
EFFECT OF BOVINE BLOOD MEAL BASED DIET ON BODY WEIGHT AND MORPHOMETRIC CHARACTERS OF TWO STRAINS OF BROILERS

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ABSTRACT.

This study was carried out to investigate the effect of Bovine blood meal (BBM) on the body weight and morphometric characters of Ross 308 and Marshall Strains of commercial broiler chickens. One hundred (100) 1-day-old chicks comprising of fifty (50) Ross 308 and fifty (50) Marshall Strains were used for this study. Fresh Bovine blood was collected from a slaughter house in Awka and boiled at 100°C for 45 minutes to kill pathogens and allow moisture to evaporate. The Bovine blood was sun dried to avoid microbial action and then ground into fine particles for easy mixing with other ingredients. BBM was mixed with standard commercial ingredients at 5% inclusion level to have 1.31kg of BBM and 23.69kg of standard commercial diet in a 25kg mix. Body weight and three important morphometric traits [Body length (BL), Heart girth (HG), Thigh length (TL)] were measured. Completely randomized design was employed for this research. Data obtained were analyzed using analysis of variance (ANOVA) and significant means were separated with Duncan's New Multiple Range Test. The highest mean body weight after 8 weeks was recorded in T3, Ross 308 (2697) fed BBM and followed by T4, Marshall (2551) fed diet containing BBM. The weight gained by T3, Ross 308 was significantly different ($P < 0.05$) from the weight gained by T4, Marshall and the control treatments. Ross 308 had better morphometric traits. There was significant difference in the three morphometric characters studied. BBM can be included in a broiler diet at 5% inclusion level for improved performance.

Keywords: Bovine blood meal, Body weight, Morphometric characters, Ross 308, Marshall

INTRODUCTION.

There is high demand of meat (protein) in developing countries such as Nigeria and this is expected to continue with increase in population (Ogbuewu *et al.*, 2017). However, there is a strong competition between man and animal for the traditional (conventional) feed ingredients required to feed animals to meet the demand of meat (protein) Ranum *et al.*, (2014); Byerly, (2013); Makkar, (2016); Pauwels, (2016). This competition coupled with climate change and global economic crisis hikes the prices of these feed ingredients beyond the reach of local farmers (Mangesha, 2011; Mangesha, 2012; Manceron, 2014). Monogastric animals such as poultry can effectively provide the meat requirement of developing countries such as Nigeria when fed properly owing to their fast maturity (broilers) and ability to convert roughages to meat (Saadullah and Saad, 2000).

In recent time local farmers have stepped up broiler production to ensure food security as regards to meat (protein), but the industry is faced with stringent conditions such as high cost of feed ingredients, insecurity not enabling farmers to produce enough for man and animals and climate change limiting crop growth/production. Hence, the need to look away from conventional feed ingredients for the production of animals (meat) to the use of non-chemical growth inhibitors and non-conventional feed ingredients. The Food and Agriculture organization (FAO) of the United Nations supports the use of these two classes of ingredients in the use of animal production but emphasizes the need for proper evaluation and utilization in diets to ensure nutritional adequacy, animal health and product quality (Owen *et al.*, 2012; Makkar, 2018). It is also advised that careful considerations should be given to factors such as nutrient composition, anti-nutritional factors, contaminants, and potential impacts with regards to health of animal and consumers (Abbas, 2020).

Bovine blood meal (BBM) is a rich source of high quality protein of about 80%, containing known essential amino acid needed for growth and development (Li *et al.*, 2011; Tadele and Getachew, 2015; Li *et al.*, 2021) Research has shown that blood meal is palatable when incorporated in the diet of

animals, improves feed intake thereby leading to better growth rates (Suresh *et al*, 2011; Kwe *et al*, 2022).

The genetic potential of broiler strains coupled with optimal nutrition is essential for maximizing growth performance and meat yield (Peak *et al.*, 2000; Ikusika *et al.*, 2020). Therefore, there is need for a research on the effect of blood meal supplementation. This study seeks to investigate the effect of Bovine blood meal (BBM) on body weight and morphometric traits of two commercial broiler strains in Nigeria.

MATERIALS AND METHODS

This research was carried out at the poultry unit of the Department of Animal Science Teaching and Research Farm, Nnamdi Azikiwe University Awka, Nigeria. Awka is on an elevation of 177ft above sea level and is a typical rainforest region.

One hundred day old broiler chicks comprising 50 Ross 308 and 50 Marshall Strains were purchased from a reputable farm at Ibadan, Oyo State. One week before the arrival of the birds, the pens used for the experiment were thoroughly washed, the feeders and drinkers were also washed before use. Fresh wood shavings and brooding paper on top of the wood shavings were used as beddings for the first week after which only fresh wood shavings were spread on the floor and changed regularly to avoid wet litter and growth of disease causing pathogens. The birds were vaccinated as and when due to ensure that the birds were in good health status.

Fresh Bovine blood was collected from Kwata slaughter house in Awka, Anambra state immediately the cattle was slaughtered. The blood was boiled at 100°C, this was done to eliminate pathogens. The cooked blood was sun dried to avoid microbial action and ground into fine particle and stored in moisture free containers. The Bovine blood meal (BBM) was mixed with a standard commercial ingredients at 5 % inclusion level to have 1.31 kg of bovine blood meal and 23.69 kg of standard commercial diet in a 25 kg mix. The control group received a standard commercial diet without bovine blood meal supplementation, while the treatment groups received the same diet supplemented with 5% Bovine blood meal. Body weight and three (3) important morphometric characters [Body length (BL), Heart girth (HG) and Thigh length (TL) were measured for a period of 8 weeks. Description of the morphometric parameters are as described by Ekugba *et al.* (2023).

A completely randomized design was employed to investigate the effect of Bovine blood meal supplementation on the two broiler strains' body weight and morphometric measurements. Data obtained were analyzed using analysis of variance (ANOVA) and significant differences between treatment groups were separated with Duncan's New Multiple Range Test.

RESULTS AND DISCUSSION.

Table I: Mean body weight measurement of Ross 308 and Marshall Strains fed bovine blood meal based diet

Strains	WK2	WK3	WK4	WK5	WK6	WK7	WK8	Mean weight	body	SEM
Ross 308 Control T1	106.00	148.80	500.00	900.00	1320.00	1870.00	2240.00	2196.00±71.19 ^c		0.20
Marshall Control T2	115.00	214.60	380.00	726.00	1270.00	1648.00	2200.00	2151.40±94.51 ^c		0.26
Ross 308 BBM T3	127.00	177.20	530.00	980.00	1710.00	2250.00	2740.00	2697.80±92.26 ^a		0.15
Marshall BBM T4	130.20	305.20	520.00	1010.00	1550.00	2170.00	2600.00	2551.40±86.64 ^b		0.08

Note: ^{abc} Means on the same row followed by different superscripts are significantly different (P<0.05); SEM – Standard error of mean

The highest mean body weight after 8 weeks was recorded in T3, Ross 308 (2697) fed BBM and followed by T4, Marshall (2551) fed diet containing BBM. From the result, birds that were fed Bovine blood meal had higher body weight than those that were fed diets without Bovine blood meal. This result is in agreement with Khawaja *et al.* (2007), Seifdavati *et al.* (2008), Shahidullah *et al.* (2008), Nwogor *et al.* (2015) and Kebede *et al.* (2021). All reported that different preparation methods

Table II: Morphometric measurement of Ross 308 and Marshall Strains fed bovine blood meal based diet

Parameters	Ross 308 Control T1	Marshall Control T2	Ross 308 BBM T3	Marshall BBM T4	SEM
BL(cm)	13.32 ^{ab}	13.00 ^b	14.38 ^a	13.94 ^{ab}	0.20
HG(cm)	12.72 ^{ab}	11.80 ^b	13.78 ^a	13.60 ^a	0.26
TL(cm)	5.14 ^{ab}	4.88 ^b	5.84 ^a	5.60 ^{ab}	0.15

Note: ^{ab} Means on the same row followed by different superscripts are significantly different (P<0.05); SEM – Standard error of mean

and inclusion levels of blood meal improved body weight. In a comparative research, Ekugba *et al.* (2023) reported that Marshall Strain has the ability to gain more body weight than Ross 308. However, in this study, Ross 308 utilized the Bovine blood meal better and had the highest body weight gain after 8 weeks of production. The weight gain by T3, Ross 308 was significantly different from the weight gained by T4, Marshall, and the control treatments.

For the morphometric characters, T3, Ross 308 had the highest body length followed by T4, Marshall fed diet containing BBM. This result for body length by T3, Ross 308 was significantly different (P<0.05) from all other treatments. In the heart girth measurements, T3, Ross 308 fed bovine blood had higher value than T4, Marshall, though it was not significantly different (P<0.05). Again for the thigh length, T3, Ross 308 had the highest value (5.84) than T4, Marshall and this was significantly different (P<0.05). This result is in line with the reports of Seifdavati *et al.* (2008) and Kebede *et al.* (2021) who reported blood meal diets improved morphometric characters than diets not containing blood meal. The result of this study agrees with Ekugba *et al.* (2023) who reported that Ross 308 improved better in morphometric characters with respect to body length and shank length, but varied in thigh length where T4, Marshall had higher value.

Conclusion

The result of this study showed that there were variations in body weight between the strains and it was significantly different. There were also significant difference in the three morphometric characters studied. These findings showed that Bovine blood meal improved body weight and morphometric characters of the strains studied. It is therefore recorded that Bovine blood can be added to a broiler diet at 5% inclusion level.

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