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Dr. Hasan ONDER

Dr. Ugur SEN

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PREFACE

This volume contains the papers presented at the V. International Congress on Domestic Animal Breeding Genetics and Husbandry - 2021 (ICABGEH-21) was held on September 28, 2021.

The ICABGEH-21 has been organized by the Agricultural Faculty of Ondokuz Mayıs University. ICABGEH-21 is the fifth international event of the congress series with the participation of top-rated invited speakers; Dr. Ann Van Soom (Ghent University, Belgium), Dr. Dariusz Piwczyński (Bydgoszcz University of Science and Technology, Poland), and Dr. Theodore A. Tsiligridis (Athens University of Agriculture, Greece). This event has been planned to bring together leading researchers, engineers, and scientists in animal science worldwide. It also provided opportunities for the delegates to exchange new ideas and application experiences, establish business or research relations, and find global partners for future collaboration. The organizing committee has done serious planning and preparation to ensure that the Turkish and international animal science scientific community to meet the challenges and move safely and successfully into the advanced information era. To this end, ICABGEH-2021 has been focused on recent developments and research on animal science aimed at protecting the environment and food safety. Thus, ICABGEH-2021 has achieved its main twofold objective: Firstly, the presentation of current research works in the field of animal science, and secondly, connecting the animal science community.

Prof. Dr. Hasan ONDER,

Congress President

EFFECTS OF DIFFERENT PROTEIN SOURCES ON GROWTH AND CARCASS PERFORMANCES OF DOMESTIC TURKEYS RAISED IN PELAGONIA REGION, R. N. MACEDONIA

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Abstract

The poultry production is a very delicate concept, they are very tender and sensitive to the lack of vitamins, minerals and proteins, and especially the amino acid composition. The appropriate amount of protein and balanced composition of amino acids are one of the prerequisites for intensive growth of young turkeys. A total of 30 heads of Domestic Turkey breed (white and black) was grown under the so-called indoor farming system in Pelagonia region, North Macedonia in the period of 2017-2018 year. The aim of this research was to determine the differences in the body weight, in the period of 10-90 days, and the carcass performances of turkeys fed with two different concepts in relation to the origin of feed proteins (group R - fed with fish flour and group S - fed with whey powder). In our study, regarding the live body weight of turkeys from both groups in the period of 90 days, a significant statistical difference between the two groups marked with R and S for different feeding intervals ($p < 0.05$) was performed. Slaughtering parameters in both groups R and S show that there is no significant difference between the two groups of turkeys ($p > 0.05$). The results obtained from our study would be an initiative for a further research of this type and will be of great benefit to farmers in our country.

Key words: Domestic Turkey, Growth, Fish flour, Whey powder, Pelagonia region

INTRODUCTION

Turkey meat contains all the essential amino acids necessary for the human body such as: lysine, leucine, methionine, tryptophan and others. Turkey meat contains less fat, but high quality essential fatty acids such as linolenic, arachidonic and linoleic. It also contains a small percentage of cholesterol, but also a large percentage of B vitamins, which makes it very suitable for modern and dietary nutrition (Petrovic. V., 1988; Caballero B, 2005). The amount of nutrients and the quality of poultry fat largely depend on its genetic potential as well as the diet of the poultry, especially specific breeding technologies (organic production, extensive breeding system) have been shown to affect

the composition of poultry meat (Caballero B. et al., 2005).

The production of domestic poultry is a very delicate matter; they are very tender and sensitive to the lack of vitamins, minerals and proteins, and especially the amino acid composition. They are also sensitive to changes in weather conditions, humidity and gases, to some stresses such as: noise, vaccination, capture and regrouping, etc. (Peric 2004). An adequate amount of protein and a balanced composition of amino acids are one of the prerequisites for intensive growth of young turkeys. In the first month of growing the required content of total protein in the diet is 28%, and in the following month they are only lower by 2% (Baker, D.H., 2000). Fish meal contains higher

levels of the amino acids lysine, methionine and cysteine (Swick, 1999). With a favorable amino acid composition, fish flour contains both Ca and P (Hendriks et al., 2002) in a favorable ratio, micronutrients - Se and I, which contributes to easily available minerals that are used efficiently, reducing environmental pollution and reducing costs for additional minerals in the diet (FIN., 2001). Due to the fat content of 2% - 12% it is also used to meet the energy needs of animals (Windstor, 2001). It contains a very long chain of polyunsaturated fatty acids (omega-3) that help the body prevent disease and maintain the immune system and is a natural source of vitamins (including choline, biotin and vitamins B12, A and E). Whey is produced in the process of separating lactic acid. Lactic acid bacteria break down lactose (milk sugar) into glucose and galactose, and then glucose is converted to L (+) lactic acid during lactic acid fermentation (Pijanovski, 1971). According to Scingoethr, (1976) and Morista et al. (1982) whey contains unidentified growth factors, while the protein content of whey includes alpha and beta-lacto globulins and can be used as a valuable source of protein in animals (Brunner, 1981). From milk to whey production pass water-soluble vitamins, while fat-soluble vitamins only partially.

Growth as a basic function and production in fat animals involves continuous increase in body weight (Hurwitz & Talpaz, 1997). Different tissue and hormone responses, on the one hand, and growth factor activity, on the other, result in different growth patterns in different organs. Gray et al. (1983) therefore determined different growth rates for different organs of birds. Sanduky & Heath, (1988) observed differences in the growth of different muscles, and Iwamoto et.al (1993) even found different growth rates in different muscle fibers. The aim of the research in this paper is to determine the live body weight and slaughter

characteristics of turkeys fed with two different mixtures in terms of protein origin (fishmeal and whey powder).

MATERIALS AND METHODS

A total of 30 heads of Domestic Turkey breed (white and black) was grown under the so-called indoor farming system (controlled room temperature, ventilation and light) in Pelagonia region, North Macedonia in the period of 2017-2018 year. Turkey's feed ration consisted of the following components: corn, soybean meal, wheat, sunflower husk, fishmeal / whey powder, fodder yeast, lard, chalk, salt as well as dicalcium phosphate and mineral supplement in order to meet the requirements of poultry nutrition (according to NRC, 1994). The composition of fish flour added to the feed mixture of turkeys from group "R" was as follows: lysine 28,000 mg, methionine 12,000 mg, Ca CO₃ = 2,000 mg, NaCl = 4,000 mg, acidifier 2000 mg, aroma 2000 mg, carrier 2000 mg, soy protein isolate, peeled soybean flour, amino acids, antitoxin. Whey powder that was added to the feed mixture of turkeys from group "S" was composed of 80% whey protein (cow, sheep and goat), 11.9 g. carbohydrates and low content of saturated fat (11.9 g out of a total of 3.4 g / 100 g whey powder). Food intake was followed by daily measurement of food content and subtraction of the remaining amount of food from the previous day. The live weight of the turkeys was measured every ten days and the increase in live weight was calculated as the difference between two consecutive measurements. Turkeys were slaughtered at the age of 100 days of rearing. After a previous twelve (12) hours of starvation and physical stunning, the turkeys were slaughtered and subsequently the process of skinning (dressing), exenteration, evisceration and dissection was performed manually in a specialized workshop for domestic animals slaughtering. The turkeys were also given the preparation ŽIVIMICIN® 20 g (antibiotic

with vitamins). Juvenile turkeys were constantly monitored by a veterinarian at the time of fattening and were actively immunized against Newcastle disease (strain La Sota ATCV et: QI01AA02). The live weight of the turkeys was measured every ten days and the increase in live weight was calculated as the difference between two consecutive measurements. In order to obtain a relevant data on live weight and slaughter parameters at turkeys, the following measurements were performed, which include:

- 1) Measurement of live weight every ten days from the first measurement which will be at 10 days of age;
- 2) Measurement of carcass parameters on the day of slaughtering: mass measurement of slaughtered carcasses without skin and feathers, measurement of edible parts, measurement of inedible parts and calculation of the yield of a classically processed carcass.

RESULTS AND DISCUSSION

The results of live mass measurements in juvenile turkeys in the period from the 10th to the 90th day.

Table 1. Body weight (g) variation of turkey with respect to feeding intervals (days) over a period of 90 days (n = 8; 95% Confidence Interval for Mean)

Treatment	Meal type	Mean \pm Std. Deviation	Minimum	Maximum
T10	R	136.2500b \pm 2.91548	132.00	140.00
	S	130.1250a \pm 1.72689	127.00	132.00
T20	R	296.3750b \pm 4.50198	290.00	302.00
	S	277.8750a \pm 3.44083	272.00	283.00
T30	R	477.7500b \pm 4.65219	471.00	484.00
	S	445.5000a \pm 5.37188	439.00	454.00
T40	R	703.0000b \pm 4.24264	698.00	709.00
	S	650.5000a \pm 4.14039	644.00	657.00
T50	R	974.8750b \pm 4.73400	969.00	982.00
	S	905.7500a \pm 3.32738	901.00	910.00
T60	R	1397.5000b \pm 8.41767	1380.00	1405.00
	S	1107.7500a \pm 3.91882	1101.00	1113.00
T70	R	1726.5000b \pm 8.73417	1711.00	1738.00
	S	1488.7500a \pm 5.84930	1481.00	1496.00
T80	R	2198.5000b \pm 4.30946	2191.00	2206.00
	S	1824.7500a \pm 8.51469	1813.00	1836.00
T90	F	2809.8750b \pm 7.03943	2801.00	2819.00
	S	2475.2500a \pm 9.75046	2465.00	2492.00

T10 = 0 to 10th day of feeding; T20 = 10th to 20th day; T90 = 80st to 90th day of feeding. For each treatment, means in the same column with different letters are significantly different from each other. Table 1 indicates that there are significant differences of body weights between the two groups for different feeding intervals ($p < 0.05$).

In Table 2 are shown the obtained results about carcass traits at both groups (R-group and S-group). Therefore, before slaughtering, a live body weight at the R and S groups is 2.78 kg and 2.43 kg, while the average body weight of the classically

processed carcasses is 1.77 kg and 1.52kg respectively. The mean value of meat yield (rendement) of the carcasses at both groups slightly differs 63.50% and 62.72%. There is a slight difference in the mean value of the non-edible internal organs (intestines, etc.)

and it is 0.15 kg in group R turkeys and 0.14 kg in group S turkeys.

Table 3 shows that there is no significant difference between the two groups of Turkeys (Fish flour fed and Whey powder fed) for all the parameters since p value is greater than 0.05 ($p > 0.05$). The growth and carcass quality of slaughtered turkeys can be influenced by many factors, including: the way of breeding, the composition of the

food, the final body weight, age, sex, as well as the genotype of the individuals. Our results are consistent with the results of many authors from the world literature (Halvorson et al., 1991; Brake et al., 1994; Waldroup et al., 1997; Roberson et al., 2003; Bogosavljević-Bošković et al., 2005; Nestor et al., 2005; Hulet, 2006; Laudadio et al., 2009; Medić et al., 2009; Sogut et al., 2010).

Table 2. Carcass traits of Turkeys obtained from groups R and S

(N=8)	Group	Live weight before slaughter (kg)	Carcass mass without feathers and skin (kg)	Classically processed carcass (kg)	Edible portions (%)	Non-edible portions (%)	Meat yield (%)
$\bar{x} \pm SD$	R	2,78 \pm 0.70	2,18 \pm 0.52	1,77 \pm 0.46	0.22 \pm 0.05	0.15 \pm 0.03	63.50
	S	2,43 \pm 0.28	1,87 \pm 0.22	1,52 \pm 0.18	0.19 \pm 0.05	0.14 \pm 0.04	62.72

Table 3. ANOVA for weight of body parts of Turkeys fed with two kinds of meals (fish flour & whey powder) for 90 days

Parameters	Sum of Squares	Df	Mean Square	F	Sig.
Body W	Between Groups	507733.516	1	507733.516	1.673
	Within Groups	3338035.714	11	303457.792	.222
	Total	3845769.231	12		
Carcass W	Between Groups	250714.286	1	250714.286	1.909
	Within Groups	1444285.714	11	131298.701	.194
	Total	1695000.000	12		
Caracass WFS	Between Groups	385073.260	1	385073.260	2.305
	Within Groups	1837619.048	11	167056.277	.157
	Total	2222692.308	12		
LHG	Between Groups	3191.209	1	3191.209	1.133
	Within Groups	30985.714	11	2816.883	.310
	Total	34176.923	12		
guts	Between Groups	595.055	1	595.055	.477
	Within Groups	13735.714	11	1248.701	.504
	Total	14330.769	12		

Df: degree of freedom

CONCLUSIONS

In our research, regarding the live weight of turkeys in both groups it was concluded that the obtained statistics (ANOVA) for live weight of turkeys up to 90th day of age, show significant differences between the two groups labeled S (whose mixture contained whey protein) and R (whose

mixture contained fishmeal protein) for different feeding intervals ($p < 0.05$). According to the obtained results we can conclude that the group of turkeys that were fed with whey powder (group S), has a lower live body weight compared to the group of turkeys fed with fish meal and the average live weight on the 90th day of fattening is

2.475 kg, while the average live weight of turkeys in group R is 2.807 kg. There is a slight difference in the mean value of the non-edible internal organs (intestines, etc.) and it is 0.15 kg in group R and 0.14 kg in group S. Slaughtering turkeys values of the two groups R and S show that there is no significant difference between the two groups of turkeys because p value (Sig.) is greater than 0.05. The results obtained from our study would be an initiative for a further research of this type and will be of great benefit to farmers in our country.

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