ORIGINAL RESEARCH PAPER | Veterinary Science | Volume : 6 | Issue : 10 | October 2016 | ISSN - 2249-555X | IF : 3.919 | IC Value : 74.50

Effect of Supplementary Feeding of Azolla on Biochemical Parameters of Broiler Rabbits

KEYWORDS: Azolla, Rabbits, Biochemical, Parameter.

Anitha. K.C	Y. B. Rajeshwari	J.ShilpaShree
Department of Livestock Production and Management Veterinary College, Bengaluru- 560 024.	Department of Livestock Production and Management Veterinary College, Bengaluru- 560 024.	Department of Livestock Production and Management Veterinary College, Bengaluru- 560 024.

ABSTRACT *Thirty weaned rabbits of an average 410-420g in weight were divided into three groups of 6 male and 4 female and used in 12 weeks feeding trial for blood biochemical profile and Haematological studies. The rabbits were fed with diets containing 0, 1.5 and 3 per cent azolla in each group T1, T2, T3 respectively The blood biochemical parameters investigated are viz., total plasma protein (TPP), albumin, globulin, blood urea nitrogen(BUN), Creatinine, Glucose and Cholesterol. The result found that TPP, albumin, globulin and cholesterol values were not influenced by dietary treatment BUN, creatinine, Glucose was significantly differ and azolla @ 3 per cent in the diet will not adverse effect on biochemical response of the broiler rabbits.*

INTRODUCTION

Rabbit contribute substantially to enhance the meat production by being prolific and it can turn 20 per cent of the proteins what they eat into edible meat, comparable figures for other species are 22 to 23 per cent in broiler chickens, 16 to 18 per cent in pigs and 8 to 12 per cent in beef. The shortage of fodder is therefore compensated with commercial feed, resulting in increased costs in meat production. Moreover, as commercial feed is mixed with urea and other artificial milk boosters, it has a negative effect on health of the livestock. The search for alternatives to concentrates led us to a wonderful plant azolla, which is natural protein source, holds the promise of providing an unconventional feed for livestock.

Azolla is waterborne blue green algae, mainly used as a biofertiliser in rice fields in many parts of the world. It is also being promoted as a feed supplement for livestock in many countries including India. Available reports indicate that Azolla is an economic and efficient feed supplement for livestock (Lumpkin, 1984; Pannaerker, 1988), Azolla is very rich in proteins, essential amino acids, as well as fibre, vitamins (vitamin A, vitamin B12 and Beta- Carotene), growth promoter intermediaries and minerals like calcium, phosphorous, potassium, ferrous, copper, magnesium etc.

Feeding of azolla in rabbit improves growth performance in terms of body weight, daily weight gain and feed conversion efficiency (Abou *et al* (2001), feed inake increase with increase of azolla (Abdella *et al* 1998). Biochemical components of blood are sensitive to toxicity in feeds and they can also be used to monitor protein quality of feeds. Hence, this study examines the effect of supplementary feeding of azolla on the biochemical profile of rabbits.

MATERIALS AND METHODS

The study was conducted at Department Livestock Production and Management, Veterinary College, Bengaluru. Karnataka, India. Thirty weaned broiler rabbits of 410 -420g comparable body weights were selected and were divided into three groups (T_1, T_2 and T_3). In each group comprised of ten rabbits (six males and four females). Rabbits were housed in individual cages. Each rabbit had free access to water provided through water droppers. The room, in which rabbits were housed was hygienically maintained. Before the start of the experiment, the animal house was fumigated and all the cages were sterilized using blow lamps. The feeder's bowls and water bowls were cleaned daily. Individual rabbits were identified by ear tagging method. Fresh air was circulated in the rabbit house by exhaust fans, ambient room temperature and relative humidity ranged from 21.7°C to 28.5^{0}C and 50% to 70%, respectively and 14 hours of light was maintained in the experimental rabbit house during the experiment. Three diets, T1, T2 and T3 were formulated from Soybean, Lucerne, Wheat bran, Maize, salt and mineral mixture to contain 0, 1.5, 3.0 sundried azolla (0, 30 and 60 per cent of fresh azolla) respectively. The ingredient was chopped and grind 1 to 2 mm size before it was incorporated in the concentrated mixture and estimated chemical composition of experimental diets are shown in Table 1 and Table 2.

Table. 1. Ingredient composition (kg) of experimental diet

Ingredients	Treatments		
	T1	T2	T3
Maize	40	40	40
Wheat bran	19	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	-	1.5	3
Total	100	100	100

Table 2. Chemical composition of experimental diets

Nutrients	Treatments		
	T1	T2	T3
CP (%)	18.3	17.9	17.5
CF (%)	9.872	9.355	9.3205

CP= crude protein, CF=Crude fibre

Volume : 6 | Issue : 10 | October 2016 | ISSN - 2249-555X | IF : 3.919 | IC Value : 74.50

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 each rabbit with sterile vials without EDTA from the ear vein in the morning time between 08:00 am and 09:00 am hours before rabbit's were accessed to feed. Vials without EDTA kept in slant position for 4 to 6 hours to separate out the serum by centrifuge at 3000 RPM for 30 minutes. TPP was measured in Goldberg's T.S. meter. Total cholesterol, creatinine and blood glucose using the calorimetric method and some amount of blood was transferred into vacutainer containing EDTA as anticoagulant at 5.4 mg after collection, the samples were transferred for analysis. Analysis was done by using auto analyzer PE-6800, Procan Electronics Inc., China. All data was subjected to analysis of variance (ANOVA) applicable to complete randomised designed by using GraphPad Prism version 5.1. when treatment effect was significant, Individual differences between the means were tested by using Tukey's Multiple Comparison Test.

RESULTS AND DISCUSSION

On proximate analysis the chemical composition of the azolla and the experiment diet used are presented in table 3.

Table 3: Chemical composition of Azolla and Experimental diets in (%)

NUTRIENTS	Azolla	TREATMENTS		
		T1	T2	T3
Dry matter	4.60	85.63	86.2	86.42
Organic matter	82.66	93.95	94.28	94.27
Crude Protein	22.48	17.56	17.97	18.24
Ether extract	4.50	2.28	2.26	1.84
Crude fibre	14.70	10.25	10.56	11.60
Total ash	17.34	6.05	5.72	5.73
NFE	40.98	63.86	63.49	62.59

Table 4: Average serum biochemical values of rabbits in treatment groups

Parameter	Treatment								
	T1 Mean± SE			T2 Mean± SE			T3 Mean± SE		
Creatinine(mg/dl)	0.77^{a}	±	0.012	0.85^{ab}	±	0.024	0.69^{ac}	±	0.046
Blood urea nitrogen(mg/dl)	16.70^{ac}	±	0.921	19.94^{b}	±	0.417	15.54^{c}	±	0.950
Glucose (mg/dl)	87.70^{a}	±	4.597	127.10^{b}	±	5.201	110.90^{c}	±	2.718
Cholesterol (mg/dl)	56.40	±	2.659	66.50	±	5.377	57.00	±	3.221
Total plasma protein(g/dl)	5.91	±	0.103	5.94	±	0.090	5.90	±	0.090
Albumin(g/dl)	3.70	±	0.053	3.71	±	0.027	3.69	±	0.055
Globulin (g/dl)	2.21	±	0.089	2.19	±	0.059	2.21	±	0.084
Albumin :Globulin	1.70	±	0.074	1.70	±	0.037	1.70	±	0.073

**Means bearing different superscripts in a row differ significantly (P<0.05)*

The cumulative Creatinine (mg/dl) were presented in Table 4 there was significant difference between T2 and T3 (P< 0.05)* and there is no significant between T1 and T2, T2 and T3, but Creatinine among the group was highly significant (P< 0.01)** . The results are in agreement with Abou (2001), the values were within the safety limits (0.5-2.6mg/dl). Non-significant difference was also observed by Reddy (2009) in Nellore sheep. Creatinine values were in the normal range and indicate activity of normal kidney function.

The Blood urea nitrogen (mg/dl) is presented in the Table 4. There was a significant difference between T1 and T2 (P< 0.05)* and T2 and T3 (P< 0.01)**. But there was no significant difference between the T1 and T3. But the BUN among the groups was significant difference (P<0.05)*,values recorded in all the three treatment groups were in the range of normal values (13-30mg/dl) which was reported by Sanderson and Philips (1981), Burke (1994) and Okerman (1994) and also non-significant difference was observed by Reddy (2009) in Nellore sheep. BUN in this study was significant differ between the group and the values were within the normal range in the lower limit. Hence, their metabolic profile is good, may be due to high quality of nitrogen present in their diet. This view supported by the presence of normal BUN levels among rabbit on different diets showing the renal sufficiency.

The Glucose (mg/dl) values fall under normal range of 75- 140mg/dl are presented in Table 4. There was significant difference between T1 and T2 (P<0.001)*** , T2 and T3(P<0.05)* and T3 and T1(P<0.01)**. Statistically there was highly significant difference (P <0.01)** between the treatment groups. Similar findings were observed by Reddy *et al.* (2009) in Nellore sheep.

The cumulative mean Total cholesterol (mg/dl) values were 56.40±2.659, 66.50±0.417 and 57.00±3.221 in T1, T2 and T3 respectively and was presented in Table 4.Statistically there was no significant difference (P >0.05) between the treatment groups. Similar result was observed in Nellore sheep (Reddy *et. al.,* 2009).The values obtained different group were similar to Gowda *et al* (1996), Kaagya *et. al* (2013) but lower than the value Terzungwe (2013) and Ahemen (2013), values were within the normal range and

Volume : 6 | Issue : 10 | October 2016 | ISSN - 2249-555X | IF : 3.919 | IC Value : 74.50

indicate of the active physiological status of thyroid.

Non significant difference were observed among the experimental groups of total plasma protein (g/dl), albumin, globulin were presented in Table 4 and falls within the normal range of 5-7.5g/dl, 2.5-4g/dl, 2.5-4g/dl respectively which was reported by Burke (1994). In contrary, Sadek (2010) and Abou 2001 reported that higher protein level in azolla silage group. Similar results were reported by Reddy *et al*. (2009) in Nellore sheep fed with azolla under intensive and semi intensive system The mean values obtained in the study were generally influenced by the quality and quantities of protein intake, serum albumin concentration gave long term measure of protein status of the diets and were indicative of non-stress factors and indicate nutritional adequacy of dietary protein.

CONCLUSION

The result of this study showed that azolla meal will support a normal blood profile and all the animals had normal metabolic profile Therefore, azolla meal can be conveniently used as good ingredient in feeding of rabbits up to the level of 3 per cent of dry azolla (60 per cent of fresh azolla)

REFERENCES

1. Abou, ZAE, Mohamed. FF, Radwan MSM (2001). Assessment of the nutritive value of dried azolla hay as a possible feed ingredient for growing NZW rabbits. Egyptian J. of Rabbit Sci.11 (1): 1-21.
2. Abdella MM, El-Sayaad GAE, Ghazal FM, EL-Baz TA (1998). Sundried Azolla as new feedstuff in growing rabbit diets. Egyptian J. of Rabbit Sci. **8** (2): 81-93
3. Ahemen T, Abu AH, Gbor V (2013). Haematological and serum biochemical parameters of rabbits fed varying dietary levels of water spinach (Ipomoea aquatica) leaf meal Pelagia Res. Lib.4(2) : 370-373
4. Burke J (1994). Clinical care and medicine of pet rabbit, in; Proceedings of the Michigan Veterinary Conference. pp 49-77
5. Gowda SK, Katiyar RC, Sharma AK, Sastry VRB (1996). Blood biochemical profile and histopathology of vital organs in rabbits fed on processed Neem (Azadirachiaindica) kernel cake incorporated in diets. AJAS 9: 471-476.
6. Kagya A JK, Nelson A, Kagya-Agyemang C (2013). Growth performance of weaner rabbits fed on dried pito mash as a replacement for maize. ARPN.J.of Agri. and Bio. Sci. 8(4).
7. Lumpkin TA (1984). Assessing the potential for Azolla use in the humid tropics. Int. Rice Commi. News. 33: 30- 33.
8. Okerman L (1994). Disease of domestic rabbits. Blackwell Scientific Publication. Oxford
9. Pannaerker S (1988). Azolla as a livestock and poultry feed. Livestock Adviser. 13: 22- 26
10. Reddy RY, Rao SK, Sudhakar K, Gupta RD, Prakash GM (2009). Biochemical profile of Nellore Sheep on feeding of azolla and sheanut cake under different management system.Indian J. of Small Ruminants.16(1):54-57.
11. Sadek MF, Fatma, Ahmed G, Hanan AM, Hassanein, Marvat M. Arafa, Elham M (2010). Using of azolla silage in growing rabbits feeding. Egypt. J. Rabbit Sci. 20 (2): 67-82.
12. Sanderson JH, and E Phillips (1981). An atlas of laboratory animal haematology clarendonpress oxford
13. Terzungwe Ahemen, Adakole H, Abu, Lois K, Iorgilim. (2013). Physiological responses of rabbits fed graded levels of Moringaoleifera leaf meal (MOLM): Some aspects of haematology and serum biochemistry Arch. Appl. Sci. Res. 5 (2):172-176