

THE EFFECT OF FARINOSE AND PELLET FEED ON PRODUCTION PARAMETERS OF WEANED PIGLETS

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The feed processing used on monogastric animal such as pigs and poultry is one of the most studied fields. Pig production in Albania is extensive and hygiene conditions in pig stalls are far from the usual standards. The main objective of this study was to investigate the effects of pellet and meal feed on the performance parameters as body live weight (BLW), daily weight gain (DWG) and feed conversion ration (FCR) of pigs, taking into consideration the extensive pig production namely the conditions similar to the livestock farms in Albania. The utilization of pellet feed improved the growth parameters, the average live weight (kg), the daily weight gain (g/day) and the feed conversion ratio (FCR), compared to the control group. During the experimental period, the group treated with the pellet feed had a higher average live weight, 0.7%, 3%, 4.4%, 7.4% respectively on the first, third, fifth and seventh week. The average daily weight gain had the same tendency: 0.4%, 11.3%, 10.4%, 22.6% higher to compare with control group. The pellet feed improved clearly the feed conversion ratio. Based on the achieved results in the present investigations, it could be concluded that the utilization of the pellet feed lead 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: weaned piglets; pellet feed; granulated feed; performance parameters

ЕФЕКТОТ НА ФАРИНОЗАТА И ХРАНЛИВИТЕ ГРАНУЛИ ВРЗ ПРОИЗВОДСТВЕНИТЕ ПАРАМЕТРИ НА ОДБИЕНИТЕ ПРАСИЊА

Начинот на искористувањето на храната кај моногастричните животни како што се свињите и птиците е многу испитувано подраје. Продукцијата на свињите во Албанија е екстензивна и хигиенските стандарди доста отстапуваат од вообичаените. Главна цел на оваа студија беше истражувањето на ефектот на хранителните брашно и гранули врз перформансните параметри како што се телесната тежина (BLW), постигнатиот дневен прираст (DWG) и конверзијата на дневниот оброк (FCR) кај свињите, земајќи ја предвид екстензивната продукција на свињи, т.е. состојби слични како во сточните фарми во Албанија. Користењето на хранителните гранули ги подобри параметрите на растежот, средната телесна тежина (kg), дневниот тежински прираст (g/ден), степенот на конверзијата на дневниот оброк во споредба со контролната група. Во текот на експерименталниот период групата третирана со хранливите гранули ја имаше средната телесна тежина повисока за 0,7%, 3%, 4,4%, 7,4% во првата, третата, петата и седмата недела соодветно. Просечниот дневен прираст покажа иста тенденција: 0,4%, 11,3%, 10,4%, 22,6% повисок споредено со контролната група. Хранителните гранули јасно ја подобрија конверзијата на дневните оброци. Врз основа на добиените податоци од извршеното истражување може да се заклучи дека користењето на хранителните гранули доведува до подобрување на производствените параметри, посебно во крајно екстензивни фармски услови какви што се оние во фармите за продукција на свињи во Албанија.

Клучни зборови: одбиени прасиња; хранителни гранули; гранулирана храна; перформансни параметри

INTRODUCTION

Food and its ingredients are the biggest input in the total production cost. In the nonruminant animals, the food accounts for 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. Pelleting technology is one of different methods of food-processing utilized for concentrates in pigs and poultry. This method has a lot of advantages such as:

- The minimization of nonutilized food by animals.
- Improvement of food conversion rate, thus kg food/kg weight.
- 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 microclimatic conditions, unbalanced diets which influence the final production. Thus the determination of the right method of food-processing should influence to minimize the effect of stressing factors.

MATERIAL AND METHODS

Keeping conditions

This experiment (when there were utilized pigs just weaned), was performed in one private farm of pigs near Kamza. The above farm functions as a closed cycle, thus includes all the necessary environments such as maternity, Flat-Deck, stockyard of males, area of controlled mating. All the environments and the microclimatic conditions are at optimal levels. The experiment groups were held in Flat-Deck of dimensions of 23 m × 6.7 m × 2.2 m.

In this environment 10 boxes of collective pigs (5 in each side) divided in the middle by a service corridor were utilized. All the floor of the boxes was spread with straw to eliminate the environment humidity. The measurement of the box was 3 m × 1.5 m × 1.08 m and was calculated for 10 pigs (0.30 m²/each pig surface). The dimensions of the runways of food were 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 2 different groups of pigs utilized just after weaning: the first one was used as a control and the second one as an 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 the experimental period was 7 weeks (from 19 May 2006 to 7 July 2006). During the 10 first days of the experiment the temperature of the stall was unchanged at 24 °C. Later, until the end of the experiment the temperature was 28 °C.

The experiment was passed in the following steps:

- Preparatory period (7 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 the same composition of diet was utilized for the two groups, but one group (control) utilized milled food and the other group (experiment) utilized pelletized food.
- Experimental period (45 days).

Table 1

The experiment design

Period	Day	Control group	Experimental group
Preparatory	7	Granulated food	Granulated food
Transitory	5	Granulated food	Pellet food
Experimental	45	Granulated food	Pellet food

Material of race

In the experiment weaned pigs, Kahyp hybrids and crossbreeding of the races "The Big White" and "The Durok" or "The Big White" and "The Hampshir" were used. These races together with the German Landras and the Belgium Landras races 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 two different nests of sows treated with balanced rations regarded energy, proteins, vitamins and minerals. For the creation of groups the principle of "analogy" regarding the productive indices of sows selected for the experiment and the average age and weight of the group were taken into consideration.

Food and feeding

In both groups (control and experiment) the same feeding receipt was utilized, according to the necessities that pigs of this age have. 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 pigs have, the composition of diet was prepared two times during the experimental period, according to the nutritional necessities. At the beginning of the experiment the food composition was prepared for pigs between weights of 15 – 25 kg and was use for the first 5 weeks. In the last two weeks food composition for pigs of weights between 25 – 60 kg was used. The composition of food used in the experiment contained 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 of 10–25 kg live weight

Ingredients	%
Maize	19.80
Wheat	38.00
Soybean	13.00
Soya oil	3.10
Wheat bran	12.00
Farm acid latici	5.00
Aringe danesi 999	1.60
Acipig	7.50
Total	100.00

Table 3

Diet composition used in piglets of 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
Monocalciumphosphate	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 follows

1.200.000 UI vit A	600 mg vit B ₂
10.000 mg Zn	120.000 UI vit D ₃
1.800 mg pantothenic acid	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 Iod
20.000 µg biotin	2.500 mg niacin
50.000 mg choline chloride	4.000 µg vit B ₁₂

During the experimental period the following indexes: were measured:

- body weight (kg),
- daily weight gain (g/day), the animals were weighted every week,
- 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 the study were analyzed with the 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 the growth rate for every two weeks period until the end of the experiment are expressed in the Table 4.

Table 4

Live weight at different treatments (kg)

Experimental period	<i>(n = 10) (X ± SD)</i>	
	Control group	Experimental group
Beginning of the experiment	11.49 ± 1.83	11.58 ± 1.76
1 week	14.05 ± 2.65	14.15 ± 2.32
3 weeks	18.15 ± 3.46	18.70 ± 2.61
5 weeks	22.60 ± 4.67	23.60 ± 3.30
7 weeks	27.00 ± 5.67	29.00 ± 4.39

There are no statistical differences for the level of the factor $P \leq 0.05$.

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

Although there are no statistical differences between the groups there is a clear tendency of increasing the index of the live body weight in the group treated with pelletized food. The group treated with pelletized food have a better index of growth rate. During the experimental period, as displayed in the Table 4, according to the weeks it was 0.7%, 3%, 4.4% and 7.4% bigger than in the control only.

The daily weight gain

Table 5

The weight gain at different treatments (g/day)

Experimental period	(n = 10) (X ± SD)	
	Control group	Experimental group
1 week	365.3 ± 137.3	367.0 ± 112.8
3 weeks	292.0 ± 92.15	325.0 ± 111.6
5 weeks	317.0 ± 202.7	350.0 ± 153.7
7 weeks	314.0 ± 95.33 ^b	385.0 ± 131.4 ^a

a, b – significant differences $P \leq 0.05$.

The progress of the daily weight gain goes in the same way as the index of the live weight. Thus, for the experiment of group, according to the weeks this index has this dynamics: 4%, 11.3%, 10.4% and 22.6% bigger than the control one. In every period of the experiment there is an increase of the daily weight gain in the group treated with pelletized food. In the 7-th week (end of the experiment) there is a statistical difference between the control and experimental groups.

Table 6

Feed conversion ratio, kg feed/ kg weight gain

Experimental period	n = 10	
	Control group	Experimental group
1 week	1.81	1.72
3 weeks	2.31	2.00
5 weeks	3.20	2.70
7 weeks	3.40	3.10

Similar experiments were performed by different authors and are still being performed 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. 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 increased $12.3 \pm 9.4\%$ bigger in the group treated with fermented humid food than in the group fed with dry (nonpelletized) food. The same authors showed that the weaned pigs fed with fermented humid food were $13.4 \pm 7.1\%$ bigger than those 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, 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 of 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 of 35 kg he utilized fresh food and later until the sacrificed weight of 95 kg he used pelletized food.

The results showed the effectiveness when the pelletized food was used in the weaning pigs in comparison with the utilization of this form of food in pigs of 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 the daily weight gain and the 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 135-th day after weaning. The live weight of pigs was not statistically significant ($P > 0.05$), but the carcass weight was smaller ($P < 0.07$) for the pigs treated with humid fresh food than in the group treated with pelletized food ($P < 0.05$). Thus, the pigs treated with pelletized food had the tendency of a bigger carcass weight than

the pigs treated with humid fresh food ($P < 0.06$). Between the 13-th and 27-th day 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 than the third group fed with acidified humid food ($P < 0.05$). It must be mentioned that the index of conversion of food (kg food / kg weight) was bigger in the group fed with pelletized dry food than in the other two groups when humid food was utilized.

Russell et al. (1996) in one experiment showed that the dry matter gain was bigger in the group fed with pelletized dry food than in the group fed with the humid food. 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 feeding with humid food has a lot of losses especially in the small pigs after weaning. The improvement of the method of utilization of foods should help to reduce these losses.

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

CONCLUSIONS

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 greater steps have been made in physiology and metabolisms of nutrients in the digestive tract, in some small private and familiar farms these 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 gain. Utilization of pelletized food has improved the growing indexes, live weight, dynamics of daily weight gain and the food consumption / unit of weight gain 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 positively influences the improvement of digestion, production indices, mostly in the condition of our farms of the type of semi-intensive and extensive 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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