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308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorijps@gmail.com

Effects of Aloe vera as Leaf Protein Concentrate on Growth Performance of Cockerels

B.I. Odo¹, B.U. Ekenyem² and A.C. Nwamo¹

¹Department of Animal Science, Faculty of Agriculture and Natural Resources Management, Enugu State University of Science and Technology, Enugu, Enugu State, Nigeria

²Department of Animal Science and Fisheries, Evan Enwerem University, Owerri, Imo State, Nigeria

Abstract: The study investigated the effects of Aloe vera as leaf protein concentrate for cockerels. It was conducted with 72 - day old cockerels which at 3 weeks of age were randomly allotted to 3 dietary treatments of 24 birds each with 3 replicates per treatment. The rations were standard commercial feed 0% (T₁), 5% (T₂) and 10% (T₃) inclusion levels of Aloe vera respectively. The design of the experiment was a completely randomized design and the birds were fed for 42 days with their respective experimental diets. Records were kept on feed intake, body weight gain, feed conversion ratio and mortality trend to the end of the experiment. Results showed that there were significant differences ($p < 0.05$) in weight gain and feed conversion ratio within treatment but no significant difference ($p > 0.05$) on feed intake. Highest overall profit was obtained from the T₂ group. The inclusion of Aloe vera at 5% level supports feed absorption and growth in cockerels. This can therefore be used as a good leaf protein concentrate in cockerel nutrition for improved productivity and therefore, profitability.

Key words: Aloe vera, leaf protein, cockerels, growth performance

INTRODUCTION

Poultry production has been recognized as one of the fastest and most efficient means of attaining animal protein self-sufficiency. This is possibly because the birds have several advantages over other animal species. Some of these advantages according to Ibe (2004) include short generation interval, availability in large numbers, fast growth rate, ease of affordability and rearing, as well as lack of taboos to production and consumption. However, Oluyemi and Roberts (1979) stated that nutrition gulps more than 70% of the total running cost of any poultry enterprise of which protein constitutes about 30-35% of the feed. The problem of feed can be tackled by sensible utilization of animal and plant products to produce feed of high nutrient density and nutritional quality (Bernard, 1969) particularly protein and energy components. Studies by Okafor and Jaconda (1975) showed that the higher the level of protein in the diet, the greater the muscular tissue development - thus proving the function of protein in tissue growth and development.

The ancestral Aloe vera is a plant that evolved from lily family, on which garlic is a member. It possesses great curative and nutritive properties. The Aloe plant is the source of two herbal preparations Aloe Gel (AG) and Aloe latex. Aloe gel is often called "Aloe vera" and refers to the clear gel or mucilaginous substance produced by parenchymal cells located in the central region of the

leaf. The gel is composed mainly of water and mono- and polysaccharides. Aloe gel contains lignin, salicylic acid, saponins, sterols and triterpenoids. The fresh gel contains proteolytic enzymes of superoxide dismutase. The gel also contain vitamins A, C, E, B₁₂, thiamine, niacin, folic acid and minerals like Sodium, Potassium, Copper, Magnesium, Calcium, Zinc, Chromium and Iron (Sabe and Wright, 1993).

Taking cognizance of the scarcity of animal, protein sources and competition between man and poultry for these sources, it is therefore important to look for alternative protein sources and their best level of inclusion for poultry nutrition. Aloe vera as a leaf protein concentrate is a rich source of amino acids (building blocks of protein) naturally with the eight essentials amino acids needed in the body. It has been found (Sabe and Wright, 1993) to contain enzyme digestible protein when the leaves are harvested, dried and milled but the appropriate level of its inclusion in cockerel diet for best performance has not been well determined. It is against this background that the experiment was conducted.

MATERIALS AND METHODS

Experimental site: The Study was conducted at Okoh Poultry farm, Independence Layout, Enugu, Nigeria. The area lies between latitude 07° 4' and 07° 2' south and longitude 08° 8' East and 07° 6' west.

It is characterized by a mean annual rainfall which ranges from 1500-1800 mm and a mean temperature of 30°C during the very hot weather and 22°C during the coldest period of the year (Oformata, 1975).

Experimental materials: The Aloe vera leaves were obtained from Abakpa_Nike, Enugu, Nigeria five weeks before the arrival of the birds. They were washed with salt and water and then chopped into tiny bits that could be easily picked from the feed by the birds during feeding.

Experimental procedure and management of the birds: Seventy two (72) cockerels sourced from Alpha Poultry farm, Emene, Enugu were randomly allotted into 3 treatment groups. Each group was further replicated thrice to provide an estimate of experimental error and a more precise measure of treatment effects. The treatments were T₁, T₂ and T₃ with 0, 5 and 10% levels of inclusion of Aloe vera respectively.

The study was carried out in a deep litter house and the chicks were brooded to 3 weeks of age before the commencement of the experiment. Feed and water were given to the birds *ad libitum*. Vital starter ration was fed to the birds during the first 6 weeks of age. Thereafter, they were fed with vital grower ration up to the 9th week when the experiment ended. The proximate composition of the commercial (vital) feed is as shown in Table 1. The birds were vaccinated against new castle disease, gumboro and fowl pox. The inclusion of the varying levels of Aloe vera started at 4th week of age.

Records were kept on average live weight, average feed intake, feed conversion ratio, % mortality.

Table 1: Proximate composition of the commercial (vital) feed

Nutrients	Starter diet, %	Grower diet, %
Crude protein	21.00	14.50
Fat	8.50	7.00
Crude fibre	5.00	7.20
Calcium	1.20	0.08
Phosphorus	0.45	0.40
Metabolizable energy	2,800 Kcal/kg	2,500 Kcal/kg

Statistical analysis: Data collected in each parameter were grouped according to replicate within treatments. The data were subjected to the Analysis of Variance (ANOVA) technique as described by Steel and Torrie (1980). Means were separated by the use of Duncan Multiple range test (Duncan, 1955).

RESULTS

Table 2 shows that there is no significant difference ($p>0.05$) in feed intake among the treatment groups. Result of average weight gain shows that there was significant differences ($p<0.05$) between some treatment groups. Weight gain in T₂ group was significantly higher ($p<0.05$) than the T₁ or T₃ groups. However, no

Table 2: Summary of performance characteristics of cockerels fed varying levels of Aloe vera

Parameter	T ₁	T ₂	T ₃
Average feed intake (kg)	0.498±0.067	0.500±0.064	0.508±0.068
Average weight gain (kg)	0.081±0.013	0.120±0.019	0.089±0.012
Feed conversion ratio	5.34±0.83	4.53±0.49	6.27±0.92
Mortality (%)	0%	0%	0%
Total cost of production per unit	N274.20	N290.40	N309.80
Total profit	N7,819.20	N9,830.40	N8,164.80

Means with different superscripts in the same horizontal row are significantly different ($p>0.05$)

significant difference ($p>0.05$) was found between T₁ and T₃ groups.

Feed conversion ratio of birds fed 10% level of inclusion of Aloe vera (T₃) was significantly higher ($p<0.05$) than those fed 5% level (T₂). No significant difference ($p>0.05$) was observed in FCR between T₁ and T₃.

Results also show that there was zero mortality in all the treatment groups.

The highest income was realized from birds on T₂ while the least came from T₁ group.

DISCUSSION

The result on weight gain clearly indicate the relevance of Aloe vera in cockerel diet. The higher weight gain in birds fed 5% level of inclusion of Aloe vera (T₂) than those fed 10% (T₃) proves the report by Lorenzetti (1984) and Sims *et al.* (1971) that Aloe vera in large quantity exerts a powerful purgative effect but in smaller quantity, it appear to aid absorption of food from the gut. Also, the significant difference ($p<0.05$) between T₂ and T₁ with weight gain in T₂ being higher than T₁ support the report by Danhoff and McAnally (1988) that Aloe vera accelerates the growth of new cells, thereby resulting to increased body weight.

The lower or higher feed conversion ratio in birds is a result of factors responsible for it. When animals are under stress and undue competition for feed and space, there is a fast feed intake thus affecting proper digestion and utilization of feed (Fraser, 1986). This observation was noticed in the treatment groups respectively. Birds in T₂ had almost the same feed intake as those in T₁ but the feed conversion ratio in T₁ was significantly higher ($p<0.05$) than T₂. This could be as a result of stress due to the competition for feed. It is also true for T₂ and T₃ which had the same feed intake but significantly higher ($p<0.05$) FCR in T₃ than T₂. This difference could also be due to poor management practices. Fox and Terning (1960) reported that the quantity of feed consumed does not directly affect the FCR. He stated that a bird could consume much feed but have a low FCR (as seen in T₂) while some could consume less feed but the rate of conversion could be higher (as seen in T₁).

Even though there was no mortality in all the treatment groups, birds in T₁ manifested some signs of ill-health during the period of the experiment. The absence of morbidity in T₂ and T₃ could be as a result of the

antibiotic action of Aloe vera (Wendell, 1993) that fight infections.

Although the estimated total cost of production per chick was highest for birds in T₃ (N309.80) and least for birds in T₁ (N274.20), the highest overall profit was obtained from T₂ (N9,830.00), followed by T₃ (N8164.80) and least from T₁ (N7,819.80).

Conclusion and recommendations: It can be concluded that the best level of inclusion of Aloe vera in cockerel diet for enhanced growth performance/productivity and profitability is 5%.

The following recommendations are therefore made:

- Aloe vera should be incorporated in cockerel diet at 5% level to enhance their growth rate and therefore profitability.
- Various species of Aloe vera should be cultivated in large scale so that they can be easily available for farmers.

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