

Effect of Pearl Millet (*Pennisetum glaucum* (L.) R.Br.) and Garlic Meal (*Allium sativum* L.) on Growth Performance 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 growth performance 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. The birds in group D (T4) gained the highest weight (1.44kg). 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 and growth

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1. Introduction

Increased poultry production is one of the surest and quickest ways of bridging the animal protein in-take gap in developing countries of the world. Although the task of bridging this protein in-take gap appears formidable in view of the present economic and technological constraints besetting our livestock industry, poultry keeping in Nigeria has been one of the sources of animal protein to the ever-growing Nigeria population, making significant contribution to human nutrition and economic development [1]. The growth of the national economy has been significantly affected by poultry [2]. The poultry sector constitutes more than 57% of the total livestock production in Nigeria [1]. Many people have gone into poultry production either producing egg or meat or both [3]. 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 [4]. Poultry is the quickest source of meat and its production process involves the

least hazardous and arduous in relation to other livestock enterprise [4].

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 [5]. 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 [6]. 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 [7]. 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 [8].

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 [9,10,11]. Therefore, it reduces the need for high protein feed ingredients and supplemental amino acids [12], which may reduce feed costs.

The use of antibiotics as growth promoters in animal feeds is facing serious criticism [13]. Although birds raised with these feed additives achieved good performance, their potential side effects became a real public health problem worldwide [14]. 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 [15,16] 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 [17]. In broilers, it was reported that garlic as a natural feed additive, improved broiler growth and feed conversion ratio (FCR) and decreased mortality rate [18]. However, effects of garlic powder on broiler performance, carcass qualities and PCV are debatable [19]. 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. That is before using weighing balance to check the weight.

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

The weight of the broiler chicks was taken weekly using a sensitive weighing balance. 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 shows the mean weight gain of broiler chicks fed with different treatments. From the figure it was observed that the highest mean weight gain was recorded in the broiler chicks fed with T4 (1436.20g) followed by those fed with T1 (1015.52g), then T3 had 956.84g, while the least was recorded in those fed with T2 diet (773.35g).

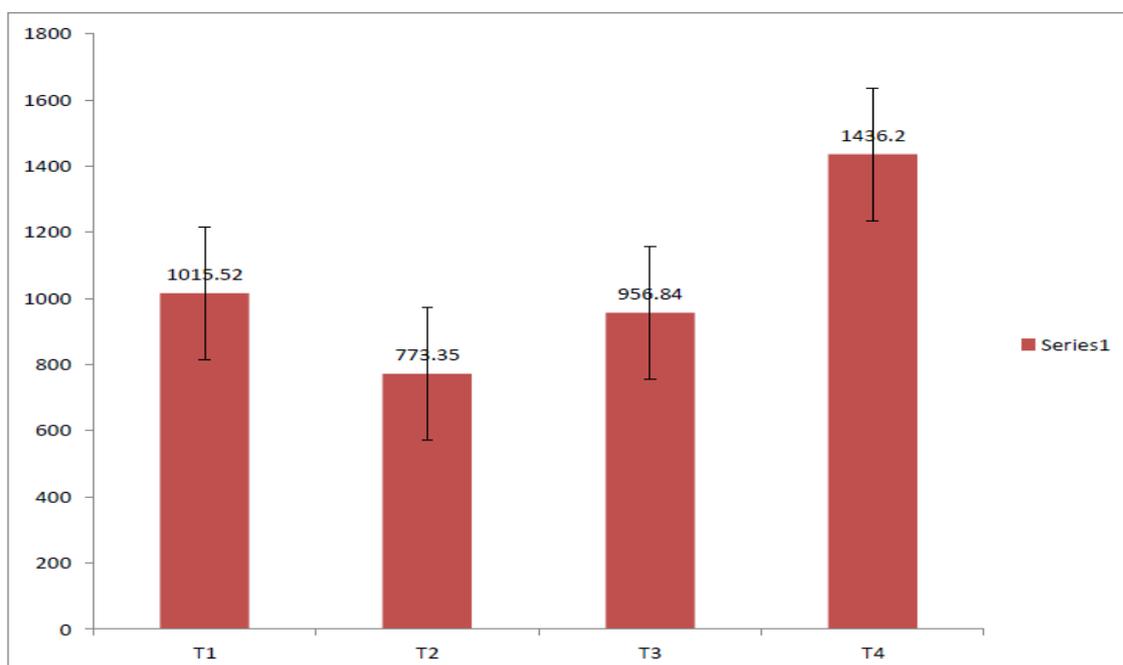


Figure 1. Mean weight gain of broiler chicks fed with different treatments

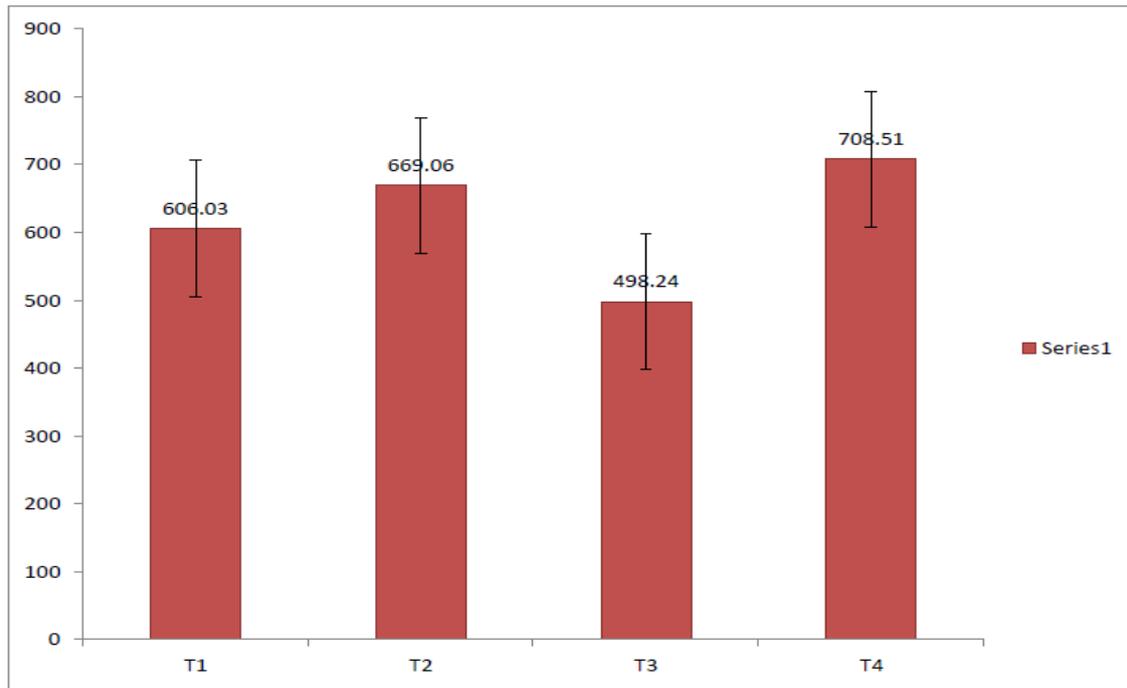


Figure 2. Mean feed intake of broiler chicks fed with different treatments

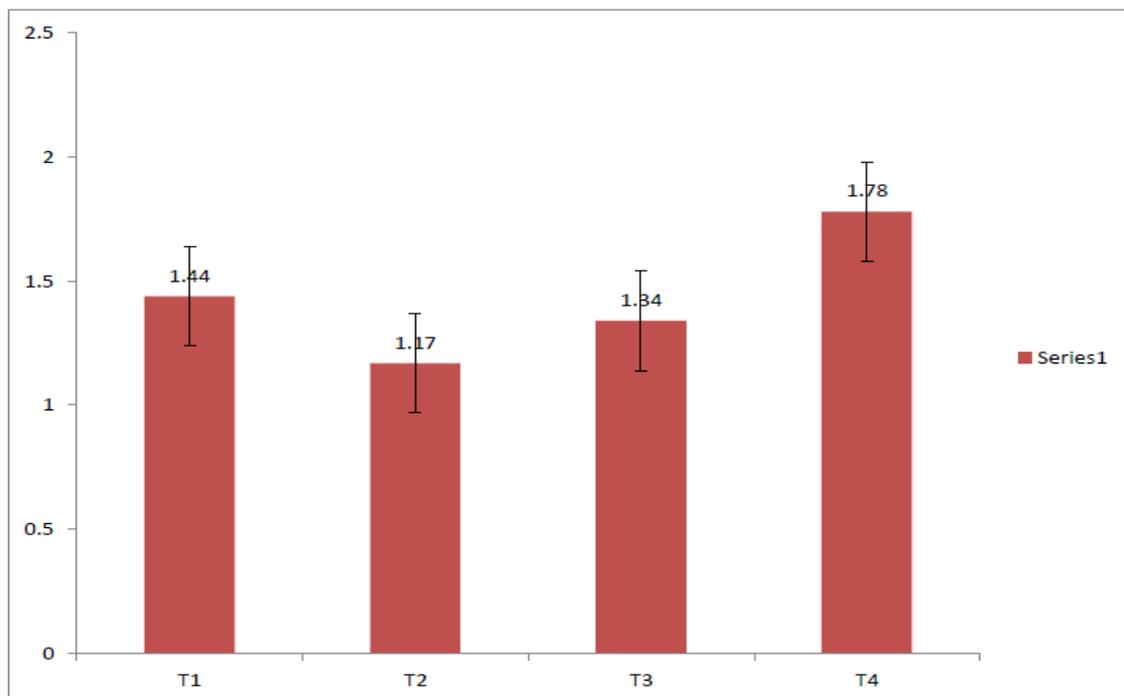


Figure 3. Mean specific growth rate of broiler chicks fed with different treatments

The result on feed intake of broiler chicks fed with the four experimental treatments in [Figure 2](#) shows that the best feed intake was recorded in broiler chicks fed with the T4 (708.51g), followed by those fed with T2 (669.06), then those fed with T1 (606.03), while the poorest was recorded in diet T3 (498.24g).

[Figure 3](#) shows the result of specific growth rate of broiler chicks fed with different treatments, from there it was observed that broilers fed with T4 had the highest specific growth rate (1.78%g/day) followed by those fed with T1 (1.44%g/day), then those fed with T3 had 1.34%g/day, while lowest was observed in those fed with T2 (1.17%g/day).

4. Discussion

Findings of this research have shown that replacing maize totally with pearl millet in broiler diets had no adverse effect on their growth performance, thus pearl millet-based diets is at par or even better than maize-based diet in poultry diets. This is in agreement with those of [Satyanarayana et al. \[21\]](#); [Singh and Barsaul \[22\]](#). Replacement of maize totally with pearl millet and inclusion of garlic meals as an additive in the diet of broiler chicks significantly ($P < 0.05$) enhanced the weight gain, specific growth rate and feed intake as compared to control group which are in agreement with the findings of

Asha *et al.* [23]. The improved growth performance could be attributed to rich nutrient content of pearl millet as compared to maize as supported by Ejeta *et al.* [24]; Davis *et al.* [10]; its lack of condensed tannins that can interfere with or slow down digestibility [25] and also allicin (an antibiotic in agent garlic) content of garlic meal which stimulates and improves the appetite of animal, thus, accelerating growth of the animal and improve feed utilization [17].

5. Conclusion and Recommendation

Based on the findings of this research, total replacement of maize with pearl millet and inclusion of garlic meal as an additive in broiler chicks' diets had no adverse effects on overall production responses of broiler chicks. There was improved growth performance and thus pearl millet can be used as sole energy source in situations where there is no maize and inclusion of garlic meal will also contribute to growth enhancement.

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