EFFECT OF *Aspilia Africana* (BUSH MARRIGOLD) LEAF EXTRACT ON HAEMATOLOGICAL PARAMETERS OF BROILER BIRDS

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Abstract
A 56 days feeding trial was conducted at the Poultry Unit of the Teaching and Research Farm in the Department of Animal Science, Ebonyi State University, Abakaliki. The study was conducted to evaluate the effect of Aspillia Africana leaf extract on the haematological parameters of broiler birds. A total of eighty four (84) day old Agrited broiler chicks used in this study were randomly grouped into four (4) treatments with three (3) replications of seven (7) birds each. The leaves were sun dried for seven days and grounded, 10g of the dried grounded leaves were dissolved in warm water and used for the research. T_1 (control) received 2liters of water with no extract, T_2 received 150ml/2liters of the extract, T_3 received 200ml/2liters of the extract, T_4 received 250ml/2liters of the extract on daily basis for 8 weeks. Blood samples were collected at the 8^{th} week from one bird per replicate through the wing vein using a 2ml syringe and sterilized needle and placed into an EDTA container for haematological studies. Data collected from the haematological indices of the birds were subjected to statistical analysis, using Analysis of Variance (ANOVA) in Completely Randomized Design (CRD). Treatment means were separated using Least Significant difference (LSD). The effect of Aspillia Africana was significant ($p>0.05$) on the parameters such as packed cell volume (PCV), Haemoglobin Count (Hb), White blood cell (WBC),Red blood cell (RBC) and Neutroglobin concentration (MCHC), Lymphocytes, Monocytes, eosinophils and Basophils were significantly ($p>0.05$) not influenced by Aspillia Africana. The result obtained from this study indicated that T_2 (150ml/2liters of the extract) gave better result compared to other levels of inclusion. It is therefore recommended that 150ml/2liters of the extract be included in the drinking water of birds because this level of inclusion possesses antibacterial property.

Keywords: Aspillia Africana, Haematology and Broilers

Introduction

Plant materials continue to play an important role in the maintenance of human health since antiquity. Over 50% of all modern chemical drugs originated from natural plant sources. These plant products are the major source of drug development in pharmaceutical industry (Dehl and Wenger 2000). Several plants are now being used in part or as a whole to treat many diseases. Active components of these plants are now being investigated, extracted and developed into drugs with little or no negative effects or contra- indication (Oluyemi e*t al., 2007*). Rural dwellers in most parts of the world do not depend on the orthodox medicine for the cure of diseases and ailment. This is because most of the modern equipment are expensive and service delivery too expensive to afford. As a result of this, a larger section has resulted to the use of traditional medicine, which are believed to be less expensive, and of little or no side effects. The initial identification of more than 20,000 species of medicinal plants of tropical forests origin by the World health Organization, in 1978 has contributed immensely to our knowledge of different uses of plants (Iwu, 1993). Most of these plants have their present uses rooted in traditional

medicines, which plays major roles in maintaining the health and welfare of both rural and urban dwellers in developing countries (Iwu, 1993). One of such plants considered of great importance is *Aspilia Africana* (Compositae). It is a semi- woody herb from a perennial woody root stock up to 2 meters high. It is very polymorphic and occurs throughout the region on wasteland of the savannah forest. It is alsowidely distributed across tropical Africa (Doyle 2002). Phytochemical analysis of the plant reveals that it has high crude oil protein content (Close 2002). It is also rich in saponin, tannins, glycoside and alkaloids (Adeniyi & Odufowora, 2000; Iwu, 1993). Kuiate *et al.* (1999) reported the presence of four essential oils obtained by hydrodistillation from the leaves of *Aspilia africana.* These oil samples include Sesquiterpenes, monoterpenes, Germacrened and apha- pienene. Historically, Aspilia Africana has been used in Mbaise and most Igbo speaking parts of Nigeria to prevent conception suggesting its contraceptive and anti-fertility potencies.(Iwu, 1993) The safety usage of this plant in this manner has not been validated. The Okpameri people of bendel north in Nigeria use the decoction of the leaves to wash face torelieve febrile headache (Uchewa, *et al* 2006). The contraction induced by norepinphrine and relaxed precontracted tension ata low and high concentrations, respectively (Iwu, 1993). *Aspilia mossambicensis* has been found to possess anti- malarial activity against *plasmodium falciparum* and galactogogne activity. It has also been used to alleviate menstrual cramps (Adeniyi and Odufowora 2000). This research is to evaluate the Haematological parameters of broiler chickens fed *Aspilia Africana* leaf extract.

Materials and Methods

Experimental site

The experiment was carried out at the Poultry unit of the Department of Animals Science Ebonyi State University Teaching and Research Farm Abakaliki. Abakaliki is within latitude $7^0$30E, and $8^0$30E and longitude $5^0$40N and $6^0$45N (FDLR, 1985). It has a mean elevation of 400m above sea level. The annual rainfall is about 1700mm to 2060mm spread between April and November. The experimental site receives an abundant and constant insulation from the sun with a maximum mean daily temperature of between 28- 31^0c attended by the effects of cloud cover (FDLR 1985).

Experimental Birds and Management

A total of 84 birds were used for the experiment for a period of 8 weeks (2 months). The birds were sourced from a reputable hatchery and were housed in an open sided poultry house whose sides were demarcated using wire gauze. The floor was concrete and was covered with wood shavings as litter material. Few days before the arrival of the chicks, the brooder house was thoroughly cleaned and disinfected. The brooder house was partitioned into four different pens and each pen was demarcated to get different cell, this was done for proper randomization. The already gotten wood shavings were spread on the ground for brooding and were changed constantly every week to prevent diseases. Feeding trough and drinkers were provided in the brooder house, the pen was pre heated to ensure that the pen is warm before the arrival of the chicks.

Experimental Design/Diet

The 84 birds were randomly allocated to four (4) treatments identified as T_1 T_2, T_3, and T4 in a Completely Randomized Design (CRD). Each treatment was replicated into three (3) having seven (7) birds per replicate, the birds were fed with commercial feed (Top Feed) and the water was treated with different level of A. Africana, the control T_1 had no extract but received 2liters of water, T_2 received 150ml/2liters of the extracts, T_3 received 200ml/2liters of the extracts and T_4 received 250ml/2liters of the extracts.

Leaf Preparation

The plant material, *Aspilia Africana* leaves were collected within Abakaliki in Ebonyi State. The leaves were sun- dried for a period of seven days and grounded to fine powder. On daily basis 10g of the grounded *Aspilia Africana* was dissolved in 2liters of warm water for to get the leaf extract before filtering to get the leave extract.

Data Collection

Heamatological parameters

Blood sample was collected from the birds, one bird replicate on the 8^{th} week of the experiment through the wing vein of the birds using 2ml syringers and sterilized needle in a container containing EDTA which served as anticoagulant for the blood for haematology study. The blood sample was taken to the laboratory and analysed for are packed Cell Volume (PCV), Red Blood Cell (RBC), White blood cell (WBC), Haemoglobin (Hb), and the leukocyte differential count which are Lymphocyte, neutrophils, monocytes, eosinophils and basophils according to the methods of Ayode Vein (1984). Mean Cell Volume (MCV), mean Cell Haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC), were analyzed using the formulas below:

MCV (fl)= PCV (%)/ RBC (10^{-6}/ml)

MCH (pg) = Hb (g/dl)/RBC (10^{-6}/ml) MCHC (%) = Hb (g/dl)/PCV (%)

Statistical Analysis

The data collected on various parameters were subjected to analysis of variance (ANOVA) to separate the means using Duncan Multiple Range Test as outlined by Steel and Torrie (1980). The Linear additive model for this design is:

X_{ij} $\mu + T_1 + E_{ij}$

X_{ij} = Any Observation made in the Experiment

μ (mu) = the Population Mean

T_1 (Tau subi) = Treatment Effect

E_{ij} (Epsilon subij = Experimental Error)

Results and Discussion

The effect of the experimental diet on the packed cell volume (PCV) of the birds was significant ($p < 0.05$). The highest value for packed cell volume (35.67%) was recorded from the birds fed control diet (T_1). This value was statistically ($p>0.05$) not different from 34.67% and 34.00% recorded from the birds fed T_2 and T_3 diets respectively. The lowest value (24.33%) for the packed cell volume was obtained from the birds fed T_4 diets. The result also indicated that PCV count decreased as the level of inclusion of *Aspilia Africana* leaf extract increased. The values obtained from T_1 T_2 and T_3 diets differed significantly ($p< 0.05$) from the value obtained from T_4 diet. Haemoglobin count (Hb) as well as Red Blood Cell (RBC) followed the same trend as Packed cell Volume (PCV).

White Blood Cell (WBC) was significantly ($P< 0.05$) affected by the experimental diet. However, the birds fed T_4 diet recorded the highest value of 6.66 x 10^{-3}/ml, which differed significantly from the values obtained from the birds that were fed other dietary treatments. The values obtained from T_1(4.14 x 10^{-3}/ml) not different from each other. The lowest value of WBC

(4.14 x10^{-3}/ml) was obtained from the birds fed control diet (T_1). Neutrophils followed the same trend as the white blood cell (WBC).

Haematological Indices

The results on the effect of Aspilia Africana leaf extracts on the haematological indices of broiler chickens are presented in table

Table 1: Hematological indices of broiler chicken fed *Aspilia Africana* leaf extract

Parameters	T1	T2	T3	T4	N SEM Packed
cell volume (PCV)%	35.67[a]	34.67 [a]	34.00 [a]	24.33 [b]	0.53
Haemoglobin Concentration (Hb)g/dI	11.88 [a]	11.55 [a]	11.33 [a]	8.11 [b]	0.18
Red Blood Cell (RBC) 10^{-6} /ml	4.47 [a]	4.38 [a]	4.33 [a]	2.86 [b]	0.10
White Blood Cell (WBC) 10^{-3}/ml	4.14 [b]	4.27 [b]	4.22 [b]	6.66 [a]	0.18
Mean Corpuscular Volume (MCV) fl	79.81	79.23	78.36	89.07	2.54
Mean Corpuscular Haemoglobin Concentration (MCHC) %	33.31	33.32	33.32	33.31	8.34
Neutrophils %	53.33 [b]	62.67 [b]	59.33 [b]	82.00 [a]	1.97
Lymphocytes %	28.33	27.67	30.67	28.33	0.95
Monocytes %	6	6	5.67	8.67	0.54
Eosinophils %	3.67	4	3.67	5.33	0.31
Basophils %	1.33	1.67	1	2	0.095

a,b,c = Means on the same row with different superscript are significantly (>p 0.05) different. SEM= standard error of the mean.

There was no significant (p> 0.05) effect on the Mean Corpuscular Volume (MCV), mean Corpuscular Haemoglobin Concentration (MCHC), lymphocytes, eosinophils, Basophils, Basophils and Monocytes. The highest value for the MCV (89.07fl) was recorded from the birds fed T_4 diet, while the lowest value of 78.36fl was recorded from the birds fed T_3 diet. The values of MCHC were higher (33.32%) in the birds fed T_2 and T_3 diets, and lower (33.31%) in the birds fed T_1 and T_4 diets. Lymphocyte was higher (30.67%) in the birds fed T_3 diets, and lower (27.67%) in the birds fed T_2 diet. The highest value of eosinophils (8.67%) was recorded from the birds fed T_4 diet, while the lowest value (5.67%) was recorded from the birds fed T_4 diet. Basophils followed the same trend as eosinophils. Monocyte was higher (5.33%) in the birds fed T_4 diets, and lower (3.67%) in the birds fed T_1 and T_3 diets respectively.

The range of Packed Cell Volume (PCV) obtained from this study (24.33-35.67%) was higher than 25.5 – 32% reported by Mitruka and Rawnsley (1977) as the normal range for broiler chickens. The values of PCV decreased as the level of inclusion of *Aspilia Africana* leaf extract increased (Table 3). This could be attributed to decrease in water intake by the birds as reported by Uchewa *et al*, (2006). The packed Cell Volume as well as haemoglobin count increased as the red Blood Cell increased. This result agreed with Close, (2002) who reported that increase in red blood cell concentration, increases the packed cell volume as well as the haemoglobin count. Similar report was given by Frandson and Elmer, (1981). White Blood Cell (WBC) count increased with the increasing level of *Aspilia Africana.* This is an indication that Africana is capable of increasing the defencse system of the birds against infectious diseases. The low level of white blood cell count observed from the birds fed control diet (T_1), could be as a result of no disease condition or low production from bone marrow (Doyle, 2002). Mean Corpuscular Volume (MCV) increased to the highest value (89.07) at the highest level of inclusion of *Aspilia Africana.* A high MCV is an indication of anaemia due to nutritional deficiencies, bone marrow abnormalities, liver disease and chronic lung disease (Dehl and Wenger, 2000). The lowest MCV

(78.36) was recorded from the birds fed T_3 diet. This could be attributed to iron deficiency, chronic disease or haemoglobin disorder and anaemia due to destruction or bone marrow disorders. Mean Corpuscular Haemoglobin Concentration (MCHC), had its lowest values (33. 31) in the birds fed control diet (T_1) as well as T_4 diet. This could be attributed to low level of haemoglobin in the blood of birds. MCHC can also reduce as a result of iron deficiency, blood loss, pregnancy and anaemia caused by chronic disease (Dehl and Wenger, 2000). Neutrophils were found to increase as the level of inclusion of *Aspilia africana* increases. This is an indication that inclusion of *Aspilia Africana* in the diets of broilers can increase the incidence of infectious diseases. The percentage of the bloods lymphocytes of the birds varied with the level of inclusion of *Aspilia Africana.* It was observed from this study that 200ml/2 liters of the extract (T_3) gave the highest number of lymphocytes (30.67%). This is an indication that the inclusion of *Aspilia Africana* at this level boosted the immune system of the birds. Monocytes, eosinophils and Basophils were found to be highest at the highest level of inclusion of *Aspilia Africana* (T_4) i.e 250ml/2liters of the extract. Basophils are the first line of defence in viral infection, that is to say that increase in the number of basophils, is an indication of viral disease. eosinophils are the first line of defense in parasitic diseases or allergic diseases, therefore an increase in the number of eosinophils recorded from the birds fed the highest level of *Aspilia Africana* (T_4), resulted to parasitic diseases or allergic diseases in the birds.

Conclusion

The result obtained from this study indicated that T_2 (150ml/2liters of the leave extract) gave better result compared to other levels of inclusion. It is therefore recommended that 150ml/2liters of the extract be included in the drinking water of birds because this level of inclusion possesses antibacterial property that will be a preferred substitute for the use of antibiotics in turkey production. I recommend that further studies should be carried on the anti-nutritional factors present in *Aspilia africana* leaf extract and its effect in broiler birds. Government should provide adequate facilities to encourage ethno- veterinary medicine in our communities.

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