Research Paper | Medical Sciences | ISSN No : 2454-9916 | Volume : 1 | Issue : 3 | Oct 2015

EFFECT OF MORINGA OLEIFERA LEAF MEAL AS A SUBTITUTE FOR ANTIBIOTICS ON THE PERFORMANCE AND BLOOD PARAMETERS OF BROILER CHICKEN IN SOKOTO, NIGERIA

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ABSTRACT

An experiment was conducted to determine the effect of two different levels of Moringa oleifera leaf meal (MOLM) as substitute to antibiotics on the performance and blood parameters of broiler chickens. Ninety six (96) of four (4) weeks old commercial chickens were allotted to 4 dietary treatment of 1 replicate each. Each replicate had 12 birds. The treatment were T1- Control group in which the birds were given a standard basal diet and were given antibiotic (enrofloxacin) via drinking water; T2-diet with 400g MOLM in 75kg of feed,T3-diet with 600g MOLM in 75kg of feed, and T4-diet with neither antibiotic nor MOLM. The experiment lasted for 21 days. Significant differences were observed in the feed intake and weight gain of the birds on diet 2(400g MOLM) and diet 3(600g MOLM) having significantly ($p<0.05$) higher values for weight gain than birds on the other diets. The hematological parameters measured did not differ significantly.

Key words: Moringa oleifera, Enrofloxacin, Basal diet.

Introduction

Antibiotics are naturally-occurring synthetics or semi-synthetics compounds with antimicrobial activity. They can be administered orally, parentally or topically and are used in human and veterinary medicine to treat and prevent disease and for other purposes including growth promotion in food animals (Phillips et al 2004) Antibiotics are utilized as growth promoters at sub-therapeutic levels and for treatment of poultry diseases. The beneficial effects of antibiotics in combating bacterial problems and as growth promoters are well documented .Medication of water using antibiotics helps birds to recover from certain diseases of bacterial origin .However ,there may be problems associated with usage of antibiotics such as drugs toxicity, residual effects and microbial resistance. The negative impact on consumers of meat or poultry products due to residual effects has also raised some concern. This has led to the ban on the use of antibiotics as growth promoters since 2006 by the European Union.

However, the use of synthetically produced substances especially antibiotic growth promoter was soon found to have objectionable side effects. Administrations of antibiotics to food producing animals-like all antibiotic use, regardless of setting or route of administration contribute to the development of antibiotic resistance. While the human health and economic implications of resistance vary widely, depending on antibiotic and pathogens of concern. The world Health Organization (WHO) has concluded that feeding certain antibiotics for production purposes (i.e growth promotion or increased feed efficiency) is a public health problem.

The emergence of antibiotics-resistant pathogens has neccessited the search for economically variable alternatives to antibiotics. Such alternative includes probiotics, prebiotics, organic acids and their salts and phytogenic additives (a wide range of plants and spices and their derivatives). During the past fifteen years, phytogenic additives in animal nutrition have attracted attention for their potential role as alternatives to antibiotics growth promoters (puvaca et al 2003) They have been shown to activate digestion ,strengthen the immune system and have antibacterial properties. Some herbal feed additives such as oregano, garlic and thyme have been indicated as alternatives to antibiotics growth promoters in broiler production. Patell (2011) reported that Moringa oleifera extract has antibacterial properties. Moringa oleifera is the most widely cultivated species of the genus Moringa. It is a fast growing drought-resistant tree native to the Himalayas in northwest India and widely cultivated in tropical and subtropical areas. It possesses important medicinal properties which include antibacterial and antifungal activities.

In developing countries(like Nigeria), sources of animal's drinking water may be contaminated with suspended material and even bacteria but unknown to the animal owner(s).In human ,each year, millions of children are known to have died in developing countries as a result of infections caused by unclean water (jose et al .,2010). Moringa oleifera seeds are said to be very good and safe for water treatment; as synthetic chemical compound (alum)may be carcinogenic(Ayotunde et al.,2011) plants substances that are foods are of little or no side effects. Most of the prescribed medicines today (about 25%) are substances derived from plant (Ngaski 2006). However, information is scanty on the utilization of Moringa leaves as feed supplement or medicine for poultry.

MATERIALS AND METHOD

Moringa oleifera leaves (MOL) were purchased from old market Sokoto. Day old chicks, antibiotics and commercial feed were purchased at Ojuano poultry Enterprise Sokoto.

Preparation of Moringa oleifera powder

Branches were cut from the moringa trees, threshed carefully to separate leaves from twigs and weighed. The leaves were spread out on floor and allowed to air dry for 4days under shady and aerated condition. The dried leaves were ground with mortar and pestles to obtain a leaf powder.

Setting of the broiler house

The poultry house was thoroughly cleaned and disinfected prior to placement of the broiler chicken and the poultry house was demarcated into 8 to accommodate 12 birds each, feeders, drinkers and bulbs were provided. The birds were kept under a deep litter management system and saw dust were used as a litter material to cover the floor to serve as absorbents. Prior to introduction of the birds, the demarcated area were randomly allocated with label of the various replicates of the treatment groups.

Management of the experimental broiler chicken

One hundred day old chicks broiler were purchased and fed on commercial broiler feed for 7weeks, water are supplied and the birds were vaccinated appropriately.

According to Makanjuola et al (2014), in a completely randomized design, ninety six (96) of four weeks-old broiler chickens were allotted to 4 dietary treatment groups with 1 replicate each. Each replicate had 12 birds. The treatment were as follows: treatment group 1 -birds were given antibiotic in drinking water, treatment group 2-diet contained 400g of Moringa oleifera leaf meal (MOLM) in 75kg of commercial broiler finisher feed; treatment group 3 –diet contained 600g of moringa oleifera leaf meal (MOLM) in 75kg of commercial broiler finisher feed and treatment group 4-diet contained no moringa oleifera leaf meal and the birds were not given antibiotic. The antibiotics used for birds on diets 1 was enrofloxacin and administered via drinking water. Routine management procedure was followed while fresh feed

and water were supplied ad libitum. The experiment lasted for 21 days. Weights gained of the birds were recorded on weekly basis. At the end of the experiment the feed intake was recorded and 5 millimeter of the blood was collected from 3 randomly selected birds from each group via jugular vein in to specimen bottles. The blood samples were used for hematological analysis.

RESULTS

Gross composition of the experimental finisher diet is shown in the table below.

Table 1: Gross composition of the broiler finisher

Ingredients	KG/100
Maize	50.00
Protein	29.00
Fat	2.00
Fibre	6.00
Calcium	12.00
Available phosphorus	1.00
TOTAL	100.00

Table 2: Performance parameters of broiler fed graded level of Moringa oleifera leaf meal (MOLM) as alternative to antibiotics.

Parameters	Positive control	Moringa 400g	Moringa 600g	Negative control	P-value
Initial weight(g)	964.58	912.50	908.33	889.58	0.126
Final weight(g)	1802.67	1968.38	1910.60	1814.58	0.113
Weight gain(g)	838.09	1055.88	1002.27	925.00	0.017
Feed intake(g)	2868.47	2877.00	2757.38	2885.23	0.012

The performance characteristics of broilers on the different groups are shown in the Table 2 .Significant differences were observed in the feed intake and weight gain of the birds. Birds on positive control, Moringa (400g) and Negative control had higher feed intake than birds in Moringa (600g).

Also, Birds on Moringa (400g) and Moringa (600g) had significantly ($p<0.05$) higher weight gain than birds on the other diets by having weight gain of 1055.88 and 1002.27 respectively.

Table 3: Haematological parameters of broilers fed graded levels of moringa oleifera leaf (MOLM) as alternative to antibiotics.

parameter	Positive control	Moringa (400g)	Moringa (600g)	Negative control	P-value
PCV (%)	25.33	25.00	29.33	28.33	0.109
Haemoglobin (g/L)	8.81	10.60	12.40	8.34	0.110
RBC(106/L)	1.91	2.65	3.17	2.29	0.219
WBC(103/L)	14.48	14.10	16.52	18.66	0.612

The hematological indices of birds fed the experimental diets are shown in the Table 3 .The results showed that there were no significant differences across the treatment in all the hematological indices recorded.

Discussion

Performance characteristics of birds fed the experimental diets

This study conducted showed very significant differences in the feed intake and weight gain of the birds. Birds on positive control, Moringa (400g) and Negative control had higher feed intake than birds in Moringa (600g). The results are in accordance with observations of Gadzirayi (2012) who reported an increase in feed intake of broilers receiving solvent-extracted soya bean meal supplemented with *Moringa oleifera* leaf meal.

According to the authors, the observed increase in feed intake may be attributed to increased bulkiness of the feed. Although birds on Moringa (400g) had higher feed intake than birds on Moringa (600g), they compared well with birds on the positive control groups in terms of feed intake.

Initial and final weight did not differ significantly between the groups but weight gain differs significantly. Birds on Moringa (400g) and Moringa (600g) had significantly ($p<0.05$) higher weight gain than birds on the other diets. This agree with research finding by Anwar et al.,(2007) who reported that Moringa-treated broilers were heavier than those fed a control diet. The authors attributed it to complete amino acid profile, considerable amount of vitamins, minerals, antioxidants, immune-stimulants and antibacterial compounds such as ptergospermin.

The significant feed intake however affect the weight gain of the birds recorded, this could be because the amount of MOLM added had a noticeable effect on the weight gain.

Haematological indices of birds fed the experimental diets

Haematological characteristics of livestock have been observed as factor determining the response of livestock to the diet they are fed (Madubuike 2006).

The hematological indices of birds fed the experimental diets are shown in the Table 3 .The results showed that there were no significant differences across the treatment in all the hematological indices recorded. This finding is similar to the result of Ewuola (2012) who reported that there was no significant difference across the treatment for growing rabbits fed graded levels of *Moringa oleifera* leaf meal. The values obtained in this study however fell within the normal range for healthy chickens(24.9-40.7%) as described by Animashahun (2006).This indicate that the dietary treatment were nutritionally adequate for the birds.

Although the packed cell volume (PCV), red blood cell count (RBC) and hemoglobin levels were not significant across the treatment, a numerical increase was observed in birds on the Moringa treated diet. The highest mean value of RBC recorded for birds on Moringa(600g) could be as a result of the level of MOLM present in the diet(the diet had the highest level of inclusion of MOLM 600g). Red blood cells are responsible for the transportation of oxygen and carbon dioxide in the blood as well as the manufacture of haemoglobin, hence higher values indicates a greater potential for these function and a better state of health (Olugbemi et al 2010). Moringa oleifera leaf meal contains iron (23mg/100g) which is necessary for many functions in the body including the formation of hemoglobin and myoglobin.

White blood cells (WBC) count was not significant across the treatments. This shows that the experimental diets neither impaired nor enhanced the birds to ward off infection (Olugbemi 2010).

In conclusion the results of the study showed that *Moringa oleifera* leaf meal could serve as alternative to antibiotics in broiler production as this is in attempt to reduce antimicrobial resistance. Replacing Enrofloxacin with *Moringa oleifera* leaf meal (MOLM) reduced the cost of production of broiler.

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