures

- Body weight and feed intake at 5, 9 and 14 weeks of trial.
- Initial and Final BW, ADG, ADFI and FCR analysed by ANOVA as a randomised complete block design (6 blocks, 4 treatments)

RESULTS

It was observed that reducing the protein content of diets for G/F pigs (without Thr or Met supplementation) resulted in a Thr and Met deficiency during the grower phase and in a Thr deficiency during the finisher phase. Over the whole trial, the pigs on LP (without Thr or Met) had the poorest (P<0.05) growth and feed to gain ratio, and no statistically significant differences were observed between treatments HP, LP-Thr and LP-Thr-Met, which indicates that with the addition of Thr (at a dig Thr: dig Lys ratio of 0.65) it is possible to achieve the same performance with the LP-Thr diet as with the HP diet.

Figure 2. Average daily weight gain and feed to gain ratio of grower and finisher pigs offered diets with different crude protein contents and balanced or not with free Thr and Met.



a,b Within each period, values with different letters are significantly different (P<0.05).

Table 1. Performance of grower and finisher pigs offered diets with different crude protein contents and balanced or not with free Thr and Met.

Treatments	**T-1**	**T-2**	**T-3**	**T-4**	***STD***
Initial weight (kg)	21.8	21.7	21.8	21.7	*0.42*
Weight wk 5 (kg)	48.6	45.5	47.2	47.1	*2.66*
Weight wk 9 (kg)	71.2 **a**	64.7 **b**	70.5 **a**	70.2 **a**	*2.91*
Final weight (kg)	99.9 **a**	94.1 **b**	100.9 **a**	100.1 **a**	*3.23*
Grower phase					
Gain (g/d)	766	682	725	726	*73.0*
Intake (g/d)	1511	1430	1500	1437	*130.9*
FGR	1.97 **a**	2.10 **b**	2.07 **b**	1.98 **a**	*0.067*
Finisher phase					
Gain (g/d)	814 **ab**	771 **b**	853 **a**	841 **a**	*41.0*
Intake (g/d)	2110	2079	2014	2166	*212.7*
FGR	2.60 **ab**	2.70 **b**	2.35 **a**	2.58 **ab**	*0.235*
Whole trial					
Gain (g/d)	797 **a**	739 **b**	808 **a**	800 **a**	*34.1*
Intake (g/d)	1896	1847	1831	1906	*159.2*
FGR	2.38 **ab**	2.50 **b**	2.26 **a**	2.38 **ab**	*0.067*

a,b Within each row, values with different letters are significantly different (P<0.05).

CONCLUSION

It is concluded that the protein content in grower and finisher diets can be reduced from 19.4 to 15.4% and from 17.8 to 14.5% respectively, without significantly affecting performance if the right Thr and Met ideal ratios are maintained with the addition of free amino acids.