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HEMATOLOGICAL PROFILE OF BROILER CHICKEN FED WITH Lactic Acid Bacteria (LAB) AND WITHOUT LAB

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ABSTRACT

The aim of this study was to evaluate the hematological parameter of broiler chicken fed wth LAB. Deep litter was used for the rearing of the birds for the period of six (6) weeks. Broiler chickens were completely randomized into five treatment groups; Treatment 1 birds were given lactic acid bacteria (LAB 1), Treatment 2 was given lactic acid bacteria (LAB 2) and Treatment 3 was given the combination of LAB 1 and 2. Treatment 4 and 5 are the control groups. Treatment 4 is the positive control group (given antibiotics) and Treatment 5 is the negative control group (not given any antibiotics or LAB). Significant differences were observed in all hematology except in Hemoglobin. Broiler chickens fed LAB 2 had the least packed cell volume with a higher value in the combination of LAB 1 and 2. Total white blood cells, monocytes, eosinophils, and basophils were significantly higher in a combination of LAB 1 and 2. Full blood count was significantly higher in broiler chickens fed LAB1 and a combination of LAB 1 and 2 (5.95 and 5.85) with the least values obtained in broiler chickens fed antibiotics (5.15). LAB 1 could be added to the diet of broiler chickens due to its improved hematology which shows no adverse effect. Also, Lab 1 heamatological parameters are within normal and show normal Haematological activities

Keywords: LAB, hematological, broiler chicken, monocytes, and basophil

INTRODUCTION

The use of probiotics in poultry nutrition as an alternative to antibiotics as feed additives is currently the focus of interest of many research centers. Studies done to date have shown that by lowering pH in the digestive tract and producing substances with antibiotic activity, probiotics inhibit the growth of pathogenic microorganisms, resulting in lower mortality of birds during rearing (Patidar and Prajapati, 1999) Numerous studies have shown a favourable influence of probiotics on production results, but it has also been suggested that these preparations are less effective under optimal zoo hygienic conditions (Kahraman *et al*, 2000).

The objective of this study was to determine the effect of lactic acid bacteria on some biochemical blood indicators of broiler chickens.

MATERIALS AND METHODS

Experimental site

The research was carried out in the MEDICOM laboratory Jos, Jos Plateau State, Nigeria, a private laboratory with standard equipment and procedure.

Experiment materials

LAB 1 and 2 were prepared in the Laboratory of the Department of Microbiology, University of Jos. Jos.

Housing and feeding management

Deep litter was used for the rearing of the birds for the period of eight (8) weeks. Commercial feed were used for both starter and finisher phases. The chicks were properly housed under standard management

practices and vaccination schedules were followed appropriately as recommended**.** There were five treatment groups**;** Treatment 1 birds were given LAB 1, Treatment 2 were given LAB 2 and Treatment 3 were given the combination of LAB 1 and 2. Treatment 4 and 5 were control groups. Treatment 4 was the positive control group (given antibiotics) and Treatment 5 was the negative control group (not given any antibiotics or LAB).

Blood sample collection

Blood samples were collected into labeled tubes containing Ethylene-Deamine-Tetra-acetic Acid (EDTA) for haematological analysis. Haematological evaluation was conducted according to the method described by Bitto and Gemade (**2001).**

White blood cell differential count

The white blood cell differential count were measured as White cell count ($x10^9$/L), Neutrophils ($x10^9$/L), Lymphocytes ($x10^9$/L), Monocytes ($x10^9$/L) and Eosinophils ($x10^9$/L).

RESULTS

Table 1 shows the hematological parameters of broiler chicken fed with LAB and without LAB. Significant differences at ($P<0.05$) were observed in all hematological parameters except in Hemoglobin. Broiler chickens fed with LAB 2 had the least Packed cell volume with a higher value in the combination of LAB 1 and 2. Total white blood cell, monocytes, eosinophil, and basophil were significantly higher ($P<0.05$) in a combination of LAB 1 and 2. FBS was significantly higher in broiler chickens fed LAB1 and a combination of LAB 1 and 2 (5.95mmol/l and 5.85mmol/l) with least values obtained in broiler chickens fed antibiotics (5.15).

Table 1: Hematological parameters of broiler chicken fed with LAB and without LAB

Parameters	LAB 1	LAB 2	LAB 1 +LAB 2	Antibiotics (positive control)	Without LAB/Antibiotics (negative control)	SEM
Packed cell volume (%)	27.50^{a}	19.50^{b}	30.50^{a}	26.00^{a}	28.00^{a}	1.21
Hemoglobin (g/d)	9.20	8.00	10.05	8.60	9.25	0.35
Total white blood cell ($x10^9$/L)	5.50^{b}	4.00^{b}	9.45^{a}	6.05^{b}	6.50^{b}	0.56
Neutrophil ($x10^9$/L)	46.00^{c}	60.00^{a}	47.00^{c}	58.50^{ab}	50.50^{bc}	1.88
Lymphocytes ($x10^9$/L)	44.00^{a}	32.00^{b}	38.00^{ab}	34.00^{b}	45.00^{a}	1.66
Monocytes ($x10^9$/L)	7.50^{ab}	7.50^{ab}	9.50^{a}	6.00^{ab}	4.50^{b}	0.62
Eosinophil ($x10^9$/L)	2.50^{ab}	0.33^{b}	5.00^{a}	1.50^{b}	1.00^{b}	0.54
Basophil ($x10^9$/L)	0.00^{b}	0.00^{b}	0.05^{a}	0.00^{b}	0.00^{b}	0.07
FBS	5.95^{a}	5.40^{ab}	5.85^{a}	5.15^{b}	5.20^{b}	0.12

^{abcd}means with different superscripts on the same row differ significantly ($P< 0.05$)
SEM = Standard error of the mean

DISCUSSION

Hematological parameters are used to describe the health status of animals and stress due to environment, nutrition, and pathological factors. This is greatly influenced by the innate ability (Genotypic ability of the animal to thrive under such conditions). A lot of researchers have reported normal ranges for hematological parameters in avian species. Campbell, (2013) recorded normal range of hematological parameters of PCV (35.9-41;0%), Hb (11.60-13.68g/dl), RBC (4.21-4.84 X 106/ml, WBC (4.07-4.32 X 103/ml, in broiler chickens. The PCV and Hb, obtained in this study were lower whereas, the WBC was

higher than the normal reference values reported by this author. The reference values reported by Jain (1993) for Hb (7.00-13.0), PCV (22.0-35.0) agree with the values reported in this study for Hb and PCV but are lower than the values reported for WBC. Merck, (2012) reported normal means values of blood parameters for PCV (32%), Hb (12 g/dl), WBC (5.5 x 103µl), MCV (174 FI), MCH (61 Pg), MCHC (33 g/dl) which are higher than the values reported for PCV but lower than the value reported for WBC in this study. The PCV values obtained in this study compared with the range of values reported by Beski and Al-Sardary, (2015) in dietary supplementation of probiotics in broiler chickens. Saied *et al*. (2011) reported that dietary probiotics had no effects on PCV when introduced into broilers diet which corroborates with the present findings. The variability in results will depend on a multitude of factors among which includes the fact that most normal reference values are established in temperate countries, whose data may not effectively reflect tropical animal characteristics due to the differences in environmental conditions as well as genetic variability. Cetin *et al*. (2005) did not obtain a significant increase in the number of white blood cells (WBC) ($P<0.05$) with probiotic treatment which corroborates the present findings. An increase in white blood cells count was observed in synergy between LAB 1 and 2, representing stimulation of the host's immune system (Al-Kassi *et al*., 2009). However, it has been shown that probiotics stimulate different subsets of immune system cells to produce cytokines, which in turn play a role in the induction and regulation of the immune response (Christensen, 2002).

White blood cells, also called leukocytes, are an important part of the body's defense against disease. In response to infection, the WBC count typically increases beyond standard normal range. Therefore, a measure of the WBC count can give an indication if there is infection or inflammation occurring. Increases in WBCs can also occur in some cancer conditions such as leukemia. A bird under stress may have a WBC that is doubled, but greater elevations are a definite indication of disease. Reduced numbers of WBCs can occur due to bone marrow disease, severe acute disease, and other conditions. It is very important to know the normal range of WBC numbers so increases or decreases can be properly evaluated(Peter, 2002). There are different varieties of WBCs and changes in their numbers can indicate particular disease conditions. The cells include heterophils (equivalent to the mammalian neutrophil or PMN), lymphocytes, monocytes, eosinophils, and basophils. A differential count can then be performed to evaluate the percentages of each type of cell. The normal distribution of leukocytes is approximately 50%,heterophils and 50% lymphocytes with small percentages of the other cells, but different factors will change the distribution. Some species respond to stress with lymphocytosis (increased lymphocytes), while others do so with heterophilia (increased heterophils). Allergic or parasitic conditions may show increased numbers of eosinophils. Chronic disease conditions may display increased numbers of monocytes (monocytosis). Monocytosis can occur in cases of chlamydiosis (psittacosis) (Peter, 2002).

The results of this study (Table 1) show that eosinophil ranged from 0.33 – 5.00%. The high percentage of eosinophils in the blood cannot be assumed that the chicken is in sick condition. The high production of eosinophils can also show the functioning of the body's defense system in the face of disease agents. The results in Table 1 also show that lymphocyte counts were significant and ranged 32 – 45.00%. Chickens have lymphocyte counts between 5.45 and 17.3 (_ 103/ mm^3) or 5.91–18.4 (_103 /mm^3) (Mazagova *et al.*, 2015). The monocyte value of 9.5 for broiler chickens given LAB1 + LAB2 in their diet was significantly higher ($P<0.05$) than only the negative control group which had the least value of 4.5.

CONCLUSION

Lactic Acid Bacteria (LAB 1) could be added to the diet of broiler chickens due to its improved hematology which shows no adverse effect. Also, Lab 1 heama parameters are within normal and shows normal Haematological activities.

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