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## **EFFECT OF FEEDING *Faidherbia albida* POD MEAL ON HAEMATOLOGICAL AND SERUM BIOCHEMICAL INDICES OF BROILER CHICKENS**

**Usman, H. B., Isiak, R., <sup>1</sup>Sabo, M. N. and Salisu, U. S.**

Department of Animal Science, Federal University, Dutsin-ma

<sup>1</sup>Corresponding Author: mustynalado@gmail.com

### **ABSTRACT**

The study was conducted to determine the effect of feeding *Faidherbia albida* (Gawo) on haematological and serum biochemical parameters of broiler chickens. Five experimental diets were formulated containing 0, 2.5, 5.0, 7.5, and 10.0% *Faidherbia albida* as T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub> respectively. A total of one hundred and sixty (160) broiler birds were fed with these diets in a completely randomized design. The experiment lasted six (6) weeks. Blood samples were collected from thirty birds; six birds from each treatment randomly selected from each treatment. Blood samples were taken via the wing vein of the birds and was transferred into sample bottles and taken to the laboratory for analysis. The results showed that Pack cell volume and haemoglobin concentration were lower ( $P < 0.05$ ) for the 5% *Faidherbia* fed group compared to the other treatments. Feeding up to 10% *Faidherbia* did not influence haematological parameters considered in this study except band cells. There was no significant ( $P < 0.05$ ) difference ( $P > 0.05$ ) between the treatment means in cholesterol, alanine aminotransferase, alkaline phosphatase, creatinine and total protein. However, the feeding of *Faidherbia albida* influenced ( $P < 0.05$ ) the aspartate transaminase, albumin and bilirubin levels in the serum of broiler chickens. Aspartate transaminase and albumin were higher in the 7.5% *Faidherbia albida* group compared to the control. Based on the results obtained, it was concluded that *Faidherbia albida* can be included in the diet of broiler chickens up to 10% without any adverse effect on their haematological and serum biochemical constituents.

**Keywords** Haematological indices, broiler, Serum, *Faidherbia albida*

### **INTRODUCTION**

Feed is an important aspect of poultry production (Adenkola *et al.*, 2013). Inclusion of feed ingredients at normal or required level will enhance egg and meat production (Etim *et al.*, 2010). Diets are formulated to provide specific level of nutrients that are needed for optimum performance. For poultry, diets of high energy content promote fast growth (Whitehead, 2002; Uchegbu *et al.*, 2007). Protein being an essential component of the diet needed for survival of animals and humans due to its basic function in nutrition to supply adequate amount of needed amino acids must be properly addressed (Owosibo *et al.*, 2007). Dietary components affect the blood profile of healthy birds (Iheukwumere *et al.*, 2012).

Haematology refers to the study of the numbers and morphology of the cellular elements of the blood – the red cells (erythrocytes), white cells (leukocytes), platelets (thrombocytes) and the use of these results in the diagnosis and monitoring of diseases (Merck Manual *et al.*, 2012). The blood transports or conveys nutrients and materials to different part of the body. Therefore, whatever affects the blood, either drugs, pathogenic organism or nutrition will certainly affect the entire body adversely or moderately in terms of health, growth, maintenance and reproduction (Oke *et al.*, 2007). A readily available and fast means of assessing clinical and nutritional health status of animals on feeding trials may be the use of blood analysis, because ingestion of dietary components have measurable effects on blood composition (Maxwell 1990; Church 1994) and may be considered as appropriate measure of long term nutritional status (Olabanji *et al.*, 2007).

Due to rise in human population, which directly pose a competition on feed materials taken by animals and human, this has brought about the need to sort for other sources of feed materials preferably, non-conventional ones like *Faidherbia albida*.



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The high cost and availability of conventional feeds such as concentrates is also a limiting factor in poultry production whereby the cost of production is invariably high compared to the output obtained thereby eluding the benefit of the enterprise. Inclusion of *Faidherbia Albida* can curb the problems associated with feed shortage and might have a better feeding quality. The objectives of the study are to determine the haematological indices and serum biochemical parameters of broiler chickens fed *Faidherbia albida* pod meal.

## MATERIALS AND METHODS

### Study area

The experiment was conducted in the Teaching and Research Livestock Farm of the Faculty of Agriculture and Agricultural Technology, Federal University Dutsin-ma in Katsina State, located in the Sudan Savannah region of Nigeria. The coordinates are longitude 07°29'29'E and latitude 12°27'18'N at an elevation of 605m with an average temperature of 25.2°C to 28.6°C. (GPS).

### Experimental design and diets

One hundred (160) day old chicks were sourced from a reputable hatchery. The birds were randomly partitioned into five (5) dietary treatments of 32 chickens per treatment replicated four times with each having eight chicks per replicate in a completely randomized design (CRD).

### Preparation of Test Ingredients

*Faidherbia albida* (Gawo) used in this study was sourced directly from Katsina market of Dutsin-ma Local Government Area, dried and ground into powdery form before being incorporated into the basal diets accordingly.

### Management of birds

All the birds were properly housed in a deep litter system. The birds were provided with fresh, clean water and feed given *ad-libitum* daily throughout the trial period, all management practices were strictly adhered to throughout the period of the experiment.

### Data Collection

#### Haematological and serum biochemical indices

Red blood cell (RBC) count was determined using the improved Neubauer ruler chamber (WHO 1980), hemoglobin estimation (Hb) by the Sahli method (WHO,1980), white blood cell (WBC) counts as described by Bell et-al., (1972) packed cell volume (PVC) was determined by the micro hematocrit method (Schalm, 1965), while the mean corpuscular Haemoglobin Concentration (MCHC), mean corpuscular Haemoglobin (MCH) and mean corpuscular Volume (MCV) were computed using appropriate formulae (Olaniyi et al., 2012).

The serum biochemical profiles were also analysed as described by Mosby and Margi, (1995): Liver Function Tests (Tests for Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), Alkanine phosphatase (ALP), Determinations of Serum Albumin and Globulin). Renal Function Tests (Determinations of Serum Urea and Creatinine).

### Data Analysis

All data generated will be subjected analysis of variance. Significantly ( $P < 0.05$ ) different means will be separated using Duncan's Multiple Range Test as contained in SAS (1999) package.

## RESULTS AND DISCUSSION

### Haematological parameters of Broilers Fed *Faidherbia albida*

The haematological indices of broilers fed graded levels of *Faidherbia albida* meal are presented in the Table 1. Pack cell volume and haemoglobin concentration were lower ( $P < 0.05$ ) for the 5% *Faidherbia* fed group compared to the other treatments. Also the 5% *Faidherbia* had higher white blood cell and lower red blood cell counts compared to 0, 2.5 and 7.5% treatments. From the results, feeding up to 10% *Faidherbia* did not influence haematological parameters considered in this study except band cells.



This is in conformity with the findings of Mitruka and Rawnsley (1981) who stated that there was no significant difference in the blood parameters of rabbits fed different inclusion levels of *Faidherbia albida* pod based diets.

Table 1: Haematological parameters of broiler chickens fed *Faidherbia albida*

| Parameters           | 0.0%                | 2.5%                | 5.0%               | 7.5%                | 10.0%               | SEM  |
|----------------------|---------------------|---------------------|--------------------|---------------------|---------------------|------|
| Packed cell volume % | 25.50 <sup>a</sup>  | 24.00 <sup>a</sup>  | 19.00 <sup>b</sup> | 24.00 <sup>a</sup>  | 22.50 <sup>a</sup>  | 0.98 |
| Haemoglobin g/dl     | 8.45 <sup>a</sup>   | 7.95 <sup>a</sup>   | 6.30 <sup>b</sup>  | 8.00 <sup>a</sup>   | 7.60 <sup>a</sup>   | 0.29 |
| White blood cell     | 14.35 <sup>b</sup>  | 13.35 <sup>b</sup>  | 20.10 <sup>a</sup> | 13.15 <sup>b</sup>  | 16.70 <sup>ab</sup> | 1.22 |
| Red blood cell       | 4.30 <sup>a</sup>   | 3.55 <sup>a</sup>   | 2.35 <sup>b</sup>  | 3.65 <sup>a</sup>   | 3.40 <sup>ab</sup>  | 0.34 |
| Heterophils %        | 17.50 <sup>ab</sup> | 14.00 <sup>bc</sup> | 9.00 <sup>c</sup>  | 14.00 <sup>bc</sup> | 21.00 <sup>a</sup>  | 2.02 |
| Lymphocytes %        | 82.00 <sup>ab</sup> | 84.00 <sup>ab</sup> | 88.50 <sup>a</sup> | 83.00 <sup>ab</sup> | 76.50 <sup>b</sup>  | 2.40 |
| Monophils %          | 0.50                | 2.00                | 0.50               | 2.00                | 0.50                | 0.76 |
| Eosinophils %        | 0.00 <sup>b</sup>   | 0.00 <sup>b</sup>   | 1.00 <sup>a</sup>  | 0.00 <sup>b</sup>   | 0.00 <sup>b</sup>   | 0.26 |
| Basophils %          | 0                   | 0                   | 0                  | 0                   | 0                   | 0    |
| BAND %               | 0.00 <sup>b</sup>   | 0.00 <sup>b</sup>   | 1.00 <sup>ab</sup> | 1.00 <sup>ab</sup>  | 2.00 <sup>a</sup>   | 0.37 |

Means in a row with the same superscripts letters are not significantly different ( $p < 0.005$ ).

#### Serum Biochemical parameters of Broilers fed *Faidherbia albida*

The results showed that there was no significant ( $P < 0.05$ ) difference between the treatment means in cholesterol, alanine aminotransferase, alkaline phosphatase, creatinine and total protein (Table 2). However, the feeding of *Faidherbia albida* influenced ( $P < 0.05$ ) the aspartate transaminase, albumin and bilirubin levels in the serum of broiler chickens. Aspartate transaminase and albumin were higher in the 7.5% *Faidherbia albida* group compared to the control. Bilirubin level was lowest in the 5.0% *Faidherbia albida* fed broiler which was only statistically lower ( $P < 0.05$ ) than the control.

Table 2: Serum Biochemical parameters of Broilers fed *Faidherbia albida*

| PARAMETER                    | 0.0%               | 2.5%                | 5.0%               | 7.5%                | 10.0%               | SEM  |
|------------------------------|--------------------|---------------------|--------------------|---------------------|---------------------|------|
| Cholesterol mg/dm            | 40.50              | 45.50               | 45.00              | 53.50               | 59.50               | 6.64 |
| Aspartate transaminase U/l   | 66.00 <sup>b</sup> | 72.50 <sup>b</sup>  | 88.00 <sup>a</sup> | 91.50 <sup>a</sup>  | 70.00 <sup>b</sup>  | 2.92 |
| Alanine aminotransferase U/l | 59.00              | 65.00               | 74.00              | 62.50               | 66.00               | 5.88 |
| Alkaline phosphatase U/l     | 79.50              | 71.00               | 67.50              | 85.00               | 64.00               | 7.01 |
| Albumine g/dl                | 0.55 <sup>b</sup>  | 2.80 <sup>a</sup>   | 1.80 <sup>ab</sup> | 2.30 <sup>a</sup>   | 2.50 <sup>a</sup>   | 0.42 |
| Creatinine mg/dl             | 1.15               | 1.30                | 1.10               | 1.35                | 2.00                | 0.29 |
| Bilirubin g/dl               | 26.00 <sup>a</sup> | 21.00 <sup>ab</sup> | 18.50 <sup>b</sup> | 20.00 <sup>ab</sup> | 24.50 <sup>ab</sup> | 1.91 |
| Total protein g/dl           | 44.50              | 45.50               | 40.00              | 38.00               | 43.00               | 5.41 |

#### Conclusion

Based on the results obtained from the study, it was concluded that *Faidherbia albida* can be included in the diets of broiler chickens up to 10% without any adverse effect on haematological and serum biochemical constituents. It is recommended that further research should be carried out with higher inclusion levels of *Faidherbia albida* in broiler diets using different processing methods.

#### REFERENCES

Adenkola A. Y., Ayo A. Y., Sackey A. and Adelaiye A. B. (2013). Eight hours road transportation and ascorbic acid administration effects on haematological parameters of pigs during the harmattan

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- season. Proceedings of the 38th Annual Conference of the Nigeria Society for Animal Production. 45-48.
- Church J. P., Judd J. T., Young C. W., Kebay J. L. and Kim W. W. (1984). Relationships among diet constituents and specific serum clinical components of subjects eating self-selected diets. *American Journal of Clinical Nutrition*. 40:1338-1344.
- Etim N. N. and Oguike M. A. (2010). Egg production of the domestic fowls (*Gallus gallus*). Factors affecting it and implications for food security. Proceedings of the 35th Annual Conference of the Nigeria Society for Animal Production. 660p.
- Iheukwumere F. C and Herbert U. (2012). Physiological responses of broiler chickens to quantitative water restrictions: Haematology and serum biochemistry. *Journal of Poultry Science* 2:117-119.
- Maxwell M. H., Robetson G. W. and McCpngruodala C. C. (1990). Composition of haematological values in restricted and ad libitum fed domesticated fowls. RBC characteristics. *British Poultry Science*. 60:1474-1484.
- Merck Manual. Haematologic reference ranges. Merck Veterinary Manuals.com; 2012.
- Mosby and Margi. S (1995). *Veterinary Clinical Laboratory Procedures*. 2<sup>nd</sup> edition Pp. 35- 38
- Oke U. K., Herbert U., Ebuzoeme C. O, Nwachukwu E. N. (2007). Effect of genotype on the haematology of Nigerian local chickens in humid tropical environment. Proceedings of the 32<sup>nd</sup> Annual Conference of the Nigeria Society for Animal Production. 2007; 18-21.
- Olabanji R. O, Farinu G. O, Akinlade J. A, Ojebiyi O. O. (2007). Growth performance and haematological characteristics of weaner rabbits fed different levels of wild sunflower (*Tithonia diversifolia* HemsL A. Gray) leaf blood meal mixture. Proceedings of the 32<sup>nd</sup> Annual Conference of Nigeria Society of Animal Production. 2007:207-209.
- Olaniyi, O. A., Oyenaiya, O. A., Sogunle, O. M., Akinola, O. S., Adeyemi, O. A. and Ladokun O. A. (2012). Free range and deep litter housing systems: effect on Performance and blood profile of two strains of Cockerel chickens Tropical and Subtropical Agroecosystems, 15 (2012) : 511 – 523
- Owosibo A. O and Longe O. G. (2007). Response of pullet chicks to graded levels of dry extruded fat soybean. Proceeding of the 41st Annual Conference of the Agricultural Society of Nigeria. 345-348
- Schalm, O. 1986. Schalm's Veterinary Haematology. 4th Edition, pp. 524.
- Statistical Analysis System, (1994). Statistical users guide. SAS institute Inc. Cary, North Carolina, U.S.A.
- Uchegbu M. C, Okonkwo F. N, Ogbuewu I. P, Nwaodu C. H, Ayanwu G. A and Udedibie ABI. (2007). Performance of starter broilers fed diets containing fermented maize milling waste. Proceeding of the 41st Annual Conference of the Agricultural Society of Nigeria. 2007; 323
- Whitehead C. C. (2002). Nutrition and poultry welfare. *World's Poultry Science Journal*. 58(4):349-355