Introduction

- Growth models are used to describe the growth of pigs, to provide support for feeding and slaughter decisions and to optimise economic returns to pig place
- Usually protein-rich feed is more expensive than energy-rich feed
- The value of carcass generally increases with its' red meat percentage
- Modern feeding technology offers flexibility, which is not yet fully utilised, e.g. adjusting the feeding even daily

The aim was to compare does weekly changing feeding pattern with or without redused protein content of finishing feed give better economic result than three phase feeding

Material and methods

- Returns were first maximised for three alternative cases
- Optimisation was performed with the bio-economic model developed in MTT Agrifood Research Finland
- Growth was described using Gomperzt growth curve with parameters from crossbred Finnish Landrace and Yorkshire pigs
- Model results were used to design weekly adjusted feeding and slaughter patterns

Material and medhods

- There were starting, growing and finishing feeds for the three phase feeding (A)
- Weekly changing feedings (B and C) were adjusted by using these three base feed + concentrate and dilution feed
- Lysine was assumed to be the first limiting amino acid

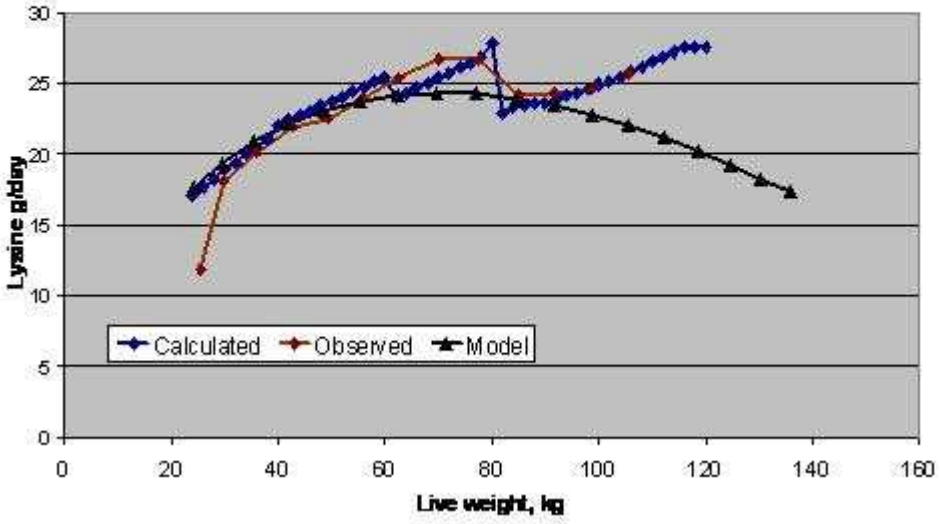
Ingredients and composition of the feeds

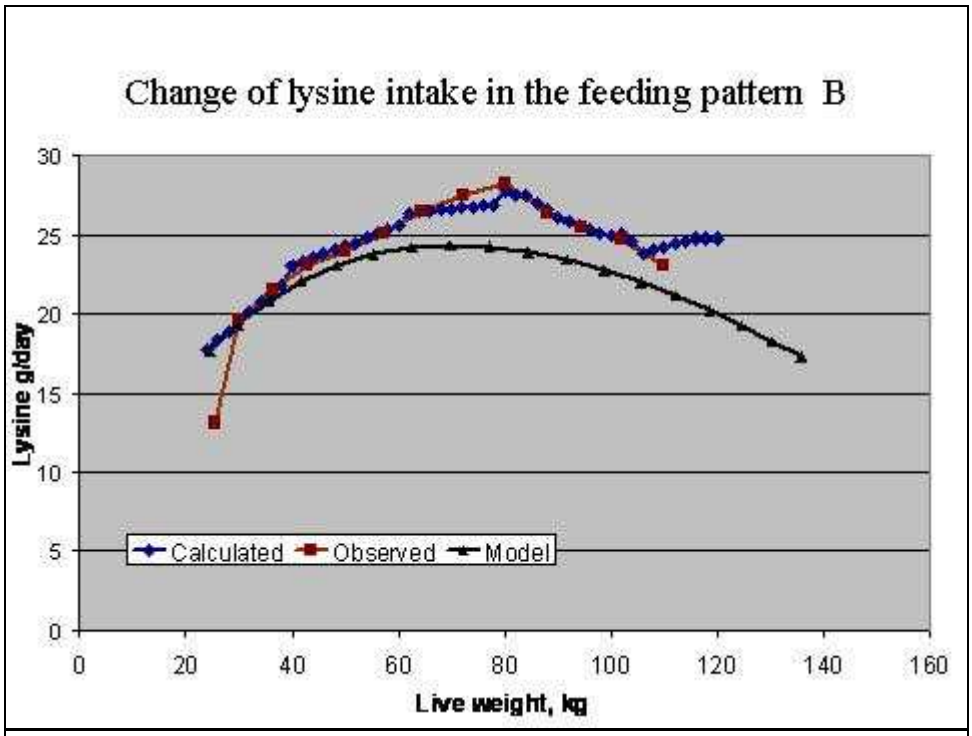
	Concent-rate	Starting diet	Growing diet	Finishing diet	Dilution
Dry matter. %	87.00	87.00	87.00	86.00	86.00
Ingredients. %					
Barley	61.51	79.69	82.33	88.08	93.88
Soybean meal	34.50	17.30	15.00	9.60	3.85
Premix	0.40	0.40	0.40	0.40	0.40
Calcium carbonate	1.34	1.36	1.30	1.23	1.21
Monocalcium phosphate	0.62	0.86	0.69	0.47	0.59
L-Lysine HCL	0.75	0.24	0.20	0.19	0.04
DL-Methionine	0.48	0.07	0.03	0.01	0.02
L-Threonine	0.40	0.08	0.05	0.04	0.02
Calculated nutritive value					
Net energy. MJ/ kg	8.46	8.65	8.65	8.74	8.84
Apparent ileal digestible lysine g/kg DM	17.79	8.93	7.94	6.59	3.79
Analysed nutrient content					
Crude protein g/kg DM	279.20	196.50	186.00	155.60	131.30
Lysine. g /kg DM	21.02	11.74	11.06	8.86	5.92

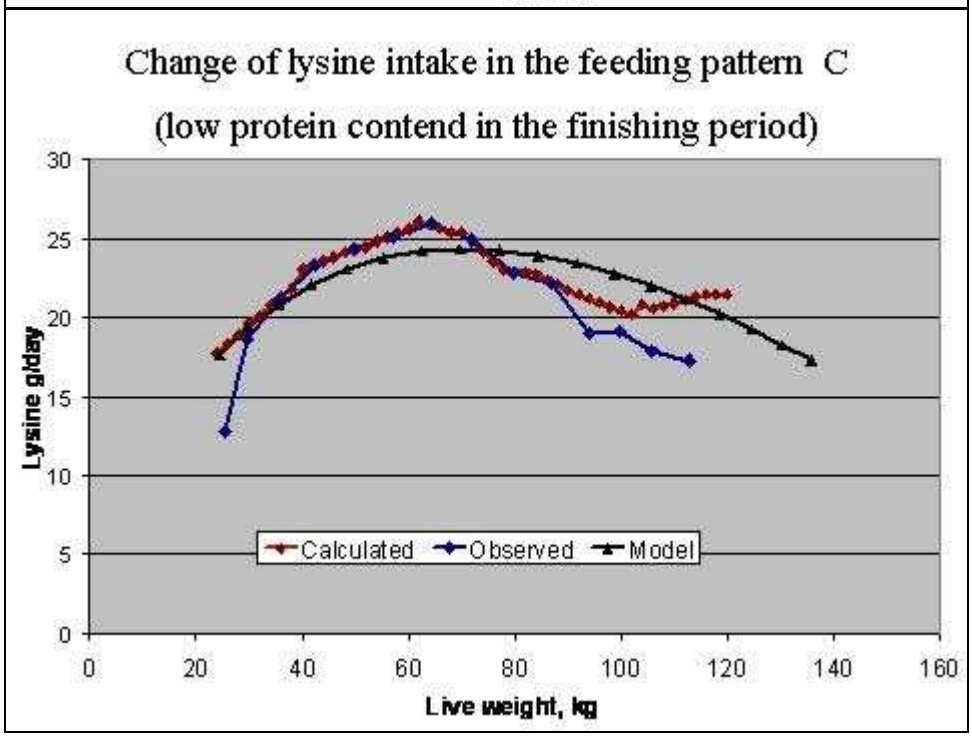
Material and medhods

- Animals were 60 crossbreds of Finnish Yorkshire and Landrace pigs.
- The pigs were grown from 25 kg to 110 or 120 kg live weight and weighed weekly.
- They were fed using feeding norms starting from 1.6 FU/d (1 FU = 9.3 MJ NE) at 25 kg weight to 3.3 FU/d at 120 kg.

Change of lysine intake in the feeding pattern A (three phase feeding)




Change of lysine intake in the feeding pattern B
Lysine g/day
Live weight, kg
Calculated
Observed
Model
0
5
10
15
20
25
30
0
20
40
60
80
100
120
140
160


Change of lysine intake in the feeding pattern C
(low protein contend in the finishing period)
Lysine g/day
Live weight, kg
Calculated
Observed
Model
0
5
10
15
20
25
30
0
20
40
60
80
100
120
140
160

Results and discussion

	Final weight 110 kg			Final weight 120kg					
	Three phase	Weekly changing	Weekly changing low protein	Three phase	Weekly changing	Weekly changing low protein	Final weight	Sex	Protein level
Final weight	111.8	112.2	111.1	121.2	120.6	120.2			
ADG, g/d	1029	1041	1015	995	1025	1020			
FCR	2.3	2.3	2.3	2.5	2.4	2.4	***		
Feed cost, €	37.5	38.2	37.7	44.4	43.6	42.6	***		
Meat %	60.0	59.4	60.0	59.4	58.5	58.2	***	***	
Feed kg	209.9	209.8	211.1	249.8	241.7	240.9	***		
Feed units	200.1	199.6	200.9	238.2	230.3	229.5	***		
Raw protein, kg	33.0	34.4	32.8	38.8	38.6	36.6	***		***
Lysine, kg	1.9	2.0	1.9	2.3	2.3	2.1	***		***
Profit margin €/year and pig place	-9.4	-12.2	-8.2	-8.2	-7.9	-7.7			

Results and discussion

- End weight significantly affected most traits
  - 10 kg rising of final weight increase the feed consumption about 35 kg and the feed cost 6 €
- Patterns B and C tended to grow pigs faster than A
- Pattern C tended to decrease both feed cost per pig and meat percentage (not significant).
- Feeding pattern significantly affected to protein consumption
  - At high final weight the consumption of raw protein was two kg and the lysine consumption was 200 grams less than in A and B patterns

Results and discussion

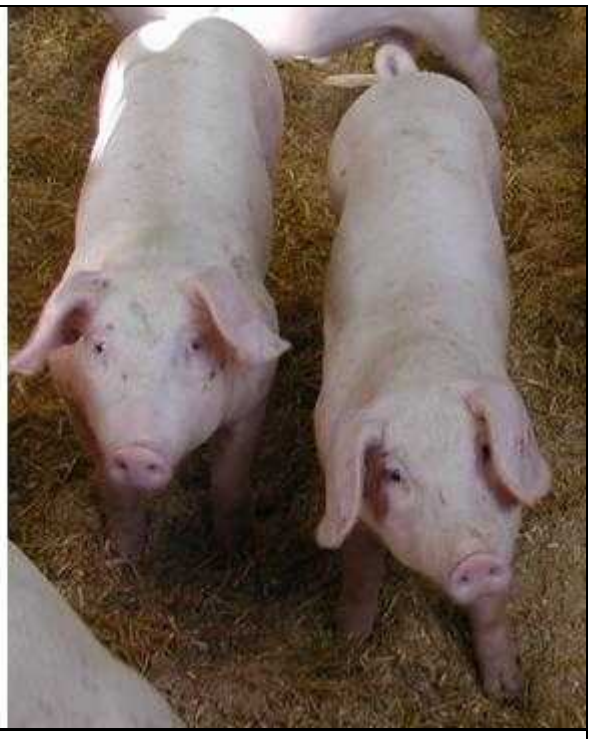
- Higher slaughter weight and reduced protein content (C) gave the highest return to pig place
- It was only slightly superior to weekly changed pattern with standard protein content (B)
- In the experiment, the benefits from weekly changing feeding were less that expected beforehand
- Possible reasons:
  - In used model, compensatory growth capasity was not taken account
  - Uncertainty about true genotype and feed composition

Conclusions

- Differences between feeding patterns were small but to in line with analytical calculations
- The number of animals in this study were too low to get signicant differences in highly variable traits
  - Differences may become more significant in large-scale and continuous production
- The benefit depends always about prices
- In future, more studies is needed to test the accuracy of optimicing models

MTT

Thank you for your attention!



Acknowledgements

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Literature

NIEMI, J. K. 2006. A dynamic programming model for optimising feeding and slaughter decisions regarding fattening pigs. Agricultural and food science 15, Supplement1: 121. Diss. : Helsingin yliopisto, 2006. (Doctoral Dissertation).

SEVÓN-AIMONEN, M.-L. 2001. The parameters of growth curve and composition of growth for Finnish pigs. In: Book of Abstracts of the 52nd Annual Meeting of the European Association for Animal Production : Book of abstracts No. 7 (2001) Budapest, Hungary 26-29 August 2001. Wageningen: Wageningen Pers. p. 290.

p_t^{soy}		0.3	€ per kg
p_t^{barley}		0.103	€ per kg
p_t^{amino}		0.015	er kg barley
$p_t^{meat2)}$		1.3	€ per kg
	+ pr	0.02	€ per %