

THE EFFECT OF PELLET FEED ON THE PERFORMANCE AND NUTRIENT'S DIGESTIBILITY OF WEANED PIGLETS.

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Abstract:

Pig production in Albania was extensive and hygiene conditions in pig stalls were often poor. Under these conditions a positive impact of pellet feed on production parameters of weaned piglets could be expected. The main objective of this study was to investigate the effects of pellet and meal feed on performance parameters: body weight (BW), daily weight gain (DWG), feed conversion ration (FCR) and apparent nutrient digestibility (AND) of weaned piglets. Forty weaned piglets, divided in two groups (control and experimental group) were located on a trial at 28 days of age, for 6 weeks experimental period. The utilization of pellet feed improved growth performance: Body weight 2.5%, daily weight gain 2.7%, feed intake 1.1% and feed conversion ratio, 1.6%, more than control group, for whole experimental period. Fibre digestibility was slightly increased and fat digestibility was slightly decreased. Overall a positive effect of pellet feed on growth performance was observed. There were not statistical significances for all production parameters. Based on the achieved results in the present investigations, it could be concluded that the utilization of pellet 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.

Keywords: piglets; pellet feed; performance parameters; nutrient's digestibility.

1. Introduction

The nutritive rations and its ingredients are the biggest input in the total production cost. Feed cost at non ruminant animals is around 80% of the total production cost. The scope nowadays is that: the industrialization of animal production and the increase of animal productivity must be accompanied with low cost of production. This means high effectiveness of feed-utilization via the diet.

Pellet production technology is one of different methods of feed-processing, utilized in pigs and poultry nutritive ration.

- Some advantages of this method are as follow:
- The animals have not possibility to select the special ingredients of nutritive ration.
- Improvement of feed-conversion ratio, kg feed/kg weight gain.
- Low cost/ production unit

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 in final production. Overall the determination of the right method of feed processing

should influence to minimize the effect of stressing factors also.

2. Material and Methods

2.1. Keeping conditions

The animal trials were carried out in a private farm of pigs. Forty piglets (White x Duroc) of four litters were transferred after weaning (28 days) to Flat-Deck and randomly allocated to 2 groups with 20 animals (10 male and 10 female). The basal diet (see Table 1) was the same for control and experimental group. The diet was offered ad libitum and animals had free access to water. All pellets and meal for the same stage of growth were manufactured to the same factory. The environmental and microclimatic conditions have been at optimal levels, according to the requirements for weaned piglets.

2.2. Experiment design:

- Preparatory period as an adaptation period lasted for 5 days.
- Experimental period lasted for 42 days. The animals were feed with the same nutritive ration, but different form of feed processing.

Table 1. Diet composition and calculated nutrient concentration.

<i>Diet composition (g/kg feed)</i>		<i>Nutrient concentration (g/kg feed)</i>	
Maize	620	ME (MJ/kg)	12.82
Soybean meal	275	Crude protein	197.8
Soya oil	50	Crude fat	34.3
Fish meal	30	Crude fibre	31.4
Limestone	10	Calcium	9.10
Monocalcium phosphate	15	Posphorus	7.68
Vitamin -mineral premix ^a	12	Lysine	11.77
L-Lysine	10	Methionine+Cystine	7.64
Methionine+cystine	10	Threonine	8.04
Threonine	10	Tryptophane	2.37
Tryptophane	3		

^a Contents in 1 kg: 1,200,000 IE vit. A, 120,000 IE vit. D₃, 4000 mg vit. E, 200 mg vit. B₁, 600 mg Vit. B₂, 2500 mg Niacin, 400 mg Vit. B₆, 4500 µg Vit. B₁₂, 20,000 µg Biotin, 1800 mg Pantothenic acid, 160 g Na, 50 g Mg, 10,000 mg Zn, 7500 mg Fe, 7500 mg Mn, 150 mg J, 70 mg Co and 40 mg Se.

Table 2. The experiment design.

<i>Period</i>	<i>Day</i>	<i>Control group</i>	<i>Experimental group</i>
Preparatory	5	Meal feed	Meal feed
Experimental	42	Meal feed	Pellet feed

During six weeks period body weight (BW), daily weight gain (DWG) and feed conversion ratio (FCR), kg feed/kg body weight gain were measured weekly. Recording of live weight and food intake data, piglets were weighed on the day of weaning, followed by weekly weighing thereafter. An ear tag identified individual animals. Once the animals were weaned, feed refusals were weighed back on a weekly basis during the post weaning period. This allowed calculations of apparent feed intake and feed conversion ratios to be made.

The apparent nutrient digestibility was determined by the indicator method during the last week of the experiment using chromium (III) oxide (0.5%). Data are presented as arithmetic means with standard deviations (Mean \pm SD). One-way analysis of variance "ANOVA" (ANOVA-single factor) and Student's t-test ($P < 0.05$) were performed to test the differences between effects of pellet and meal feed.

2.3. Pellet characteristics.

Pellet diameter is often quoted in the commercial literature used by feed manufacturers to sell their product with the general opinion that smaller diameter pellets are better at promoting feed intake in young pigs [3]. The pellets were made by a commercial piglet starter feed manufacturer and as such are representative of the types of diets that would be available commercially, in such an environment pellets would only be described by their diameter, and

in this experiment, no significant performance differences were seen between these commercial diets. Pellets were subject to standard quality control procedures in the pellet plant and as such it is known that all pellets produced achieved results greater than 90% when subjected to the Holmen test.

3. Results and Discussion

The utilization of pellet feed improved growth performance: Body weight 2.5%, daily weight gain 2.7%, feed intake 1.1% and feed conversion ratio, 1.6%, more than control group, for whole experimental period.

Dry matter, crude protein and crude fibre digestibility was slightly increased respectively 1,2%, 0,6% and 2,8%, compare to the control group. Fat digestibility was slightly decreased 1,4% compare to the control. Caused by the high coefficient of variation the differences were not significant.

Similar experiments were performed by different authors and are still performing all around the world regarding the same argument. In 10 experiments with weaned pigs [4] showed that the daily weight gain was increased 12.3 \pm 9.4% 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% in group treated with fresh humid food. In two experiments [7] compared

the effect of utilization of fresh humid food and weaned pigs, on growing pigs and pigs in the last pelletized dry food in different categories of pigs: period of growing.

Table 3. The effect of pellet feed on production parameters.

<i>Parameters</i>		<i>Control group</i>	<i>Experimental group</i>
Production	n ¹	X ± SD	X ± SD
-Initial BW, kg	10	6.1 ± 1.01	6.2 ± 1.07
-BW 6 th week ²		19.8 ± 5.10	20.3 ± 5.83
Feed intake, kg		25.8 ± 7.04	26.1 ± 6.30
DWG, g ³		326 ± 123	335 ± 128
FCR ⁴		1.88 ± 0.48	1.85 ± 0.31

¹Number of animals, (10 piglets/ every group, at the beginning of the experiment)

²BW at the end of the trial.

³DWG for whole experimental period.

⁴FCR for whole experimental period.

Table 4. Apparent nutrient digestibility, %

<i>Parameters</i>	<i>Control group</i>	<i>Experimental group</i>
	X ± SD	X ± SD
Dry matter	73,24 ± 6,70	74,18 ± 6,24
Crude protein	77,35 ± 5,06	77,80 ± 5,08
Crude fat	70,13 ± 3,01	69,18 ± 2,58
Crude fibre	52,03 ± 7,56	53,50 ± 7,54

In his experiments [2] concluded that the feed conversion ratio was higher 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 piglets after weaning. The improvement of the method of utilization of foods should help to reduce these losing.

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 [8].

The studies of [5] showed that even in the cases when there is a distinguished change in the dynamics of daily weight gain and feed consumption, the influence of pelletized and fresh humid food was showed only in the indexes of carcass (after the animal scarification).

Another group of authors [9] showed that the dry matter gained was higher in the group fed with pelletized dry food in comparison with the humid food utilized. The ratio between meat and fat, the percentage of the skin in total were not influenced by the feeding treatments (P>0,05).

Piglets by nature however, are very astute, highly inquisitive animals that spend a large proportion of their time investigating their environment [3]. By utilizing and redirecting this exploratory behavior towards the feed trough, it is hypothesized that feed intake would increase. In order to utilize this innate

behavioral curiosity, a foodstuff with properties which will encourage approach behavior needs to be found. Whilst it has been shown that when kept in large groups young pigs show higher average daily gains when offered a pellet diet as opposed to meal [6], there is very little data relating to the effects of pellet size or in particular changes in pellet size during the pre/post weaning period. [1] in a preliminary study found that when piglets who were still suckling their dam were offered supplementary solid feed in the form of sow rolls (pellets with a very large diameter), they spent longer periods of time engaged in trough directed behavior than those piglets offered feed in a typical commercial pellet size (2–3 mm diameter.)

4. Conclusions

- Pellet production technology is one of different methods of feed-processing, utilized in pigs and poultry nutritive ration. Therefore, an intensive research work is carrying out in this topic from many researcher groups in different countries.
- Based on the achieved results in the present investigations, it could be concluded that the utilization of pellet 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.
- The utilization of pellet feed has induced slightly the performance parameters like: Body weight, daily weight gain and feed conversion ration.

Because of the high coefficient of variation the differences were not significant.

- Feeding pellet form slightly increased crude fiber digestibility in experimental group.

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6. References

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