

Research Concerning the Influence of the Reducing Level of the Compound Feed on the Performances of the Pigs for Fattening

Monica Marin, Laura Urdes, Elena Pogurschi, Dumitru Dragotoiu

Faculty of Animal Science, Bucharest, 011464, Marasti Blvd., 59, Romania

Abstract

The test performed was aimed at analyzing the various levels of the crude protein parameters in the recipes of compound feed administered to pigs for fattening, as well as the influence of these levels on the quantity of excreted nitrogen and the production performances. Fattening was achieved in two stages: 30-60 kg and 60-100 kg. In the first stage the content in crude protein was 17.57%, respectively 16.06% and in the second stage was 15.03% and 13.47%. The others recipe parameters were approximately equal in all batches of the respective stage. The results of the tests showed that the productive performances of the pigs and the results obtained at slaughtering haven't been influenced significantly by the reducing proteic level of the compound feed and by the elimination protein of animal source, but the quantity of excreted nitrogen by pigs was decreased, playing for safety the environment pollution.

Keywords: compound feed, fattening, nitrogen balance protein, pigs, slaughtering

1. Introduction

The essential preoccupation of pig breeders represent the apply of feeding technology which allow to improve the productive performances (gain, specific consume etc.), to obtain superior quality carcasses and to reduce the quantity of eliminated nitrogen [1].

In this context measures which can be taken at the swine alimentation level would be the use of compound feed recipes on growing stages, using additives which improve the conversion of food, the decrease of crude protein quantity from compound feed, the achievement of a suiting balance between amino acids and having them as base parameters expressed as available amino acids [2, 4].

All these measures influence positively, on the other hand the breeding of pigs, and on the other hand the protection of the environment, the

eliminated nitrogen being able to pollute the water table and the air [3].

By the researches which we have attempted in this paper, we have studied the influence of lowering the protein content of compound feed over the bioproductive performances and over the eliminated nitrogen quantity.

2. Materials and methods

Researches have been made on a number of 48 pigs from the Large White breed, divided in two batches homogenous as corporal weight and as the ratio between sexes.

Fattening has been realized in two stages, the first stage (from 30 to 60 kg) and the second stage (from 60 to 100 kg).

Swine from the first batch have been fed with compound feed, having a higher protein level (17.57% CP in the first stage and 15.03% CP in the second stage), while the second experimental batch decreased the proteic level from the recipes, respectively 16.06% CP in the first stage and 13.47% CP in the second stage.

* Corresponding author: Monica Marin, Tel: (+40)720657597, monica_marin_zoo@yahoo.com

The structure and the parameters of compound feed recipes used during the experimental period are presented in the table 1.

Table 1. The structure and parameters of the tested compound feeds (%)

Specification	Stage I (30-60 kg)		Stage II (60-100 kg)	
	Batch L1	Batch L2	Batch L1	Batch L2
Maize	63.00	73.13	77.37	75.10
Soybean meal	10.00	7.00	5.00	4.00
Full fat soya	15.00	10.00	8.30	6.50
Sunflower meal	5.00	7.00	7.00	11.50
Fish meal	4.20	-	-	-
L-lysine	-	0.20	0.25	0.28
DL-methionine	-	0.08	0.06	0.90
Calcium carbonate	0.70	0.69	0.50	0.30
Calcium phosphate	1.00	0.80	0.42	0.32
Salt	0.50	0.50	0.50	0.50
Choline premix	0.10	0.10	0.10	0.10
Vitamins-mineral premix	0.50	0.50	0.50	0.50
TOTAL	100.00	100.00	100.00	100.00
<i>Parameters of recipes</i>				
Metabolisable energy EM (kcal/kg)	3145	3179	3268	3226
Crude protein CP (%)	17.57	16.06	15.03	13.47
Lysine (%)	0.931	0.933	0.791	0.796
Methionine+Cystine (%)	0.611	0.608	0.553	0.559
Methionine (%)	0.356	0.350	0.307	0.304
Threonine (%)	0.674	0.587	0.579	0.563
Tryptophan (%)	0.185	0.179	0.181	0.176
Calcium (%)	0.904	0.892	0.673	0.651
Phosphorus (%)	0.674	0.635	0.469	0.427
Crude fiber (%)	2.96	3.05	3.08	3.11

The main objectives followed in the experience have been the evolution of body weight, daily and specific consumption of compound feed, the results obtained at slaughtering, also the estimation of the eliminated nitrogen by the experience swine.

To measure the elimination of nitrogen an experience of nitrogen balance has been organised, using 4 castrated male swine with a body weight of almost 37.5 kg, each animal being housed in a cage of digestibility.

After a week of adaptation, during the period of control (during 6 days) the daily quantity of compound feed and faeces and the eventual rest of feed has been established, probes being taken to establish the nitrogen content by Kjeldahl method. The tested compound feed were the administrated ones in the first stage of fattening, having a content of 17.57%, respectively 16.06% CP.

3. Results and discussion

The influence of compound feed over the productive performances registered by the pigs for fattening from the two batches is presented in the table 2 and 3.

The body weight made at the two experimental batches in the first 53 days of experiment have been of 62.03 kg at the batch which consumed compound feed with a lower protein level to 65.01 kg. At the end of the experiment the body weight has been of 95.82 kg at the second batch and 99.51 kg at the first batch. The differences between the batches haven't been significant.

Table 2. The evolution of the body weight of pigs

Parameters	UM	Batch	
		L1	L2
Animals number	head	48	48
The experiment period	days	100	100
Initial weight	kg	32.42	30.87
Weight at 53 days	kg	65.01	62.03
Final weight	kg	99.51	95.82

Table 3. The evolution of the average daily gain, the daily consumption and the specific consumption in the compound feed

Stage	Batch	Average daily gain (g/head/day)	Daily consumption (kg/head/day)	Specific consumption (kg feed/kg gain)
I	L1	0.615±0.24	2.47±0.14	4.01±0.28
	L2	0.588±0.31	2.59±0.22	4.40±0.14
II	L1	0.734±0.19	3.11±0.31	4.24±0.26
	L2	0.719±0.27	3.24±0.36	4.51±0.12
I+II	L1	0.674±0.18	2.79±0.27	4.14±0.24
	L2	0.653±0.14	2.91±0.22	4.46±0.20

From the analyse of the obtained results we can see that swine from the first experimental batch have registered superior daily gains to the swine from the second experimental batch with almost 3.21%, the differences being significantly.

The daily consumption of compound feed varied between 2.79 and 2.91 kg/head/day during the whole fattening period, a small increase being remarked in the case of the pigs from the second batch, at which the proteic level of compound feed has been decreased to the first batch with almost 15% in the both fattening stages.

Using the consumption of compound feed and of average daily gain the specific consumption has been established, which presented a tendency of increase in the case of the second experimental batch (4.14 kg feed/kg gain to 4.46 kg feed/kg gain at the first batch during the whole period), the registered differences being of 7.17%.

The obtained results after the slaughtering are presented in table 4.

Table 4. Results obtained at slaughtering

Specification	Batch	
	L1	L2
Killing out percentage (%)	75.43±0.47	73.21±0.50
Average thickness of fat (cm)	2.43±0.18	2.17±0.26
Meat in carcass (%)	46.64±0.73	45.83±0.69
Eye muscle surface (mm ²)	56.32±0.46	53.71±0.39
Quality classes (%):		
E	5.00	2.00
U	34.00	30.00
R	40.00	46.00
O	21.00	20.00
P	0.00	2.00

The killing out percentage has been between 73.21% and 75.43% being easily increased at the

batch in which's food the compound feed with a higher protein level has been administrated, the differences being insignificant, which demonstrates that the decrease of protein level in the condition of maintaining the optimum level of amino acids doesn't effect the quality of the carcass.

The coating of fat had an average thickness between 2.17 cm at the second batch and 2.43 cm at the first batch, and the meat proportion from the carcass varied between 45.83% at the second batch and 46.64% at the first batch.

After what the meat proportion from the carcass indicates, most the carcasses obtained from the pigs of the both experimental batches have been situated in the R quality class.

After the nitrogen balance the ingerated nitrogen quantity has been established, like the eliminated one in faeces and urine (table 5).

The ingerated nitrogen quantity depends on the nitrogen content, respectively in crude protein of compound feed used in the first fattening stage, being with almost 5,62% higher in the case of the pigs from the first experimental batch to the ones from the second experimental batch.

Table 5. Results of nitrogen balance

Specification	Experimental batch	
	L1	L2
Ingerated nitrogen (g/day)	98.85	93.29
Eliminated nitrogen (g/day)	22.34	20.19
- faeces (g/day)	22.34	20.19
- urine (g/day)	31.74	29.97
- total (g/day)	54.08	50.16
Retented nitrogen (g/day)	44.77	43.13

The reduction of ingerated nitrogen quantity has been associated with a decrease of the excretion of the total nitrogen quantity in case of the eating compound feed with a content of 16,06% crude protein, the differences between the two batches being 7.25%.

4. Conclusions

The reduction of protein level in parallel with the elimination of animal meals from the compound feed administrated to pigs for fattening doesn't influence negatively the productive performances obtained in the conditions of maintaining the level of amino acids at a constant level.

The killing out percentage, the average thickness of fat and the proportion of meat in carcass

haven't been influenced significantly by the decrease of the crude protein proportion with almost 15% in compound feed destined to pigs from the second experimental batch.

The nitrogen quantity eliminated by pigs decreases in the case of ingestion of compound feed with a lower content of crude protein, a positive aspect in the condition in which it has been observed that the breeding and the quality of the carcass, the pollution being at the same time avoided.

References

1. Hebean, V., Grossu, D., Hăbeanu, M., Comparative studie on the performance of Large White x Periş Synthetic Line-345 and Duroc hybrid pigs, *Lucrările simpozionului „Biologia și Nutriția Animală în Perspectiva Integrării Europene”*, Balotești, 2003, 92-97
2. Henry, Y, Developpement morphologique et metabolique du tissue adipeux chez le porc: influence de la selection de l'alimentation et du mode d'elevage, *Annales Biologie Animal Biochimie Biophysique*, 2004, 17, 923-952
3. Mourot, J., Mise en place des tissue adipeux sous cutanes et intramusculaire et facteurs de variation quantitatifs et qualitatifs chez le porc, *Production Animale*, 2001, 14, 335-363
4. Wood, J.D., Enser, M., Fisher, A.V., Manipulating meat quality and composition, *Proceedings of the Nutrition Society*, 1999, 58, 363-370