



EFFECT OF INCLUSION OF AZOLLA PINNATA ON THE HAEMATOLOGICAL PARAMETERS OF BROILER RABBITS

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Abstract

The study was carried out to search for alternatives to concentrates led us to a wonderful plant azolla, which holds the promise of providing a sustainable feed for livestock. The objective of the study is to study the effect of supplementary feeding sun dried Azolla (Azolla pinnata) on haematological parameters of broiler rabbits. Thirty broiler rabbits for 12 weeks fed with diets containing azolla as supplementary feed at 0, 1.5 and 3.0 per cent level in T₁, T₂ and T₃, respectively. The blood was collected at the end of experimental week to study the mean haematological parameters of the three experimental groups. Haematological parameters like PCV, Hb, RBC, WBC, MCV, MCH, and MCHC, DLC were taken and found that there were no significant differences ($P > 0.05$) between means of the three groups. Sun dried azolla inclusion up to 3.0 per cent in the diets does not appear to affect the haematological parameters and therefore, can be included in the diet.

Keywords: Azolla, Haematological parameters, Broiler rabbits

I. INTRODUCTION

Rabbit meat production is an attractive proposition, especially when the aim is to produce quality animal protein. It is best known for being prolific and efficient feed converter. Rabbits like variety of vegetable materials, tree leaves such as mulberry, and bamboo are good. Berseem and Lucerne may also be incorporated as per availability and also Utilisation of kitchen and garden refuses, weed, leaves makes to meat and wool production. The use of forage and other agro-industrial by products have become an area of interest for many researchers because of challenges posed by the high cost of conventional feed stuffs. In recent years commonly occurring aquatic plant, azolla has become prominent and has attracted the attention of scientists because of its apparent high potential as a feed resource for livestock.

Blood analysis is an established means of assessing clinical condition and health status of animal on feeding trials since ingestion of dietary components has measurable effect on blood composition. It may be an appropriate measure for long term nutritional status and also and to assess the feed toxicity especially with feed constituents that affect the formation of blood. Keeping these points into consideration, the study was to carried out to find the effect of supplementary feeding of azolla on the haematological indices of rabbits.

II. MATERIALS AND METHOD

Thirty weaned rabbits of 410 -420g comparable body weights were selected and were divided into three groups (T₁, T₂ and T₃), each group comprised of ten rabbits (six males and four females). The diets for the rabbits comprised of two different levels. The amount of feed ingredient used in the experiment was presented in table 1. Rabbits were housed in individual cages. Each rabbit had free access to water provided in water droppers. The room in which rabbits were housed was hygienically maintained.

Blood samples were obtained at the end of the feeding trial. Rabbits were bled on the last day of feeding week. Blood was collected in sterile vials. The blood was immediately transferred into vacutainer containing EDTA as anticoagulant at 5.4 mg. Analysis was done to the collected samples by using auto analyzer PE-6800, Procan Electronics Inc., China

Table 1: Ingredient composition (%) of experimental diets

Ingredients	Treatments		
	T1 (Control)	T2 (1.5% dry Azolla)	T3 (3% Azolla)
Maize	40	40	40
Wheat bran	19.5	18.5	18.5
Lucerne meal	19.5	19	17.5
Soybean meal	19	19	19
Salt	1.5	1.5	1.5
Mineral mixture	0.5	0.5	0.5
Azolla(dried)	-	1.5	3
Total	100	100	100

Data on haematological parameters were analyzed by analysis of variance with animal and treatment as main effects using GraphPad Prism version 5.1. Individual differences between means were tested using Tukey's Multiple Comparison Test when treatment effect was significant.

III. RESULTS AND DISCUSSION

The chemical composition of the compound feed mixture that fed to the broiler rabbits of the treatment groups was depicted in the table 2 and the average haematological values of broiler rabbit during growth trial in different treatments were presented in the table 3.

Table 2: Chemical composition of the compound feed mixture

Nutrients	TREATMENTS		
	T1	T2	T3
Dry matter	85.63	86.2	86.42
Organic matter	93.95	94.28	94.27
Crude Protein	17.56	17.97	18.24
Ether extract	2.28	2.26	1.84
Crude fibre	10.25	10.56	11.6
Total ash	6.05	5.72	5.73
NFE	63.86	63.49	62.59

Table 3: Average haematological values of Broiler Rabbits

Parameter	Treatments		
	T1 (Control)	T2 (1.5% Dried azolla)	T3 (3% Dried azolla)
WBC (*10 ⁹ /l)	5.60 ± 0.14	7.75 ± 0.75	7.51 ± 0.91
RBC (10 ⁶ /mm ³)	6.40 ± 0.11	7.02 ± 0.13	6.77 ± 0.25

Hb (g/dl)	14.16 ± 0.15	14.12 ± 0.34	14.01 ± 0.40
MCV (mm ³)	66.73 ± 0.37	65.40 ± 0.29	66.42 ± 0.54
MCH (pg/cell)	21.35 ± 0.18	20.06 ± 0.21	20.63 ± 0.23
MCHC (%)	31.60 ± 0.20	31.84 ± 0.31	30.89 ± 0.28
PCV	45.20 ± 0.66	46.35 ± 0.61	45.59 ± 1.05
DLC			
Neutrophils (%)	32.80 ± 2.58	39.60 ± 3.93	33.50 ± 3.50
Lymphocytes (%)	58.10 ± 2.85	65.80 ± 2.78	63.50 ± 3.71
Eosinophils (%)	1.70 ± 0.14	1.70 ± 0.21	2.00 ± 0.26
Monocytes (%)	2.10 ± 0.17	2.00 ± 0.15	1.89 ± 0.25

WBC=White blood cell, RBC= Red blood cell, Hb= Haemoglobin, MCV=Mean cell volume, MCH=Mean Corpuscular Volume, MCHC= Mean Corpuscular Haemoglobin Concentration, PCV=Packed cell volume, DLC= Differential leucocyte count

From the table 3, the mean serum WBC ($\times 10^9/l$) were $5.60 \pm 0.14(T_1)$, $7.75 \pm 0.75 (T_2)$ and $7.51 \pm 0.91 (T_3)$; RBC($10^6/mm^3$) were $6.40 \pm 0.11(T_1)$, $7.02 \pm 0.13(T_2)$ and $6.77 \pm 0.25 (T_3)$; Hb(g/dl) $14.16 \pm 0.15(T_1)$, $14.12 \pm 0.34(T_2)$ and $14.01 \pm 0.40(T_3)$; MCV(mm^3) $66.73 \pm 0.37(T_1)$, $65.40 \pm 0.29 (T_2)$ and $66.42 \pm 0.54 (T_3)$; MCH(pg/cell) $21.35 \pm 0.18(T_1)$, $20.06 \pm 0.21(T_2)$ and $20.63 \pm 0.23 (T_3)$; MCHC(%) $31.60 \pm 0.20(T_1)$, $31.84 \pm 0.31(T_2)$ and $30.89 \pm 0.28 (T_3)$ and PCV were $45.20 \pm 0.66(T_1)$, $46.35 \pm 0.61(T_2)$ and $45.59 \pm 1.05(T_3)$. The values were in the range of normal values reported by Burke (1994) but the difference between the means of three group were non-significant ($p > 0.05$). Haemoglobin (Hb) values (g/100ml) varied but not significantly ($P > 0.05$) among treatment groups. Values obtained were generally fall within normal range (9.4 -17.4) for rabbits (Mitruka and Rawnsley, 1997) recommended for clinical healthy rabbits and good transportation of oxygen from the respiratory organs to peripheral tissues. The result was close agreement with in with the findings of Ahemen *et. al.* (2013)¹, Ahemen *et. al.* (2013)² Ahamefuel *et. al.* (2008), Gowda (1996) and Vasanthkumar (2000) who observed no significant ($P > 0.05$) when fed with unconventional feedstuff.

Similar results were reported by Cherryl *et. al.* (2014) and Alalade *et. al.* (2007) when pig and chicken fed with azolla. Packed cell volume (PCV) is a measure of the relative mass of blood and is an index of toxicity. The result obtained in this study shows that PCV of rabbits were in the range of normal values reported by Sanderson and Philips (1981) and Burke (1994) who considered the normal PCV of a healthy rabbit to be between 30-50%. The normal PCV value is suggestive of adequate nutritional status of the rabbits. The result is in agreement with the findings of Cherryl (2014) and Alalade (2007) who observed no significant difference ($P > 0.05$) when azolla fed at the level of 10 and 20 per cent of leaf meal and also Kagya (2013) and Ahemen (2013) when fed with other conventional feed.

Red blood cells (RBC) function to transport oxygen. The values of RBC obtained in this study were within the normal range ($5.46-7.94 \times 10^6 /mm^3$) reported by Sanderson and Philips (1981) and Burke (1994). No significant effect of diet was observed on RBC values. Similar result was found by Ahemen *et. al.* (2013) when rabbit fed with water spinach. There were no significant differences ($P > 0.05$) in the mean corpuscular volume (MCV), mean corpuscular haemoglobin concentration (MCH) and mean corpuscular haemoglobin concentration (MCHC). The values obtained were within the normal ranges which indicates that rabbits were not anaemic and also indicates that the animal doesn't have any negative effect on haematological parameters when fed with azolla at different inclusion levels. The result was close agreement with the findings of

Ahemenet *al* (2013)¹, Ahemenet *al* (2013)² Gowda (1996), Vasanthkumar (2000) and Ewola (2012) when fed with unconventional feeds. Similar result was reported by Cherryl *et. al.* (2014) and Alalade *et. al.* (2007).

The cumulative mean DLC values were Neutrophils(%) $32.80 \pm 2.58(T_1)$, $39.60 \pm 3.93(T_2)$ and $33.50 \pm 3.50(T_3)$; Lymphocytes(%) $58.10 \pm 2.85(T_1)$, $65.80 \pm 2.78(T_2)$ and $63.50 \pm 3.71(T_3)$; Eosinophils (%) $1.70 \pm 0.14(T_1)$, $1.70 \pm 0.21(T_2)$ and $2.00 \pm 0.26(T_3)$ and Monocytes(%) were $2.10 \pm 0.17(T_1)$, $2.00 \pm 0.15(T_2)$ and $1.89 \pm 0.25(T_3)$ values were in the range of normal values reported by Burke (1994) but the difference between the means of three group were no significant difference among the treatments ($p > 0.05$).

Leucocytes perform a defensive function in the body system especially when transported to the body tissues. The white blood cell counts were not significantly ($p > 0.05$) different. Values obtained in this study were within the recommended normal range reported These results indicate that the animals were healthy because decrease in number of WBCs below the normal range is an indication of allergic conditions, anaphylactic shock and certain parasitism while elevated values indicate the existence of recent infection usually with bacteria. Similar result was reported by Cherryl *et. al.* (2014) and Alalade *et. al.* (2007).

The neutrophils, eosinophils, monocytes, basopils and lymphocytes were not significantly ($P > 0.05$) affected by dietary treatments, thus indicating probably normal physiological status of the animals when fed with 1.5 % and 3% of azolla. It also implies that the immune system of rabbits were adequate; the numerical difference observed were probably due to individual variations among these rabbits. Similarly the results were reported by Cherryl *et. al.* (2014) and Alalade *et. al.* (2007).

IV. CONCLUSION

The present study undertaken to analyse the effect of azolla on haematological values in broiler rabbits revealed that the blood values were similar in all the three groups with no significant difference. Thus concluded that inclusion of Azolla in rabbit diet had no influence on the haematological profile and showed that nutrients in the diets fed were balanced and support normal performance to maintain normal haematological profile of rabbits. Similar conclusion was given by Madubike and Ekenyem, 2006. Therefore, azolla meal can be conveniently used as good ingredient in feeding rabbits.

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