

ASPECTS REGARDING THE CONVERSION OF FEED TO PIGS RAISED IN INDUSTRIAL COMPLEX

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Abstract

This paper aims to analyze the most efficient use of the feed, respectively of the feed conversion, both for the physiological needs of the organism, and for the production of the meat increase. Because of the total production costs of pork, the largest share belongs to feed, this representing approx. 65-80% of the cost price of meat, special attention is paid to this aspect, regarding the use of feed with maximum efficiency. Depending on the breed, age and sex, pigs need the most accessible form of energy, protein, vitamins and minerals, at levels and proportions that guarantee the expression of their genetic potential. The totality of the substances taken from the food and used by the organism, within the metabolic processes, follows, mainly, two directions: first ensuring one's own physiological needs and vital functions and second is production characteristic of the species and category.

Keywords: pig, feed conversion, technological aspects, pork, maximum efficiency.

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1. INTRODUCTION

In the present study, in the population of the industrial pig breeding complex, the fodder is obtained from its own compound feed factory. The compound feed factory uses PVM - protein-vitamin-mineral premixes (which are added in a proportion of 1-3% of the ration), thus reducing production costs.

The actual feeding is done mechanized. Feeding throughout the complex is done with solid feed. The administration of the fodder is done mechanized and automated, through a conveyor system with knots. The feeding system has the role both to transport food from the storage bunkers (with a capacity of 8 t each), through a system of pipes to the breeding boxes, and to limit the daily rations, depending on the age / physiological state pigs. Each hall is equipped with two bunkers. The feed storage bunkers are supplied with a technological trailer - bunker type (with a capacity of 20 t), for transport from the central warehouse to the bunkers in the halls. The trailer is equipped with an automatic feed unloading system in the bunkers in the halls. Since the unloading of fodder is done snail

type, the feed losses in the atmosphere are zero. The compartments are equipped with automatic feeders provided with an anti-spreading system, in order to limit the feed losses.

2. BIOLOGICAL MATERIAL

The following breeds are bred in the studied complex Landrace and Duroc.

3. RESULTS OBTAINED

According to the category of pigs and the physiological state, the concentrated feedstuffs are specific to each category of age or physiological state, and the respective rations bear different names or codes in numbers.

The combined feed for feeding suckling piglets during weaning, called prestarter, contains in addition to feed based on powdered milk, easily digestible protein feeds, sugar or glucose, mineral-vitamin supplements, taste-odor corrector, etc.

It is characterized by a high protein level (20-22%) of good quality proteins and balanced

ratio in amino acids and an energy level of 3200 kcal / kg.

The combined fodder for young pigs, called starter, is used after weaning up to a weight of 7-9 kg. It is characterized by a protein level of 17-19%, an energy level of 3000-3100 kcal./kg and a content of 0,9-1% lysine.

The combined grower fodder is used in pig feed starting with a weight of 9-20 kg up to 30 kg. It is characterized by a protein level of approx. 17% with 0,65-0,75% lysine and an energy level of 3000 kcal./kg.

The combined finisher fodder is used in the last part of the fattening and is characterized by approx. 17% crude protein, 0,55-0,65% lysine and metabolizable energy approx. 3000 kcal / kg.

Within the analyzed unit, the combined feeds specific to each age category and physiological condition are used.

Recipes may undergo changes in values and component depending on the results of qualitative analyzes of cereals and grains that are part of them, as well as depending on the physiological condition of the animals. These changes also apply to the premixes used. These can also be modified depending on the supplier.

EU feed consumption rules for similar feed technologies are set out in tabular form, as follows:

Categories of pigs	Total energy requirements, nutritional unit of energy /head	The need for energy, nutritional unit of energy /kg fodder
Sows	1200	1,16
Boars	900	1,14
Young sows (55-120 kg)	200	1,02
Piglets (7-30 kg)	45	1,16
Fat pigs (30-110 kg)	205	1,08

*The nutritional unit of energy is in direct connection with the type of feed used, differentiated by age / physiological condition.

Corresponding to the total energy requirement for the production / maintenance of a pig, as well as to the corresponding energy requirement for 1 kg of feed, the following feed quantities resulted (for maximum accommodation capacity):

- Sows – 3.000 heads and young sows 1.000 heads = 4.000 heads

Feed quantity = $3000 \times 1200 / 1,16 + 1000 \times 200 / 1,02 = 3.299.527$ kg

- Boars - 34 artificial insemination heads (boars and young boars)

Feed quantity = $34 \times 900 / 1,14 = 26.842$ kg

- Piglets (7 - 30 kg) – 67.000 heads / year

Feed quantity = $67.000 \times 45 / 1,16 = 2.599.138$ kg

- Fat pigs (30 - 110 kg) – 32.000 heads / year

Feed quantity = $32.000 \times 205 / 1,08 = 6.074.074$ kg

The annual amount of fodder is 12.000 – 14.000 tons.

Starting from these norms, the calculation of the feed requirement corresponding to one kg of growth increase is:

- Suckling piglets (0-7 kg)

- growth spore = 7 kg

- total feed required = 2,1 kg

- needs required for 1 kg growth increase = $2,1 / 7 = 0,3$

- Piglets (7 - 30 kg)

- growth spore = 23 kg

- total feed requirement = $45 / 1,16 = 38,79$ kg

- the need for fodder for 1 kg growth increase = $38,79 / 23 = 1,67$

- Fat pigs (30 - 98 kg)

- growth spore = 68 kg

- total feed requirement = $205 / 1,08 = 189,81$ kg

- the need for fodder for 1 kg growth increase = $2,79$

Average feed required / kg growth increase = $(0,3 \text{ kg / kg} \times 21 \text{ days} + 1,67 \text{ kg / kg} \times 49 \text{ days} + 2,79 \text{ kg / kg} \times 77 \text{ days}) / 103 \text{ kg} = 2,94$

Categories of pigs	Necessary fodder / kg increase growth	Required average feed / kg increase
Suckling piglets (0- 7 kg)	0,3	2,94
Piglets (7-30 kg)	1,67	
Fat pigs (30-110 kg)	2,79	

The feed requirement for the maximum accommodation capacity is 12.000 – 14. 000 to. / year, of which:

- pig youth – 1.603,16 to. / year
- fattening pigs – 9.219,84 to. / year
- sows – 1.141,00 to. / year
- boars – 36,00 T / year

Production yield. BAT (Best Available Techniques) comparison

The parameters that characterize the efficiency of the technological processes developed within the zootechnical farms are the daily increase of the weight and the conversion of the food. In studied industrial complex, the growth technology used targets 2,5 cycles / year, which corresponds to a period of the production cycle of 147 days, a value that includes the disinfection periods from the population / depopulation of the halls (6-7 days).

Basically, reaching the optimal slaughter weight (98-100 kg) is achieved in a period of 147 days.

According to the above values, the daily weight gain is 710 g / day.

Feeding systems	Daily weight gain (g / day)		Food conversion (kg feed/kg increase)	
	BAT	Study farm	BAT	Study farm
Dry food	681	710	3,05	2,94
Wet food	696	-	3,03	-
Liquid food	657	-	3,07	-

In order to characterize the feed technology used in the studied farm compared to BAT in this sector, it is necessary to analyze the parameters that characterize the production yield, namely:

- Daily weight gain
- Food conversion

It is observed that the maximum daily weight gain is obtained in the case of the use of porridge, in which case the losses are higher than in the feeding of dried fodder, which leads to increased costs in terms of collecting / eliminating the resulting manure.

In the case of the studied farm, the value of daily weight gain is significantly higher than the average value resulting from the use of BAT (20 g / day; 2,9 kg / cycle) and the feed conversion is significantly higher than BAT (0,11 kg feed). / kg increase; 11 kg / cycle). Practically, in the case of the studied farm, through a lower feed consumption, a higher growth increase is obtained than the one obtained by using the current BAT.

The feeding technology used within the studied farm represents a BAT in this field, considering the following aspects:

- the type of food used is in accordance with the physiological needs and vital functions corresponding to the species and category of pigs, the food prepared in its own combined fodder fabric. According to the recipes specific to each type of feed, the necessary energy, amino acids, minerals and vitamins are provided. Compared to BAT, the feeds used do not contain additives, namely: metals (Fe, Zn, Mn, Cu) and antibiotics, which have an influence on manure. Within the studied farm, as an alternative, probiotics, acidifiers and enzymes are used.
- the feeding systems used are at the BAT level practiced in the U.E. for dry food, being fully mechanized and automated;
- production yield is higher BAT, as follows: feed conversion is significantly higher BAT (2,94 < 3,05 kg feed / kg increase, achieving a saving of 2,9 kg

feed / cycle) and the daily weight gain is higher than that indicated by BAT (710 > 681 g / day).

4. CONCLUSIONS

Within the studied farm, complete combined fodder specific to each age category and physiological condition is used, as follows:

- prestarter fodder - used for piglets aged between 7 and 28 days, up to a weight of 7,6 kg / piglet
- "starter" type fodder - used for piglets from the 28th day of life and up to a weight of 15 kg
- "grower" type fodder - used for fattening pigs weighing between 15-30 kg
- "finisher" type fodder - used for fattening pigs over 30 kg and up to slaughter
- fodder for specific requirements - used for pregnant, lactating sows
- feeds with prophylactic or curative effect - probiotics, acidifiers, enzymes.

The fodder used in the studied farm, is characterized by a high level of energy, high content of crude protein, amino acids and minerals, as well as a low content of crude fat and crude fiber.

For the characterization of the feed used on the farm, the values of the nutritional parameters of these feeds were compared with those of the feed currently used in the EU, finding the following:

- the fodder used in the case of the studied farm has a high energy content, which is in the values indicated by BAT, at their upper limits for the corresponding categories of pigs
- the amino acid balance is lower in value than BAT
- the percentage of minerals does not fall within the BAT guide values (showing increases - calcium and decreases - phosphorus).

The explanation for the differences is that, on the farm used, a feed technology is practiced that uses combined feeds made in its own

combined fodder fabric according to the recipes indicated by purebred suppliers, aiming to achieve maximum production yields (characterized by daily growth in weight and food conversion) in short periods of time. This is achieved both through hybridization schemes aimed at creating specialized industrial hybrids for meat production, and through an appropriate feed technology, specific to these breeds of pigs.

The daily rations are at the BAT levels indicated for different categories of pigs. The compound feeds used have a high energy value, instead they are low in amino acids.

The parameters that characterize the efficiency of the technological processes carried out within the zootechnical farms are the daily weight gain and the feed conversion.

Within the farm, the growth technology used targets 2,5 cycles / year, which corresponds to a period of the production cycle of 147 days, value to which is added the disinfection periods from the population / depopulation of the halls (6-7 days). Basically, reaching the optimum slaughter weight (100-110 kg) is achieved in a period of 147 days.

In the case of the farm, the value of daily weight gain is significantly higher than the average value resulting from the use of BAT (20 g / day; 2,9 kg / cycle) and the feed conversion is significantly higher than BAT (0,11 kg feed / kg increase; 11 kg / cycle). Basically, through a lower feed consumption, a higher growth increase is obtained than the one obtained by using current BAT.

The feed technology used on the farm is a BAT in this area, given the following aspects:

- the type of food used is in accordance with the physiological needs and vital functions corresponding to the species and category of pigs, food prepared in its own combined fodder fabric. According to the recipes specific to each type of fodder, the necessary energy, amino acids, minerals and vitamins are provided. Compared to BAT, the feeds used do not contain additives, namely: metals (Fe, Zn, Mn, Cu) and antibiotics, which have an

- influence on manure. In the studied farm, as an alternative, probiotics, acidifiers and enzymes are used
- the feeding systems used are at the BAT level practiced in the U.E. for dry food, being fully mechanized and automated
 - the production yield is higher BAT, as follows: the feed conversion is significantly higher BAT ($2,94 < 3,05$ kg feed / kg increase, achieving a saving of 2,9 kg feed / cycle) and the daily weight gain is higher than that indicated by BAT ($710 > 681$ g / day).

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