

Research on dietary energy influence on the growth performance and meat quality in the Muscovy ducks. 2. Effects of medium and low levels of metabolic energy in mixed feed

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Abstract

The experiment, carried out on 304 hybrid ducklings belonging to the Muscovy breed divided into 2 equal lots of 8 repetitions, analyzed the effect of some mixed feed recipes of 2751 —2851 Kcal (11,54- 11,93 MJ)/kg, as compared to 2551-2651 Kcal (10.68-11.09 MJ) EM/kg, administered differently according to age. In the case of duckling processed at 70-77 days, the body weight, the feed conversion, processing efficiency and the proportion of the economically valuable anatomic parts are not significantly influenced. The percentage of abdominal fat is significantly reduced in using low energy recipes. For the same recipes, the percentage of mineral salts increases, while that of muscular fat decreases.

Keywords: *Muscovy ducks, metabolic energy, compound feed, carcass quality*

Introduction

Raising palmipeds and particularly Muscovy ducks has an extremely important role in European poultry farming. Thus, as we have shown before [5], ducks range third in meat production, after hens and turkeys, while Muscovy ducks represent 50 % of the ducks produced in Europe and 75-80 % in France.

Literature on Muscovy duck food is quite scanty, although specialists have tried to improve it during the past 10-15 years.

As concerns the diet energetic level, Leclercq and Carville (1981-1986) concluded that the increase is not changed between 2400 and 3200 Kcal EM, but specific consumption is smaller and fattening higher in superior energetic levels.

Jeroch (1987) reduced the diet energetic content from 2850 Kcal to 2250 Kcal EM/kg. and obtained a reduction in the fat content and

an increase in the protein content of the carcass.

Elena Popescu-Micloșanu (2000) pointed out in a previous paper, that, between, 2750-3050 EM/kg mixed feed, the duckling body weight does not change, but the meat and carcass quality improve.

Material and method

Research works took place at the Băneasa Experimental Didactic Station, belonging to the USAVM-Bucharest, on a number of 304 hybrid Moscowy ducklings B₄B₂ produced in the station; the ducklings were divided into 2 lots of 8 repetitions each, equal in number and sex ratio. The 2 lots received mixed feed of medium energetic value (Em) between 2751-2851 Kcal EM/kg (11.54-11.93 MJ/kg) or feed of low energetic value (Es), between 2551 —2651 Kcal EM/kg. (10.68-11.09 MJ/kg), according to age. The protein level of the rations was equal, between 20 % and 16 % according to the administering period. Table 1 presents the feed recipes used.

Table 1 Structure and quality parameters of the mixed feed

Feed ingredients	Medium energy (Em)			Low energy (Es)		
	0-4 weeks	4-8 weeks	8-11 weeks	0-4 weeks	4-8 weeks	8-11 weeks
Corn	53.7	59.0	64.6	24.3	29.7	35.2
Wheat	-	-	-	25	25	25
Wheat bran	7.4	8.5	9.7	16.2	17.3	18.4
Soybean meal	29.6	23.2	16.4	25.2	18.7	12.1
Meat meal	4.0	4.0	4.0	4.0	4.0	4.0
Premix methionine 10%	1.5	1.5	1.5	1.5	1.5	1.5
Premix choline HCl 10%	1.2	1.2	1.2	1.2	1.2	1.2
Salt	0.2	0.2	0.2	0.2	0.2	0.2
Calcium carbonate	0.9	0.9	0.9	0.9	0.9	0.9
Dicalcium phosphate	0.5	0.5	0.5	0.5	0.5	0.5
Mineral-vitamin premix	1.0	1.0	1.0	1.0	1.0	1.0
Analyzed						
Crude protein, %	20.043	18.09	16.01	20.02	18.02	16.01
Metabolic energy,						
- Kcal/kg	2751.3	2800.0	2850.9	2550.6	2600.2	2650.9
- MJ/kg	11.51	11.72	11.93	10.67	10.88	11.09
Crude fiber, %	4.62	4.44	4.25	5.06	4.87	4.59

Calcium, %	0.886	0.976	0.865	0.900	0.889	0.879
Available phosphorus, %	0.400	0.396	0.392	0.423	0.419	0.415
Lysine, %	0.970	0.835	0.690	0.935	0.795	0.654
Methionine+Cystine, %	0.744	0.689	0.631	0.747	0.691	0.634

The ducklings were raised on soil from 1 day of age to 77 days, following the usual growth technology for ducklings.

The evolution of body weight in ducklings was followed by individual weighing, consumption of mixed feed per each repetition and per growing periods. At the end of the experiment, 6 male and 6 female ducklings were slaughtered, in order to determine carcass and commercial body parts productivity, as well as meat chemical composition. The primary data were statistically processed by the usual methods.

Results and discussion

The results obtained are shown in the following tables and present the influence of the medium and low energetic levels on raising Muscovy ducks.

The ducklings body weight according to the specific treatment can be observed in Table 2.

Table 2 Evolution of duckling body weight according to feed energy concentration (g)

	Age (days)	Males	Females	Both sexes
Em	1	48.19±1.422	48.34±3.271	48.26±0.335
	28	1273.18±32.273	966.90±15.805	1099.02±26.992
	42	2060.45±42.815	1473.10±24.27	1726.47±47.039
	56	2870.73±70.563	1796.55±25.439	2333.64±87.703
	70	3389.47±70.563	1978.00±27.850	2683.73±74.852
	77	3460.53±12.764	2020.00±44.721	2740.26±77.342
Es	1	47.96±0.910	48.51±1.187	48.20±0.714
	28	1182.26±14.789	970.00±22.419	1099.02±19.031
	42	1892.58±15.681	1440.00±31.697	1715.10±36.352
	56	2687.10±36.364	1787.50±42.626	2237.30±67.074
	70	3246.43±32.216	1967.65±39.278	2607.04±96.666
	77	3321.43±29.583	1994.12±46.793	2657.77±99.725

Starting from similar average weights of day-old ducklings, at the age of 2 weeks, both male and female ducks achieve larger body weights in the medium energy lot (Em) than in the low energy one (Es); nevertheless, the differences are not statistically assured. Yet,

starting from the age of 28 days, the situation changed: the male ducks under Es diet had a significantly lower weight than those under Em at ages of 28, 42 and 56 days. Thus, at 8 weeks, male ducks under Em had an average weight of 2870.7 g, while the Es ones 2687.1 g. Nevertheless, both at 70 and 77 days, the differences are not statistically assured, although the weights remain lower in Es, as compared with Em. Female ducks recorded very similar body weights, with insignificant differences between 28-77 days. In both sexes, the differences between lots are very small and not statistically assured.

The average daily gain in male ducklings (Table 3), as well as body weight are also significantly higher in Em than in Es, between 15-28 days to 57-70 days; between these periods, the average daily gain reached about 56-58 g in medium energy. In female ducks, the average daily gain varied insignificantly according to the energetic level. Yet, between 1-56 days, the Em lot obtained a gain by 9.8 % higher than in the Es one.

Table 3 Average daily gain of ducklings according to food diet (g)

Period (days)	Energy level					
	EM			Em		
	MM	FF	MF	MM	FF	MF
1-14	30.91	28.07	29.39	29.45	26.99	28.17
15-28	56.52	37.30	46.91	51.71	39.05	45.58
29-42	56.23	36.15	46.19	50.73	33.57	42.15
43-56	57.87	23.10	40.49	56.75	24.82	40.78
57-70	37.05	12.96	25.00	39.95	12.86	26.41
71-77	10.15	6.00	8.07	10.71	3.78	7.24
1-28	43.75	32.80	37.53	50.51	32.91	37.52
1-56	50.40	34.43	40.81	41.12	31.05	30.09
1-70	47.73	27.56	37.64	45.69	27.41	36.55
1-77	44.31	25.60	34.96	42.51	25.26	33.89

The specific consumption is lower in the medium energetic level than in the low one, the highest difference between lots being recorded between 1-56 days, when Em achieves a feed conversion of 2.991, while Es-3.232 (lower by 7.5 %) (Table 4).

Table 4 Feed conversion according to food diet

Energy level	Period (days)	Feed conversion
Em	1-28	2.179
	1-56	2.991
	1-70	3.470

Es	1-77	3.746
	1-28	2.317
	1-56	3.232
	1-70	3.658
	1-77	3.970

The results obtained at the slaughtering time of duckling are presented in Table 5. The efficiency in eviscerated carcass and carcass without head, neck and shanks, as well as the percentage of thighs, are not influenced by the energetic level either in 56 or in 77 days. The percentage of breast appears significantly better in Em at 56 days; the values were 18.22 % in Es and 19.75 % in Em. Also, the percentage of abdominal fat is more reduced in Es, both in 56 and 77 days. It is obvious that, together with the increase in the age of slaughtering, there is an improvement in the slaughtering efficiency and breast percentage in the carcass.

Table 5 Results obtained from duckling slaughtering

Slaughtering yields (%)	Em		Es	
	56 days	77 days	56 days	77 days
Carcass after evisceration	79.682	82.070	78.310	82.010
Carcass without head, neck and shanks	64.987	63.410	62.686	62.940
Legs	22.082	17.990	21.847	17.980
Breast	19.753	24.310	18.220	24.290
Abdominal fat	1.324	1.170	0.796	0.930

The analysis of meat composition (Table 6) points out a significant decrease in the ash percentage of thighs and particularly of breast in Es (from 1.17 to 1.09 % in legs and from 1.62 to 1.23 % in breast). Also, the quantity of fat in thighs and pectoral muscles is reduced, without influencing the protein level.

Table 6 Duck meat composition at the end of the experiment (%)

		Em	Es
Legs	Ash	1.17	1.09
	CP	20.44	21.23
	EE	3.28	2.87
Breast	Ash	1.62	1.23
	CP	21.96	21.19
	EE	2.37	1.79

Conclusions

As a result of research on the influence of the energetic level of the mixed feed (2751-2851 Kcal, as compared to 2551-2651 Kcal EM/kg.) on the growing performances of Muscovy ducks, the following conclusions can be drawn:

1. In 8-week ducklings, body weight and feed conversion are influenced by the energetic level, particularly in males, reaching 2870.7 g. in medium energy (Em) and a body weight by 6.4 % less in low energy. Feed conversion is by 7.5 % lower in Em.
2. At the slaughtering age (70 and 77 days), duckling body weight and feed conversion are not significantly influenced by the energetic level.
3. Slaughtering efficiency and the percentage of the highly - commercial value anatomic parts record no statistically-assured differences between the batches, excepting the Em lot which has a significantly higher percentage of pectoral muscles at 56 days. The percentage of abdominal fat is significantly reduced in low energetic diets.
4. Meat quality is improved by increasing the mineral salts percentage and decreasing the muscular fat quantity in the lot with an energetic level of 2551-2651 Kcal EM/kg.

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