

## THE EFFECT OF DIFFERENT ENERGY AND PROTEINS LEVELS IN DIET ON PRODUCTION PARAMETERS OF BROILER CHICKEN FROM TWO GENOTYPES\*\*

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**Abstract:** The aim of this work is to examine the influence of various systems of diet on production parameters of broilers from two different genotypes. The examination was done in a production farm for intensive fattening of broilers in R.Macedonia. Broilers from genotype Hubbard Classic and Cobb 500, 2400 one-day chickens all together sorted out in 16 separated and marked boxes have been used as a material. In each box were put 150 chickens, which contained four different treatments (two different hybrids x two diets) and four repetitions in one turns. Starter mixture was used during I-II weeks, grower for III weeks, then finisher 1 from IV-VI week, and finisher 2 for VII weeks of broilers fattening. Chemical structure of the first mixture (diet 1) had higher level of energy and proportion E:P, while the second mixture had higher level of proteins and lower values of proportion E:P. During the fattening the production parameters of the examining chickens: body mass, daily gain, feed consumption, and conversions were regularly observed. All data have been processed by computer subprogram Basic Statistic and Anova. Chickens, which were fed with the first mixture 1, had higher body mass between the period of II-VII week than the chickens fed with the second mixture and these differences were statistically significant. Total feed consumption and mostly per week was insignificantly bigger at the chickens from the genotype Hubbard in the proportion with the feed consumption of the chickens Cobb. The effect of the various substances (energetic-protein) was insignificant at the feed consumption, but significant ( $p < 0,05$ ) at the feed conversion.

**Key words:** broiler chicken, genotype, energy, protein, production parameters.

## Introduction

In the past, broiler meat became important material for production of different meat products. To this trend of development, the demands for breeding, selection and nutrition were adapted. Nutrition is one of the major external factors that can influence feeding result. New hybrids from breeding - selection centers are asking for new special nutrition procedures and pasture compounds that are energetically and with nutritive material content on that level which allows completely new expression of chicken inherited characteristics in fattening.

*Jackson et al. (1982)* analyzed the significant of influence of different levels of proteins and energy in diet and sex on performances and profitability of broiler characteristics. Sex and diet had great influence on broiler performances. Enlargement of the number of proteins in diet directly increased body weight and efficacy at 49 days age. *Albuquerque et al. (2003)* used male chicken in their attempt to prove the influence of two new energetic nutrition in finisher (3200 and 3600 kcal ME/kg) which were used only in the last week of fattening, for slaughterers in 42, 49 and 56 day. Results showed better gain and better conversion of broilers fed with finisher 3200 kcal ME/kg. Broilers fed at 42 and 49 days had better performances and average production than those which were 56 days old. *Sakomura et al. (2006)* estimated growth potential and accumulation of alimentary substances in carcass, for broiler chicken Cobb and Ross starting from 1 to 56 day of fattening. They realized that Ross broiler chicken showed bigger final weight and maximum growth level compared to Cobb chicken. However growth rate reached its peak at Cobb chicken, which indicates that Cobb chicken achieved their body weight faster and they grew faster than Ross. Author's recommendation was Cobb chicken to be used as lighter until 35-42 days age, while for heavier be used chicken of Ross line. *Smith and Pasti* concluded that genotype does not have significant influence on feed conversion.

## Materials and methods

The examination was carried out on production farm for intensive fattening of broiler chickens in R. Macedonia. As researching material broiler chickens, one day old, of Hubbard Classic and Cobb 500 genotype were used, in total amount of 2400 chicken distributed in 16 separate and labeled box. In each box there were 150 chickens, which were part of four

different treatments (two hybrids x two diets) with four repetitions in one turn. Starter compound was used during I and II week, grower during III week and finisher 1 starting from IV -VI week and finisher 2 in the VII week of chicken fattening. Chemical composition of the first mixture (I) was with higher energetic level and in proportion E:P; the other mixture (II) was with higher protein level and lower values of proportion E:P. During the fattening, production parameters were regularly controlled: body weight, daily gain, feed consumption and conversion. Data were put in the computer program Statistic, where in the sub program Basic Statistic average values and variability measures were defined. When variability was defined in order to test variability of examined chicken sample, at the same time, the distribution of characteristics was checked.

## Results and discussion

In the period from 14-49 day, chickens fed with mixture I had greater body weight than chickens fed with mixture II (table 1). The differences in body weights were statistically significant in all measurements from 14-49 day. Body weight of chickens fed with mixture I at the end of the research was 2512,83g and was significantly greater than body weight of chickens fed with mixture II (2425,98 g).

**Table 1. Body weight (g) of chicken fed by different mixtures**

Age (day)	Mixture				S.S.D. (F test)
	I		II		
	X	SD	X	SD	
8	108,12	5,11	110,64	6,25	NS
14	276,24	19,36	245,19	24,49	*
21	614,84	86,34	542,89	95,20	*
28	1066,26	119,37	1002,26	140,26	*
35	1572,21	173,93	1536,23	146,33	*
42	2088,41	211,25	2019,46	238,58	*
49	2512,83	264,95	2425,98	277,78	*

\* ( $p < 0,05$ ), S.S.D.-Statistically Significant Different ( $p < 0,05$ )

NS -No S.S.D.

Chickens fed with different mixtures had lower daily gain during the first week (table 2).

The highest daily gain of chickens fed with mixture I, was in the period from 35-42 day of growth (73,74 g). The highest daily gain of chicken fed with mixture II were in the period from 28-35 day of growth (74,28 g). Chickens fed with mixture I had higher daily gain than chickens fed with mixture II in the period from 7-21 and 35-49 day. Chickens fed with mixture II had higher daily gain than chicken fed with mixture I in the period of performance until 7th day and from 21-35th day.

**Table 2. Daily gain (g) of chicken fed by different sistem of diet**

Age (day)	System of nutrition	
	I	II
1-7	10,29	10,60
7-14	24,02	19,22
14-21	48,37	42,43
21-28	64,49	65,62
28-35	72,28	74,28
35-42	73,74	69,33
42-49	60,63	58,07

Chickens fed with mixture II had higher weekly feed consumption and higher conversion than chickens fed with mixture I, which can be seen from the table 3.

Feed gain in chickens fed with mixture II was higher than feed gain in chickens fed with mixture I during the whole period of research, except on 21 and 35 day when the values were lower. Chicken fed with mixture II had bigger final conversion (2,043) than chickens fed with mixture I (1,917). The conversion during examination period was higher in chickens fed with mixture II. Feed consumption and conversion are quantities with low variability. Chickens fed with mixture I had larger body weight in the period from 14-49 day than the chicken fed with mixture II and this difference in body weight were statistically significant. Mixture I had greater energetically nutrition value as the proportion E:P in starter, grover, finisher 1 and finisher 2 in proportion with mixture II. *Jackson et al. (1982)* realized that the rise of nutrition energy consecutively increases chicken body weight until 49 day and improves feed efficiency.

Weekly feed consumption of Hubbard chicken was slightly higher compared to feed consumption of Cobb chicken, but statistically it is not

**Table 3. Weekly feed consumption and conversion of chicken fed by different mixtures**

Age (day)	Diet				S.S.D. (F test)
	I		II		
	X	SD	X	SD	
<i>Weekly feed consumption (g),</i>					
8	120,89	10,84	124,45	9,14	NS
14	166,97	8,72	193,77	12,74	*
21	423,57	20,72	402,58	23,44	NS
28	565,89	21,33	600,33	27,37	*
35	916,06	30,42	876,24	26,86	*
42	1336,48	32,24	1402,29	43,09	*
49	1291,31	49,75	1340,22	59,71	*
<i>Conversion</i>					
8	1,117	0,08	1,125	0,08	NS
14	1,138	0,06	1,209	0,07	NS
21	1,158	0,06	1,332	0,05	*
28	1,179	0,06	1,372	0,07	*
35	1,418	0,06	1,419	0,06	NS
42	1,689	0,05	1,789	0,05	*
49	1,917	0,06	2,034	0,07	*

\* ( $p < 0.05$ ), S.S.D.-Statistically Significant Different ( $p < 0.05$ )  
 NS No S.S.D.

important. *Smith and Pesti (1998)* concluded that genotype had no significant influence on feed conversion, but had significant influence on feed consumption for different genotypes. Conversion was indirectly proportional with the level of protein in diet, but it was not under influence of line hybrids. The influence of different compounds (energetic-protein) was insignificant for feed consumption and significant for feed conversion. Conversion at the end of the examination was 1,975 and had inclination to increase during the examination period, but compared to feed consumption it did not have linear trend. Statistically significant differences at feed conversion were determined in the period from 28-49 day of fattening. Chicken fed with mixture I, which in the phase finisher 2 contained about 3200 kcal/kg ME and was given to chicken in the last feeding week, on the contrary to mixture II, bigger growth was shown, less feed consumption and better feed conversion which was statistically significant. These results are in

accordance with *Albuquerque et al.* (2003) results which confirmed better production performances by chicken fed in the last week with finisher of 3200 kcal/kg ME and slaughtered on 49 day.

## Conclusion

- In the period from 14-49 day chicken fed with mixture I had bigger body weight than chicken fed with mixture II. The differences in body weight were statistically more significant in all these measurements from 14-49 day.
- Genotype didn't have significant influence on the feed consumption and conversion. Differences in feed consumption per week were statistically significant in all their phases. Conversion at the end of the examination was 1,975 and inclined to increase during examination period. Influence of the different compounds (energetic - protein) was insignificant for feed consumption and statistically significant for conversion.

# UTICAJ RAZLIČITOG NIVOVA ENERGIJE I PROTEINA U HRANI NA PROIZVODNE PARAMETRE BROJLERSKIH PILIĆA DVA GENOTIPA

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## Rezime

Cilj ovog rada bio je istraživanje uticaja različitog nivoa energije i proteina u hrani brojlerskih pilića dva genotipa na neke proizvodne parametre. Rad je bio izveden u objektu za intenzivnu proizvodnju brojlerskih pilića u R.Makedoniji. Pri tome su kao materijal korišćeni pilići dve hibridne linije Cobb 500 i Hubbard Classic, kojima su se proizvodne osobine pratile do 7 nedelje starosti. Korišćene su dve vrste smeše tako što je hemijski sastav prve smeše bio sa većim nivoom energije i odnosa E:P, dok je druga smeša bila sa većim nivoom proteina i manjim vrednostima odnosa E:P. Kao najvažniji proizvodni parametri u porastu pilića uzeti su: telesna masa pilića, dnevni prirast, utrošak hrane i konverzija. Pilići hranjeni prvom

smešom imali su veće telesne mase od II-VII nedelje odgoja i te razlike su bile statistički značajne. Ukupni utrošak, a većinom i nedeljni bio je neznačajno veći kod pilića genotipa Hubbard. Uticaj različitih smeša (energetsko-proteinski) bio je signifikantan kod konverzije hrane. Pilići hranjeni prvom smešom pokazali su statistički značajni veći prirast, manji utrošak hrane i bolju konverziju.

Kod pilića hranjenih različitim smešama hrane, kao i kod pilića različitog genotipa razlike u proizvodnim su evidentne ali u potpunosti nisu definisane, što nameće potrebu za daljim istraživanjima ovih uticaja na proizvodne osobine brojlerskih pilića.

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