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Comparative studies on the live bodyweight and meat protein percentage in commercial broiler and layer chicken

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Abstract

The live bodyweights and percentage of protein present in the meat of commercial broiler and layer chicken of same age group were compared in the study. The mean live bodyweight recorded respectively in 45 days old broiler and layer birds were 2100 ± 192.3 and 254 ± 2.9 grams which indicated a much faster growth rate of broilers than the layer lines belongs to same age group. Variation in the hormonal mechanisms of appetite control results in large differences in the mechanism of feed intake and utilization of nutrients in layer and broiler breeders. The broiler chicken meat contained 59 percentage of protein per one gram of tissue and in layer meat it was only 56 percentage. The increased protein percentage in broiler meat may be explained based on this observation that the broiler starter and finisher diet always contains a high percentage of crude protein when compared with layer ration.

Keywords: Broiler, layer, meat protein

1. Introduction

Major focus of research in poultry industry was on developing strains of birds with high feed conversion efficiency with rapid growth rate to cater the demand for broiler meat and another group of birds with capacity to produce more eggs by consuming relatively less amount of feed. Breakthrough in genetic selection, management, and nutrition paved way to the emergence of two categories of chicken: the broiler and layer. Table eggs and broiler meat are the major end products of the poultry sector in India. Presently, production of eggs is estimated to number about 50 billion, that of broilers 450 million, and that of poultry meat 735,000 tonnes. In addition, organized facilities have been set up over the years for the manufacture of egg powder and frozen, processed broiler meat essentially to cater to export markets and markets in the metropolitan areas of India.

The study was intended to compare the bodyweights and percentage of protein present in the meat of commercial broiler and layer chicken of same age group.

2. Materials and methods

Commercial broiler and layer chicken slaughtered at the Meat Technology Unit, Kerala Veterinary and Animal Sciences University, Mannuthy formed the materials for the present study. Prior to slaughter, live body weights of each birds were recorded to the nearest 0.1 g using a digital weighing balance. Meat samples were collected from a total of 12 birds comprising of six commercial broiler birds and six layer birds belonging to the same age group (45 days post hatch).

The amount of protein in mg/ gram of tissue was estimated by the following method- one gram meat of broiler and layer chicken was homogenated and centrifuged at 2000 rpm for 10 minutes in separate centrifuging tube. The three test tubes were taken and labelled as broiler and layer and blank respectively. 0.1ml of each tissue extract were taken in respective test tubes and added 0.9 ml of distilled water to the same. One ml of distilled water was taken in third test tube and this was considered as blank. Added 3ml of copper sulphate reagent to each including blank. Then added 0.5 ml of folin's reagent and allowed to stand for 10 minutes [1].

The OD value was recorded and from this the percentage protein was derived.

3. Results and Discussion

The mean live bodyweight of broiler birds under study was 2100 ± 192.3 grams. The maximum bodyweight recorded was 2300 grams and minimum was 1850 grams in commercial broiler chicken. In layer chicken the mean live bodyweight recorded was 254 ± 2.9 grams. The maximum bodyweight recorded was 258 grams and minimum was 250 grams (Tab. 1), indicating that the broilers are growing at a much faster rate than the layer lines belongs to same age group. The difference in body weight between broiler and layer types of chickens was due to the considerable increase in growth rate in broilers during the first 2 week of age as the broiler lines were developed for the production of meat [2]. Hassanpour *et al.*, (2010) [3] observed that broiler chickens have more muscle fibres of greater size and their breast muscles grow 8 times as fast as in layer hens. The broiler lines were observed to have increased muscle mass and this contributes to their increased body weight. Another report stated that broiler strain grown up to four times faster than the layer strains selected for reproductive traits [4]. Selection of the broiler lines for increased growth has resulted in some undesirable consequences such as poor reproductive performance, excessive fatness, increased skeletal abnormalities and ascites. Where as in layer breeds the body weight was found to be normal in relation to their age of growth. In layer lines, an advantageous growth pattern would be the combination of low asymptotic weight and a high maturing rate [5].

Attaining of maximum growth in broilers and layers is based on nutritional supplements in relation with the production requirements. Several factors are related to change in growth rate. Buzala *et al.*, (2016) [6] observed effects of growth rates in broiler breeder and layer hens on some productive traits. Variation in the hormonal mechanisms of appetite control results in large differences in the mechanism of feed intake and utilization of nutrients in layer and broiler breeders.

The broiler chicken meat contained 59 percentage of protein per one gram of tissue and in layer meat it was only 56 percentage. Bartov and Plavnik (1998) [7] reported that moderate excess of dietary protein above the recommendations increased carcass and breast meat yields and decreases fattening, beside its effect on improving feed efficiency. The increased protein percentage in broiler meat may be explained based on this observation that the broiler starter and finisher diet always contains a high percentage of crude protein when compared with layer ration.

Table 1: Body weight of broiler and layer birds used for the study

Bird No	Body weight of birds in grams	
	Broiler	Layer
1	1850	258
2	2000	250
3	1950	254.6
4	2300	256.5
5	2300	255
6	2200	252
Mean \pm SD	2100 ± 192.3	254 ± 2.9

Table 2: Estimation of protein by Lowry's method

Type of Bird	O.D Value	Amount of Protein mg/gram of Tissue	Amount of Protein (Percentage)
Broiler	1.48	0.592	59 %
Layer	1.39	0.556	56

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