

EFFICIENCY OF PEAS IN THE DIETS OF HEAVY-TYPE (BIG-6) TURKEYS

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Gauta 2009-10-19; priimta spausdinti 2009-12-16

ABSTRACT

Until 8 weeks of age, turkey poults are very sensitive to feeding conditions, and it is important to know the effects of different amounts of peas in the diets on turkeys of different ages. The aim of our trial was to determine the efficiency of peas in the turkey diets and to find the most effective levels of protein content in the diets of turkey poults till 20 weeks of age.

The best growth performance was determined for turkeys fed diets containing 15 % of peas instead of part of soybean oil-meal with the further increase of the amount of peas up to 40 % with no soybean oil-meal usage. The recommended amounts of peas in the diets according to this study are as follows: 15 % from 0 to 4 weeks of age, 20 % from 5 to 8 weeks of age, 30 % from 9 to 12 weeks of age, 40 % from 13 to 20 weeks of age, with no usage of soybean oil-meal.

Key words: *turkeys, peas, soybean oil-meal*

INTRODUCTION

The greatest part of protein feeds for poultry, i.e. soybean and sunflower oil meals, fish meal, maize, are imported from abroad. However, these feeds, as judged by experience, are not always of the best quality, yet quite expensive.

Comparatively large amounts of protein rich ingredients for feed manufacture are produced on the farms of Lithuania. These are peas, lupines, field beans and rape. These feed ingredients are cheaper than soybean oil meal, the most wide-spread ingredient in poultry feeding [5, 7, 11].

The efficiency of legume-grain feeds in the diets of poultry has been studied by foreign and Lithuanian authors only episodically.

Crude protein content on a dry matter basis in the peas grown in Lithuania accounts for 22.5–23.9 % and that of digestible protein in 15 % wet grain accounts for 16.4–17.5 % [2]. Different authors indicate different levels of peas to be used in broiler chicken feeds. Lithuanian authors [10, 11, 12] assume that the optimum content of peas in broiler feeds is 16 %, while German authors indicate 30 % [4, 9].

There were attempts to use peas in the diets for turkey poult [15]. Turkey poult were offered diets containing 25 % peas until 16 weeks of age. Later the level of peas in the diet was increased and accounted for 55 % at the finishing stage. The control group of turkeys was given soya-maize feeds. Weight gains of the turkeys fed peas were equally high as those of the control turkeys. Another trial was designed to feed turkeys on pea-containing diets supplemented with fat and without fat. The energy levels of the feeds were different. Male turkeys tended to be more sensitive to the energy level in the diets than females. The weight of 16-week-old turkeys fed pea feeds supplemented with fat was 9.51 kg, without fat supplementation 9.05 kg and those fed soya-maize feeds reached 9.01 kg weight.

Nutrient digestibility of peas has also been studied [4]. The digestibility of organic matter, protein, fat, nitrogen free extracts of grapes peas were, respectively, 66.9, 78.5, 48.7 and 70.3 %. Metabolizable energy was 2844 kcal/kg [13].

Peas contain digestion inhibitors such as trypsin inhibitors, hemagglutinins, tannins [1]. It can be found in the literature, that digestion inhibiting factors have no effect on the performance of birds provided the level of peas in the diet does not exceed 30 % [3].

Until 8 weeks of age, turkey poult are very sensitive to the environmental and feeding conditions, and thus, it is important to know the effects of different amounts of peas in the diets of turkeys at different age [6].

Heavy hybrid turkeys of BIG-6 cross were used in the study to determine the efficiency of peas in the turkey diets and to find the most effective levels of protein content in the diets of turkey poult till 20 weeks of age.

MATERIALS AND METHODS

The trials were carried out on V. Tamošiūnas' turkey farm, district of Anykščiai. The turkeys were grown till 20 weeks of age. Due to the fact that male and female turkeys were housed separately, the turkeys were allotted into two control (one comprising male, another female birds) and six experimental groups of 12 birds each, of which three groups were male and the other three-female. Each day was recorded consumption quantity of feed in groups, deaths. As well as each of twelve groups of birds were weighed 4, 8, 12, 16 and 20 weeks of age.

Experimental design Bandymų schema					
Age, week Amžiaus sav.	Protein content of feed, % Lesalo baltymingumas %	Control group Kontrolinė grupė	Group 1 1 grupė	Group 2 2 grupė	Group 3 3 grupė
		Pea content in diet, % Žirnių kiekiai racione %			
0-4	27-28	0	10	15	20
5-8	23-24	0	15	20	25
9-12	18-19	0	20	25	30
13-16	17	0	40	40	40
17-20	17	0	40	40	40

Turkeys in the control groups were fed starters without peas, while soybean oil-meal was replaced by 10 % peas for experimental Group 1, 15 % for Group 2 and 20 % for Group 3. The amounts of peas in the diets were increased with the increasing age of experimental turkeys and at same time the amount of soybean oil-meal for control turkeys was decreased. Finisher diets for experimental turkeys were formulated without soybean oil-meal. Feed test of feed consumption of food matter intake and digestibility study was carried out nutrient-balance test. Test carried out with 18 weeks age turkeys. Birds were considered to be the individual cages, equipped with and individual feeder and drinker. Feeders were constantly full, but feed was accounting. During this test period, 2 times day were collected for each bird faeces. Feed and faeces study by Wender methodology [8]. The test is carried out according to R. Schiemann guidance [14]. The survey data was processed biometrical the R-statistical package (version 1.8.1 ISBN 3-900051-00-03).

RESULTS AND DISCUSSION

Control weighing of birds indicated (Table 1) that at the age of 12 weeks male turkeys in Group 1 weighed 350 g less and those in Group 3 1330 g more compared with the control group. At this age, female turkeys had the lowest and the highest weights in, respectively, Group 2 (5210 g) and Group 3 (6840 g).

At 16 weeks of age, control male turkeys had the lowest weight of 11.9 kg and the weight of the birds in three experimental groups increased from 410 g to 1071 g. Control females at this age weighed from 735 g to 1113 g less in comparison with the experimental females in three groups. The highest weight at the age of 16 weeks was reached by the males (12971 g) and females (8938 g) in Groups 3.

At slaughter, i.e. 20 weeks of age, the weights of the Control and Group 1 turkeys became equal, while the male and female turkeys in Group 2 and 3 weighed, respectively, 87–477 g and 42–161 g more than the birds in the Control group. At the age of 20 weeks, the highest weights were determined for the males and females in experimental Group 3, respectively, 16540 g and 11256 g.

Table 1. Weight of broiler turkeys kg
1 lentelė. **Kalakučių – broilerių svoris, kg**

Age, wk Amžius sav.	Control group Kontrolinė grupė		Group 1 1 grupė		Group 2 2 grupė		Group 3 3 grupė	
	♂	♀	♂	♀	♂	♀	♂	♀
4	0.97	0.90	0.99	0.90	1.10	0.95	1.20	1.03
	±0.03	±0.04	±0.02	±0.03	±0.05	±0.04	±0.04	±0.03
8	3.89	2.98	3.64	3.01	3.95	3.32	4.56	3.59
	±0.14	±0.09	±0.07	±0.16	±0.09	±0.09	±0.18	±0.09
12	7.98	5.51	7.63	5.61	8.00	5.21	9.14	6.84
	±0.10	±0.09	±0.11	±0.08	±0.14	±0.09	±0.10	±0.08
16	11.90	7.82	12.31	8.56	12.47	8.75	12.97	8.93
	±0.21	±0.16	±0.19	±0.09	±0.17	±0.14	±0.20	±0.09
20	16.06	11.09	16.07	11.10	16.15	11.13	16.54	11.25
	±0.30	±0.12	±0.32	±0.13	±0.28	±0.25	±0.41	±0.14

In 16 weeks, the lowest food consumption (Table 2) was found in male and female Groups 3, respectively, 13860 and 10770 g and that was by 8.6 and 6.5 % lower compared with the control group. Female turkeys in experimental Group1 and male turkeys in Group 3 had the lowest food consumption during the fifth growing month. The food consumption was, respectively, 8.38 and 5.11 % lower than in the Control group of turkeys.

Table 2. Food consumption, kg
2 lentelė. **Lesalo sunaudojimas kg**

Age, wk Amžius sav.	Control group Kontrolinė gr.		Group 1 1 grupė		Group 2 2 grupė		Group 3 3 grupė	
	♂	♀	♂	♀	♂	♀	♂	♀
4	2.31	2.08	2.13	2.10	2.15	2.00	2.03	1.87
8	7.01	6.33	6.99	6.00	6.86	5.87	6.64	5.10
12	11.78	9.88	11.12	9.50	10.86	9.00	10.59	8.83
16	15.16	11.52	14.39	11.30	14.03	11.06	13.86	10.77
20	18.00	13.24	17.66	12.13	17.84	12.60	17.08	12.92
Total	54.26	43.05	52.29	41.03	51.74	40.53	50.20	39.49
Food consumption / kg gain Lesalų sąnaudos / kg priesvorio gauti								
16	3.1	3.8	2.8	3.4	2.7	3.2	2.5	3.0
20	3.4	3.9	3.2	3.7	3.1	3.7	2.9	3.5

During the whole experimental period turkeys of Group 3 consumed: male – 50.2 kg and female – 39.49 kg of feed. The food consumption was, respectively, 7.48 and 8.27 % lower than in the Control group of turkeys.

Table 3. Results from digestion trials
3 lentelė. **Balansinio bandymo rezultatai**

Item Rodikliai	Groups Grupės							
	Control group Kontrolinė		Group 1 1 grupė		Group 2 2 grupė		Group 3 3 grupė	
	♂	♀	♂	♀	♂	♀	♂	♀
Daily food intake, kg Suvartota lesalų per parą kg	0.67	0.52	0.67	0.53	0.63	0.6	0.62	0.50
Dry matter retention, % Sausųjų medžiagų pasisavinimas %	71.78	69.35	67.53	68.88	74.17	71.39	74.97	69.24
Fat retention, % Riebalų pasisavinimas %	71.70	68.67	67.84	68.21	74.76	71.14	75.09	69.33
Energy retention, % Energijos pasisavinimas %	70.29	71.35	68.85	68.68	69.92	69.74	79.25	77.46
Nitrogen retention, % Azoto pasisavinimas %	57.25	55.39	47.94	50.65	60.21	54.66	58.59	53.48
Protein retention, % Baltymų pasisavinimas %	90.27	94.78	91.98	92.89	93.55	94.28	93.75	92.67

Digestion trials (Table 3) indicated that increasing levels of peas in the diets led to better fat retention by, respectively, 0.66–2.47 % and 0.33–3.39 % in comparison with the birds of the Control group. Energy retention was 6.11 % higher in male Group 3 compared with the Control group. Protein digestibility by experimental female turkeys fed pea supplemented diets was higher from 1.71 to 3.48 % in comparison with the Control group.

Our studies are consistent with results of both Lithuanian and foreign scientists recommendations. According to the results obtained we recommend the use of turkeys different ages on a quantity of peas 15 % to 40 %.

CONCLUSIONS

1. The best growth performance was determined for turkeys fed diets containing 15 % of peas instead of part of soybean oil-meal with the further increase of the amount of peas up to 40 % with no soybean oil-meal usage. At the age of 20 weeks, male turkeys of this group weighed 16.5 kg, females 11.25 kg, but the data was not statistically significant compared with the Control group.

2. Food consumption/kg gain was 3.9 kg and 4.7 kg, respectively, for males and females in the Control group, while in the experimental Group 3 males consumed 3.4 and females 4.2 kg per kg gain.

3. The recommended amounts of peas in the diets according to this study are as follows: 15 % from 0 to 4 weeks of age, 20 % from 5 to 8 weeks of age, 30 % from 9 to 12 weeks of age, 40 % from 13 to 20 weeks of age, with no usage of soybean oil-meal.

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ŽIRNIŲ EFEKTYVUMAS STAMBAUS TIPO KALAKUTŲ „BIG-6“ RACIONUOSE

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Santrauka

Iki 8 savaičių amžiaus kalakučiukai yra jautrūs lesalų kokybei. Todėl labai svarbu žinoti kaip veikia jų produktyvumą skirtingi žirnių kiekiai įvairiame kalakučiukų amžiuje. Mūsų tyrimų tikslas buvo įvertinti žirnių panaudojimą kalakučiukų racionuose ir surasti labiausiai tinkamą jų kiekį kalakučiukų racione iki 20 savaičių amžiaus.

Geriausiai augo kalakučiukai, kurių racione pirmąsias keturias savaites sojų rupiniai buvo pakeisti 15 % žirnių ir sekančiais auginimo laikotarpiais žirnių kiekis buvo didinamas iki 40 % visai nenaudojant sojos rupinių.

Apibendrinus tyrimo išvadas galima rekomenduoti tokius žirnių kiekius racionuose: nuo 0 iki 4 savaičių 15 %, nuo 5 iki 8 savaičių – 20 %, nuo 9 iki 12 savaičių – 30 % ir nuo 13 iki 20 savaičių amžiaus – 40 %, visai nenaudojant sojų rupinių.

Raktažodžiai: kalakutai, žirniai, sojų rupiniai

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ISSN 1392-6144

Животноводство: Научные труды. 2009. 54. С. 100–106

УДК 636.5.084

ЭФФЕКТИВНОСТЬ ГОРОХА В РАЦИОНАХ ИНДЮКОВ ТЯЖЕЛОГО ТИПА „БИГ-6“

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Резюме

До 8-недельного возраста индюшата чувствительны к качеству корма, поэтому очень важно знать, как на их продуктивность влияет различное количество гороха в разные периоды их жизни.

Целью нашей работы было оценить возможность применения гороха в рационах индюшат и найти наиболее подходящее их количество в рационах индюшат до 20 – недельного возраста.

Наилучший рост отмечен у индюшат, в рационе которых впервые четыре недели жизни часть соевых шротов было заменено 15% гороха и в следующие периоды выращивания количество гороха было увеличено до 40 %, вовсе не употребляя соевые шроты.

Обобщив выводы исследования можно рекомендовать следующие количества гороха в рационах: от 0 до 4 недельного возраста 15 %, от 5 до 8 недельного возраста 20 %, от 9 до 12 недельного возраста 30 % и от 13 до 20 недельного возраста – 40 %, вовсе не употребляя соевые шроты.

Ключевые слова: индюки, горох, соевые шроты

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