

THE EFFECT OF PELLET AND GRANULATED FEED ON PRODUCTION PARAMETERS OF FATTENING PIGS

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Abstract

The feed processing used on non ruminant animals like pigs and poultry is one of the most studied field. Pig production in Albania is extensive and hygiene conditions in pig stalls are too far from the usually standards. The main objective of this study was to investigate the effects of pellet and meal feed on the performance parameters like as body live weight (BLW), daily weight gain (DWG) and feed conversion ration (FCR) of pigs, under consideration of the extensive pig production conditions like these in Albanian livestock farms. The utilization of pelleted feed improved growth parameters, average live weight (kg), daily weight gain g/day and feed conversion ratio (FCR), compared to the control group. During the experimental period, the group treated with pellet feed had a higher average live weight, 1.3%, 2.4%, and 2.7% respectively on the third, fifth and seventh week. The average daily weight gain had the same tendency. The pellet feed improved clearly the feed conversion ratio also. Based on the achieved results in the present investigations, it could be concluded that the utilization of pelleted feed led to an improvement of the production parameters in pigs, especially under the extremely extensive farm conditions like these in Albanian farms of pig production.

Key words: pigs, pellet feed, granulated feed, performance parameters, daily weight gain

INTRODUCTION

The food and its ingredients is the biggest input in the total production cost. In the non ruminant animals, the food account for the 80% of the total production cost. The scope nowadays is that the industrialization of animal production and the increase of animal productivity should be accompanied with low cost of production. This means high effectiveness of food-utilization via the diet. The effectiveness of food-utilization increase by the procession of food which can be of different forms such as: thermic, physical, chemical and bacterial. Pellet technology is one of different methods of food-processing utilized for concentrates in pigs and poultry. This method has a lot of advantages:

- The minimization of non utilized food by animals.
- Improvement of food-conversion rate, kg food/kg weight gain.
- The animal doesn't have the possibility to select the food or its ingredients.
- Low cost/ unit of production.

The on-growing animals in our farms face with a lot of difficulties such as:

drawback of sanitary-hygienic and micro-climatic conditions, unbalanced diets which influence in final production. Thus the determination of the right method of food-processing should influence to minimize the effect of stressing factors.

MATERIAL AND METHOD

Keeping conditions

This experiment (when there were utilized pigs just weaned), was performed in one private farm of pigs near Kamza. The above farm function as a closed cycle, thus includes all the necessary environments such as maternity, Flat-Deck, stockyard of males, area of controlled mating, etc. All the environments the microclimatic conditions are at optimal levels. The experiment groups were held in Flat-Deck of dimensions of (23m x 6,7m x 2,2m).

In this environment were utilized 10 boxes of collective pigs (5 in each side) divided in the middle by a service corridor. All the floor of boxes was spread with straw to eliminate the environment humidity. The measurement of box was (3m x 1.5m x

1,08m) and was calculated for 10 pigs (0,30 m²/ each pig surface) was. The dimensions of the runways of food was calculated according to the number of pigs in the experiment (thus for 10 pigs/each box). Water supply runs through an automatic system.

The experiment design

There were utilized 2 different groups of pigs just after weaning: the first one was used as control and the second one as experiment. The variable is *the different form of feeding*, studied in two different methods: milled and pelleted.

Group A Control
Group B Experiment

The pigs after weaning (age 40 days) were placed in a different stall, which was divided in (Flat-Deck). Every group was compounded by 10 pigs previously

matriculated (overall 20 pigs). The duration of experimental period was 7 weeks. During the 10 first days of experiment the temperature of stall was unchanged at levels of 24 °C. Later, until the end of experiment the temperature was at levels of 28 °C.

The experiment was passed in the bellowed steps:

- Preparatory period (5 days), when the treatment was similar for the two groups. This period was used for the pigs to adapt with the new experiment.
- Transitory period (5 days). During this period was utilized the same composition of diet for the two groups, but one group (control) utilized milled food and the other group utilized pelleted food (experiment).
- Experimental period (50 days).

Table 1. The experiment design

Period	Day	Control group	Experimental group
Preparatory	5	Granulated food	Granulated food
Transitory	5	Granulated food	Pellet food
Experimental	50	Granulated food	Pellet food

Material of race

In the experiment were used weaned pigs, Kahyp hybrids and crossbreeding of races “The Big White” and “Durok” or “The Big White” and “Hampshir”. These races together with German Landras and Belgium Landras race are distinguished for the high reproductive indices, high efficiency of food-conversion and good quality of food. The pigs utilized in the experiment derive from the two different nests of sows treated with balanced rations regarded energy, proteins, vitamins and minerals. For the creation of groups was taken in mind the principle of “analogy” regarding the productive indices of sows selected for the experiment and the average age and weight of group.

Food and feeding

In the both groups (control and experiment) was utilized the same feeding receipt, according to the necessities that have pigs of this age. The food was prepared in the form of pellets and milled at the Factory of food processing for animals AGROTEK, DEKA-COMPANY. Because of the fast intensity of growing that have pigs, the

composition of diet was prepared two times during the experimental period, according with the nutritional necessities. The composition of food used in the experiment contains products and byproducts of cereals such as: corn, wheat, products and byproducts of oleaginous germs such as: soybean meal, soya oil, sunflower meal.

Table 2. Diet composition used in piglets 25-60 kg live weight

Ingredients	%
Maize	45.00
Wheat	21.25
Soybean meal	17.20
Sunflower meal	3.00
Soya oil	0.80
Wheat bran	8.00
Monocalciuphosphate	1.00
Aringe danesi 999	1.50
Calcium carbonate	1.15
Grower	1.00
Natrium clorure	0.10
Total	100.00

The mineral-vitamin chemical of 1 kg probiotic is as follow:

1.200.000 UI vit A	600 mg vit B ₂
10.000 mg Zn	120.000 UI vit D ₃
1.800 mg Acid pantotenik	7.500 mg Mn
4.000 mg vit E	400 mg vit B ₆
70 mg Co	200 mg vit B ₁
75. 000 mg Fe	150 mg Jod
20.000 µg biotin	2.500 mg niacin
50.000 mg choline chlorid	4.000 µg vit B ₁₂

During the experimental period were measured the below indexes:

- **Body weight** (kg).
- **Daily weight gain** (gr/day) the animals were weighted every week.

Table 3. Live weight at different treatments (kg)

Experimental Period	Control group		Experimental group	
	n	X± SD	n	X± SD
Beginning of the experiment	10	25.20 ± 1.83	10	24.90 ± 1.76
1 week	10	27.50 ± 2.65	10	27.30 ± 2.32
3 weeks	10	32.70 ± 2.81	10	33.10 ± 2.67
5 weeks	10	38.20 ± 3.46	10	39.10 ± 2.61
7 weeks	10	44.10 ± 4.67	10	45.30 ± 3.30

There are no statistical differences for a level of factor $P \leq 0,05$.

From the table above results that the groups at the beginning of the experiment were analogs regarding the average weight. 3 weeks after the beginning of the experiment there are no differences in body weight. In the 5-th week there is a light increasing of this factor. After the 5-th week the difference between groups were more evident regarding this factor.

The daily weight gain

Table 4. The weight gain at different treatments (g/day).

Experimental period	Control group		Experimental group	
	n	X± SD	n	X± SD
1 week	10	328.5 ± 137.3	10	342.8 ± 112.8
3 weeks	10	346.6 ± 92.15	10	386.6 ± 111.6
5 weeks	10	366.6 ± 202.7	10	400.0 ± 153.7
7 weeks	10	393.3 ± 95.33	10	413.3 ± 131.4

The progress of the daily weight gain goes in the same way as the index of live weight. Thus, for the experiment group, according to the weeks this index has this dynamics: 4,2%, 0,4%, 8,4% and 4,9%

- **Feed conversion ratio** (kg food/ kg weight gain).

Statistical analysis of data

The statistical analysis of data of the experiment and the influence of the factor in study were analyzed with method of variance "ANOVA" (ANOVA-single factor). The comparison between the two forms of food processing used in the experiment was analyzed for the T-test (Two Sample Assuming Equal Variances).

Growth rate

The average indexes of growth rate for every two weeks period until the end of the experiment are expressed in the table below.

Although there are no statistical differences between groups there is a clear tendency of increasing the index of the live body weight in the group treated with pelletized food. During the experimental period, as displayed in the table 3, according to the third, fifth and seventh weeks, the live weight was: 1,3%, 2,4%, and 2,7% higher than control.

bigger than control. In every period of the experiment there is an increase of the daily weight gain in the group treated with pelletized food.

Table 5. Feed conversion ratio, kg feed/ kg weight gain

Experimental period	n	Control group	n	Experimental group
1 week	10	1,81	10	1,72
3 weeks	10	2,31	10	2,00
5 weeks	10	3,20	10	2,70
7 weeks	10	3,40	10	3,10

Similar experiments were performed by different authors and are still performing all around the world regarding the same argument. In a lot of these studies we show comparisons between the utilization of different forms of foods as pelletized, fresh and humid food, fermented and humid food, etc. Every group of nutritionists gives arguments about their positive effect over the indexes such as: Live weight, daily weight gain, food conversion rate.

Jensen and Mikkelsen (1998) in 10 experiments with weaned pigs showed that the daily weight gain was increased $12.3 \pm 9.4\%$ bigger in the group treated with fermented humid food in comparison with the group fed with dry (non pelletized) food. The same authors showed that the weaned pigs fed with fermented humid food were $13.4 \pm 7.1\%$ bigger than group treated with fresh humid food.

Moran et al. (1998) in two experiments compared the effect of utilization of fresh humid food and pelletized dry food in different categories of pigs: weaned pigs, on growing pigs and pigs in the last period of growing.

In the experiment this author used pelletized food for the weaned pigs (26 days) until they reached the weight 35 kg. Later from the weight of 35 kg until the sacrificed weight of 95 kg the diet was changed to humid food in the rapport 3 parts water: 1 part food. Later this author repeated the experiment alternating the foods. Thus, until the weight 35 kg utilized fresh food and later until the sacrificed weight (95 kg) used pelletized food.

The results showed the effectiveness when the pelletized food is used in the weaning pigs in comparison with the utilization of this form of food in pigs in bigger weights.

The studies of Jorgensen et al. (1999) showed that even in the cases when there is a

distinguished change in the dynamics of daily weight gain and index of consumption of food, the influence of pelletized and fresh humid food was showed only in the indexes of carcass (after the animal scarification).

The pigs after the two treatments were sacrificed in the day of 135-th after weaning. The live weight of pigs there was no statistically significant ($P > 0,05$), but the carcass weight was smaller ($P < 0,07$) for the pigs treated with humid fresh food in comparison with the group treated with pelletized food ($P < 0,05$). Thus, the pigs treated with pelletized food had the tendency of a bigger carcass weight in comparison with the pigs treated with humid fresh food ($P < 0,06$). Between the days 13-th and 27-th the dynamics of daily weight gain between the two groups was similar, although these two groups (the first fed with pelletized food and the second fed with humid fresh food) had a slightly lower dynamics of daily weight gain in comparison with a third group fed with acidified humid food ($P < 0,05$). Must be mentioned that the index of conversion of food (kg food / kg weight) was bigger in the group fed with pelletized dry food in comparison with the other two groups when was utilized humid food.

Russell et al. (1996) in one experiment showed that the dry matter gained was bigger in the group fed with pelletized dry food in comparison with the humid food utilized. The ratio between meat and fat and the percentage of the skin in total were not influenced by the feeding treatments ($P > 0,05$).

Brooks et al. (1996) in his experiments concluded that the food conversion rate was bigger in the group treated with dry pelletized food. Because of this the same author proposed that the term "Feed Usage" should be utilized more often than the term "Feed Intake". This is because the feeding with humid food has a lot of losing

especially in the small pigs after weaning. The improvement of the method of utilization of foods should help to reduce these losing.

Partridge (1992) thinks that the food losing should be less when is experimented a method of automatic feeding that distribute in the same ratio the food and the water.

RESULTS AND DISCUSSIONS

The method of food processing and utilization for farming and especially in poultry and pigs is one of the most studied fields in the science of animal production. Although have been made greater steps in physiology and metabolisms of nutrients in the digestive tract, in some small private and familiar farms this advances are not taken in to account. According to the actual conditions of our farms we thought to give some considerations and suggestions regarding the positive effect of pelletized food in the production indices in general, and notably in the index of food consumption / unit of weight gained. Utilization of pelletized food have improved the growing indexes, live weight, dynamics of daily weight gained and the food consumption/ unit of weight gained in comparison with milled food. According to the results of this study we conclude that: The utilization of the pelletized food for pigs after weaning influence positively improving the digestion, production indices, mostly in the condition of our farms of type of semi-intensive and extensive of pig rearing. In condition of our

private pig farms of growing and rearing, the utilization of pelletized dry food must be considered a good method for lowering the cost for every unit of production.

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