

Evaluation of Pearl Millet (*Pennisetum Glaucum* (L.) R.BR.) and Garlic Meal (*Allium Sativum* L.) on Packed Cell Volume (PCV) of Broiler Chicks

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Abstract An experimental research was carried out to evaluate the effect of pearl millet as an energy source and garlic meal as an additive on the Packed Cell Volume (PCV) of broiler chicks. A total of 60 three-week old broiler chicks were used in the experiment. The broiler chicks were randomly selected into four experimental groups of five birds in each cage. Each treatment was composed of three replicates over a period of 10 weeks in a completely randomized design. The control group (group A or T1) were fed diet without any replacement and supplementation (basal diet); group B (T2) were fed diet containing pearl millet (replacing maize totally) without any supplementary garlic meal; group C (T3) were fed diet containing supplementary garlic meal at 2.0g/100g of diet; group D (T4) were fed diet containing pearl millet (replacing maize totally) and supplementary garlic meal at 2.0g/100g of diet. Data collected were analyzed using Analysis of variance (ANOVA) at $P < 0.05$ level of significance. The results showed that diet T1 contained 2861.28ME kcal/kg, diet T2 contained 2605.92ME kcal/kg, diet T3 contained 2843.48ME kcal/kg and diet T4 contained 2588.12ME kcal/kg. Highest PCV gain was recorded in group D (16.79%) followed by group B (12.65%) while the least was recorded in group C (10.16%). It is therefore concluded that the total replacement of maize with pearl millet and inclusion of garlic meal as an additive may be used for economical and efficient production of broilers.

Keywords: broiler chicks, pearl millet, garlic, PCV

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1. Introduction

Broiler production is one of the keys in bridging the protein in-take gap, since broiler chicken meat has lower iron contents. Therefore, it is accepted as healthy and nutritious when compared to beef and mutton. Poultry is a collective name given to a group of birds reared or hunted for useful purposes. They are domesticated birds kept for egg or meat production which include chickens (domestic fowls), turkey, ducks and geese [1]. Poultry is the quickest source of meat and its production process involves the least hazardous and arduous in relation to other livestock enterprise [1]. The quality of the broiler chicken meat mainly depends on the quality of the diet fed to the birds. Nutritive value of a specific feed or diet is the function of feed intake and the efficiency of extraction of nutrients from the feed during digestion [2]. Nutrient absorption by broiler chickens is a function of the amount of feed eaten and the nutrient levels in the diet. In broiler chicken production industry, cereal grains such as maize etc. make up the majority of the dietary ingredients and account for a large portion of metabolizable energy, protein and amino acids [3]. Maize (*Zea mays*, L.) is a staple food of great socio-economic importance in the sub-Saharan Africa of

which Nigeria is inclusive. Maize accounts for the large proportion of about 45 - 55% of poultry feed because of its high conversion factor into meat, milk and egg compared to other cereal grains [4]. Presently, Nigeria produces less than the market demand which has contributed to the increase in the cost of production of broiler chicks, therefore, any effort to substitute maize in poultry feeds will significantly reduce the cost of production [5].

It is based on this fact that pearl millet (*Pennisetum glaucum*) and garlic powder which are readily available to farmers in Nigeria were considered to be used in broiler chicken feed as a source of energy and an additive respectively to produce high quality lean meat. Pearl millet is well known for its high protein and lysine contents as compared to maize and sorghum [6,7,8]. Therefore, it reduces the need for high protein feed ingredients and supplemental amino acids [9], which may reduce feed costs. The use of antibiotics as growth promoters in animal feeds is facing serious criticism [10]. Although birds raised with these feed additives achieved good performance, their potential side effects became a real public health problem worldwide [11]. In pursuit of improved chicken healthiness and in order to fulfill consumer expectations in relation to food quality, poultry producers adopt natural feed supplements, mainly herbs. The positive effects of herbal supplements on broiler

performance, carcass quality and quality traits of meat [12,13] have been demonstrated.

Garlic (*Allium sativum*) is well known as a spice and herbal medicine for the prevention and treatment of a variety of diseases [14]. In broilers, it was reported that garlic as a natural feed additive, improved broiler growth and feed conversion ratio (FCR) and decreased mortality rate [15]. However, effects of garlic powder on broiler performance, carcass qualities and PCV are debatable [16]. The consumption of numerous dietary components available in these leaves has been shown to have measurable effects on blood parameters such as the packed cell volume [17]. According to Maxwell *et al.*, [18], blood parameters are important in assessing the quality and suitability of feed ingredients in farm animals. Esonu *et al.*, [19] had stated that haematological parameters reflect the physiological responsiveness of the animal to its internal and external environments which include feed and feed additives. Animashahun *et al.*, [17] stated that the comparison of blood chemistry profile with nutrient intake might indicate the need for adjustment of certain nutrients upward or downward for different animal groups. In search of quality and healthier feed, this research aimed at substituting maize with pearl millet and using garlic as an additive in improving the broiler production.

2. Materials and Methods

2.1. Procurement of Experimental Animal

A total of 60 broiler chicks at three weeks old were used for the experiment. The birds were randomly selected into four (4) treatment groups of five birds each. The stocking density is five birds per meter square. Each group was replicated three times. The animals were maintained under standard laboratory condition, that is, a well aerated

room with alternating, light and dark cycle of 12 hours each. They were allowed to acclimatize with the environment for one week before the commencement of the experiment. The experiment involved collecting blood samples from individual birds for all the treatment via the wing vein.

2.2. Experimental Treatments

The broiler chicks used for the experiment were randomly assigned to four treatments. The diets were prepared and separated according to the treatments. Treatment 1 (served as control), this diet had no inclusion of pearl millet meal and garlic meal, this was given to birds in cage A. Treatment 2 contained pearl millet meal only as a source of energy, this was given to birds in cage B. Treatment 3 contained maize meal only as an energy source and 2.0g of garlic meal was given to birds in cage C. Treatment 4 contained both pearl millet meal as an energy source and 2.0g of garlic meal, this was given to birds in cage D. The birds were fed twice daily at 8:00am and 6:00pm throughout the period of study. The experiment lasted for ten weeks.

2.3. Data Analysis

Blood samples were collected from individual birds for all the treatment via the wing vein on weekly basis. The blood samples contained in microhaematocrit capillary tubes (up to $\frac{2}{3}$ (two-third) of the tube) were analyzed for PCV using the centrifuge microhaematocrit method. The result of the experiment was analyzed using Analysis of variance (ANOVA). The comparison of mean was separated using a post Hoc test (Least Significant Difference), [20].

3. Results

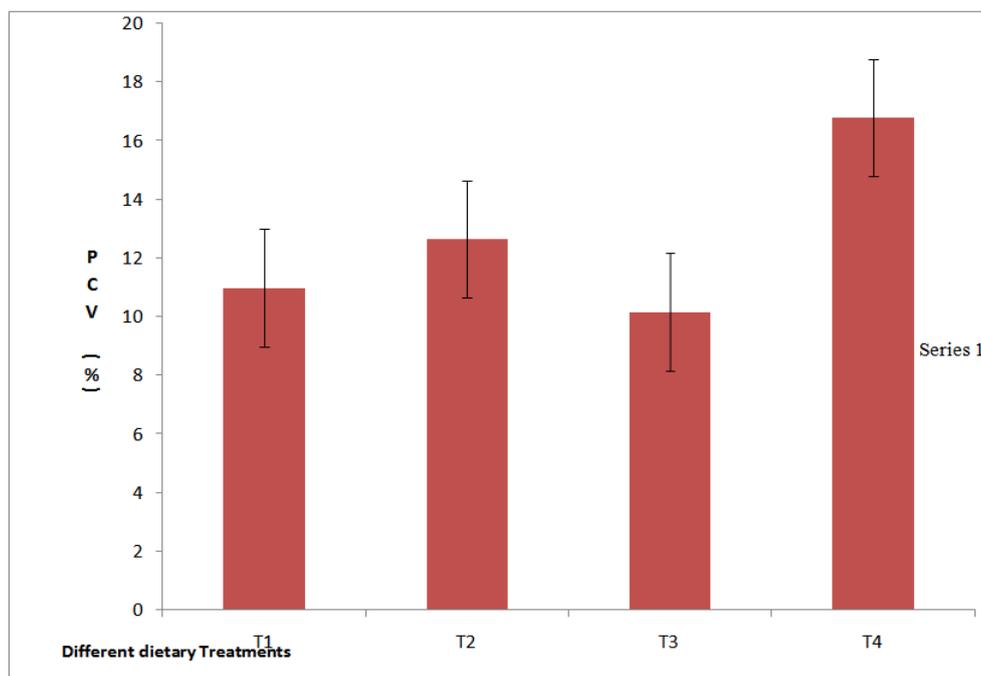


Figure 1. Mean PCV gain of broiler chicks fed with different treatments

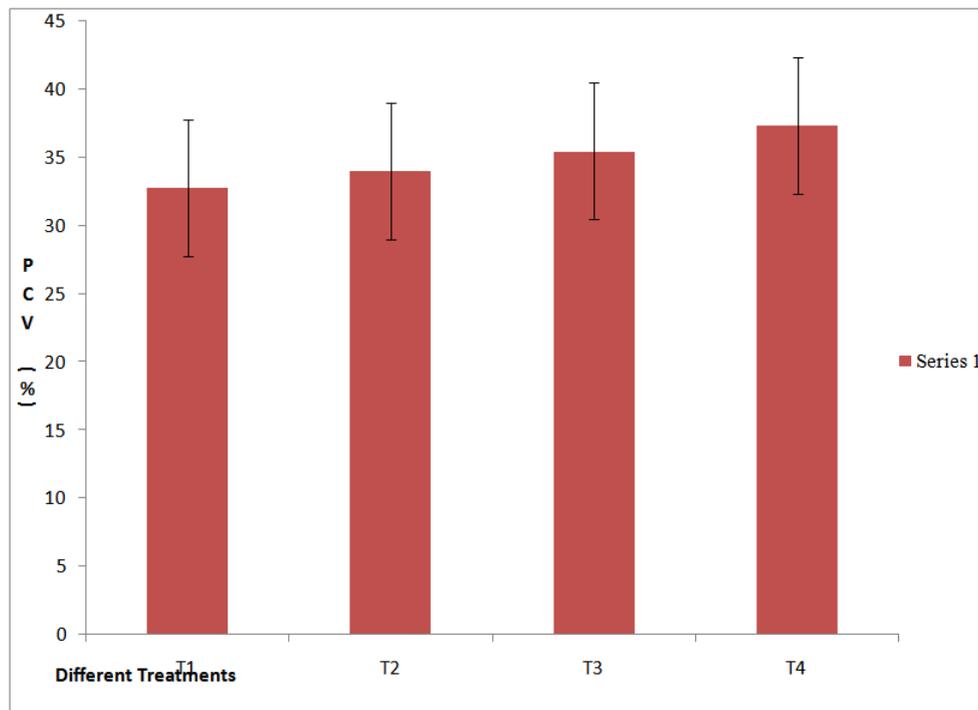


Figure 2. Mean PCV of broiler chicks

Figure 1 above shows the weekly mean PCV gain of broiler chicks fed with pearl millet as an energy source and garlic as an additive for 10 weeks. The highest PCV gain was recorded in the broiler chicks fed with T4 diet (16.79%) followed by those fed with T2 (12.65%), while the least was recorded in those fed with T3 diet (10.16%). The analysis of variance result revealed that there was significant difference ($P < 0.05$) between the PCV gain of broiler chicks fed with the four dietary treatments.

Figure 2 above shows the mean PCV of broiler chicks fed with different dietary treatments. It was observed that broilers fed with T4 had the highest PCV (37.32%) followed by those fed with T3 (35.45%). The least was T1 (32.76%).

4. Discussion

Packed cell volume of broilers fed with pearl millet-based diet and garlic meal inclusion was the highest (37.32%) at the end of the experiment with significant difference at $P < 0.05$. Thus, pearl millet and garlic meal improved the PCV of broilers and are not in any way anemic to broilers. Also at week 10, the experimental diets (Treatment 1-Treatment 3) resulted in values still not within the range for a normal PCV of broilers (35.9%-41.0%) according to the reports of. The highest PCV gain as recorded in the broiler chicks fed with diet Treatment 4 diet followed by diet Treatment 2 diet could be attributed to the fact that pearl millet has richer mineral content especially calcium and iron than maize [21] which promotes red blood cell production. Again, the higher percentage of PCV recorded by the diet Treatment 4 is an indication of better blood formation in broilers when compared with other treatments. Similar report was given by Ufele *et al.* [22].

5. Conclusion and Recommendation

Based on the findings of this research, total replacement of maize with pearl millet and inclusion of garlic meal (2.0%) in broiler finisher diets had no adverse effects on overall production responses of broiler chickens. There was improved PCV indicating that the diet enhanced PCV of the broiler chicks. Thus pearl millet can be used as sole energy source in situations where there is no maize and inclusion of garlic meal can serve as an additive for improvement.

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