

**GROWTH PERFORMANCE AND CARCASS CHARACTERISTICS OF  
CONFINED FULANI ECOTYPE CHICKENS FED VARYING DIETARY  
ENERGY AND PROTEIN LEVELS**

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This is to certify that this research work titled “Growth performance and carcass characteristics of confined Fulani ecotype chickens fed varying dietary energy and protein levels” was carried out by Egbekun, Christiana Powei in partial fulfilment of the requirements for the award of the degree of Master of Science (M.Sc.) in Animal Science, Obafemi Awolowo University, Ile –Ife, Nigeria.

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## DEDICATION

I dedicate this project to God Almighty the Author and finisher of my faith, my Parents (Engr and Mrs. Emmanuel Egbekun), for their immeasurable support during the course of my study and research.

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## ABSTRACT

The objectives of this study were to determine the optimum energy and protein levels for confined Fulani ecotype chickens (FEC), evaluate and determine their growth performance and carcass characteristics with a view to contribute to the existing knowledge on appropriate feeding management of Fulani ecotype chickens.

One hundred and eighty day-old local Fulani ecotype chickens were used for this study and the experiment was carried out at Poultry Unit of the Teaching and Research of Obafemi Awolowo University Ile – Ife, Osun State. The chicks were fed starter test diets for the first six weeks of age and finisher diets from 6 – 12 weeks of age. Drinking water was provided *ad libitum*. Birds were randomly allocated to six dietary treatments replicated thrice, with ten birds per replicate in a factorial arrangement (3 x 2) of energy at 3 levels (2900, 3000 and 3100 kcal ME/kg ) and crude protein (CP) at 2 levels (20 and 22%, starter phase and 18 and 20%, finisher phase). Growth response parameters evaluated comprised final body weight, feed intake, weight gain, and feed conversion ratio. Carcass characteristics were evaluated by estimating carcass yield, and proportions of various body parts such as drumstick, thigh, shank and breast.

In the starter phase, dietary regimes had no effect ( $P>0.05$ ) on feed conversion ratio but final body weight, body weight gain and feed intake of the FEC were significantly affected ( $P<0.05$ ). Birds on 3000ME kcal/kg were superior ( $P<0.05$ ) in final body weight and body weight gain, which was similar ( $P>0.05$ ) to birds on 2900 ME kcal/kg. Birds on 3100 ME kcal/kg consumed more ( $P<0.05$ ) feed than others. There was a significant interaction effect



between protein and energy levels on average daily gain where birds on 2900 and 3000 ME kcal/kg with 22% CP were superior ( $P < 0.05$ ) to those on other energy-protein combinations. In the second phase, birds fed 20% CP and energy content of 3000 ME kcal/kg were superior ( $P < 0.05$ ) to other treatments in final body weight but there was no significant effect ( $P > 0.05$ ) of diets on other growth parameters. In both phases birds on 3000 kcal ME/kg with 22 or 20% CP had the least feed cost per kg gain. The same trend of results was followed as found in the first and second phases when the overall growth period (0-12 weeks) was considered. The different levels of energy and crude protein had no significant effect ( $P > 0.05$ ) on the carcass characteristics of the Fulani ecotype chickens.

In conclusion, protein and energy utilization for growing Fulani ecotype chickens was satisfactory with 22% CP and 3000 kcal ME/kg diet at the early phase (0-6 weeks), and 3000 kcal ME/kg and 20% at the latter phase (6-12 weeks) of growth. Dietary regime had no effect on carcass characteristics of growing Fulani ecotype chickens under deep litter system.

## CHAPTER ONE

### INTRODUCTION

#### 1.1. Background to the study

The indigenous chicken is a general terminology given to those birds kept in the extensive system, scavenging in the free-range, have no identified description, multi-purpose and unimproved (Horst, 1989). Elsewhere in Africa, they are also called family chickens, bush chickens, African hen, bush hen or Sahel chickens (Guèye and Bessei, 1997). These highly adaptable creatures are found throughout rural parts of Africa and every culture owns them. Indigenous chickens form part of the agricultural farming activities among rural communities, although farmers regard them as secondary to the major farming activities such as crops, cattle, sheep and goat production and they are mostly under the management of women (Guèye and Bessei, 1997).

Indigenous chickens contribute significantly to the livelihood of the rural farmers by providing them with high quality animal protein in the form of eggs and meat for home consumption as well as for sacrifices (Guèye and Bessei, 1997).

Moreover indigenous chicken is a pool of heterogeneous genetic material which differs in adult body size, weight and plumage and often found in an extensive system of poultry or scavenging freely (Ajayi and Agaviezor, 2009). The indigenous chicken is a descendant of the species *Gallus gallus domesticus*. However, different strains and varieties have been identified and these differences are as a result of hereditary morphometric traits such as plumage, comb size or form, types of feather, amount of feather on the skin, size, eye colour etc. (Yakubu *et al.*, 2009). Local chickens constitute 80% of the estimated 172 million poultry birds found in Nigeria and

contributesubstantially to annual egg and meat production (up to 90%) for family consumption and for sale (FAOSTAT, 2012). Local chickens manifest a great deal of variation, which is due to genetic andenvironmental factors (Olori and Sonaiya, 1992), hencethey are reservoirs of genetic materials for geneticstudies, improvement, preservation and conservation. However, Sonaiya (2004) reported that indigenous chickens are faced with numerous challenges including poor health, poor feeding, and low production rate in terms of eggs, slow growth, and mortality. Both chicks and adults are fed together as a group. Feed is broadcasted on the ground (sand) in the case where supplementation is done (Sonaiya 2004). Although they generally lay few eggs and grow very slowly, they have the potential to increase their productivity if they are given good care in terms of proper feeding, veterinary care and good housing.

### **1.2 Characterization Of Local Chickens in Nigeria**

Local or indigenous chickens, among chicken species, probably show the highest rate of variation of population types. For the local chickens characterized so far in Nigeria, Botswana, Kenya, Malawi, Sudan, and Ethiopia, a great variation is observed in morphological characteristics and production parameters (Kingori *et al* 2003). With respect to body weight three variants have been distinguished i.e. dwarf, normal and heavy body weights. Plumage pigmentation is varied but mainly tends towards blackish and brownish colors showing extended and pied colourations. Plumage distribution is mainly normal while special forms such as naked neck, frizzle and silkiness appear sporadically. The comb is mostly single but rose, pea, walnut, duplex and crest are also present. The shank and skin are also frequently pigmented showing green, grey and blue variants. In addition, melanin deposition in skin, meat, internal organs and bones are also encountered in some genotypes (FAO 2010). Some of these variants are due to the presence of major morphological marker genes which increases the adaptability of these



breeds to tropical climatic environments. For example, the comb type indicates that the bird have been favoured by hot climatic conditions whereby large comb, such as single comb allows for efficient heat regulation (Apuno *et al.*, 2011). Scientists have conducted a series of experiments utilizing the indigenous chicken of many countries and several major genes were identified. These genes can be split into three categories; feather reducing genes, genes that reduce body size and genes that control plumage colour (FAO ,2010).The genes were associated with ecological areas. The feathered chickens/genotypes are predominant in cold climates, where the body is well covered with feathers to help in insulation and protection against losing body heat. The warm and hot climate is dominated by naked necks and frizzle feathers expression caused by incomplete dominant genes Na and F respectively, a feature that allows better heat dissipation. The naked-neck genotype is characterized by featherless skin on the neck, on the breast and on ventral part of the thigh (Khubondo *et al* 2015).

In developing countries, poultry production is classified into commercial and traditional sub-sectors (Mbugua, 1990). Each of them has its own peculiarities that make them special to the national foodsecurity. The traditional sub-sector consists of local ornative chickens, which have not been classified into breeds, although there are many ecotypes such as Fulani (savannah), Yoruba (forest), Nsukka, Owerri and Awgu ecotypes (Yakubu *et al.*, 2009). However, two of these ecological classes were considered to be most important in the classification of indigenous chickens in Nigeria namely, Fulani and Yoruba Ecotypes(Yakubu *et al.*, 2009). Further, Fulani ecotype is considered to be heavy breed while Yoruba ecotype a light breed (Momoh *et al.*, 2007). Most of the studies on Fulani Ecotype Chickens has been in the area of breeding and genetics concerned mainly with genetic diversity, phenotypic and morphometric characterization, egg traits, hatchability (Peters *et al.*, 2004; Fayeye and Oketoyin, 2006), early growth performance of FEC (Ibe,

1993; Sola-Ojo and Ayorinde, 2009); and phenotypic variations (Mancha *et al.*, 2006; Ajayi and Agaviezor, 2009), Surprisingly, in these studies, confined FEC have been fed with feed designed for broiler chickens, which may not be appropriate

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