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Effect Of Berseem Supplemented diet on Hemato-Biochemical Parameters of Kadaknath Breeds

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ABSTRACT

Forages are an important source of cheaper feed and their role may be assessed from the fact that their feeding alone constitutes nearly 30% of the total cost of livestock production. Berseem (*Trifolium alexandrium*) is highly nutritious, highly palatable fodder and it contains 17% crude protein and 25.9% crude fiber on a dry matter basis. The total digestible nutrients content is 60-65% on a DM basis. The present was planned to evaluate the effect of Berseem supplemented on diet on hemato-biochemical parameters of Kadaknath breed. The experiment was conducted in the Department of Livestock production management, College of Veterinary Science and A.H., Rewa (M.P.). Day old, 72 straight run chicks were divided into three treatment groups, comprising three replicates and eight birds in each replicate.Hematological studies revealed that the mean value of RBC was significantly higher in G2 whereas Hb, PCV was significantly ($p<0.05$) higher in G3 followed by G2.While WBC, DLC, MCV, MCH were significantly higher in G3.The mean value of blood glucose was significantly higher in G2, while Total protein, Albumin and Globulin was significantly higher in G3 followed by G2.

INTRODUCTION

Poultry development in India has made impressive progress during the last three decades evolving from backyard ventures to a full-fledged commercial agro-industrial business mainly due to comprehensive research and development initiated by the Government and subsequently taken up by the organized private sector. Forages are an important source of cheaper feed and their role may be assessed from the fact that their feeding alone constitutes nearly 30% of the total cost of livestock production. Berseem and oats are grown during Rabi season to meet fodder needs in winter and cultivation of sorghum and maize are practiced to fulfill the summer and rainy season requirements. Berseem (*Trifolium alexandrium*) is highly nutritious, highly palatable fodder and it contains 17% crude protein and 25.9% crude fiber on a dry matter basis. The total digestible nutrients content is 60-65% on a DM basis.

Kadaknath is an important indigenous breed of poultry native of Jhabua and Dhar Districts of Madhya Pradesh. The Kadaknath birds have an appreciable degree of resistance to diseases compared with other exotic breeds of fowl in their natural habitat in free-range. Therefore, this study was focused on supplementing berseem on poultry feed typically involves identifying and illustrating the effects of conventional locally available grasses and how to use them efficiently to maximize poultry productivity and product (quality) as result to improve the livelihood of the society and also focused on hemato-biochemical traits .

MATERIALS AND METHODS

Management of Birds-

Day old, 72 straight run chicks were divided into three treatment groups, comprising three replicates and eight birds in each replicate. The chicks were wing banded, weighed individually, and distributed randomly on uniform body weight basis in the treatment groups. The birds were housed in deep litter system. The birds of the control group (G1) were fed a basal diet while the other group (G2) and (G3) were fed 5% and 10% of basal diet replaced by green berseem fodder on DM basis. The basal diet (Broiler chick ration) will be procured from market containing 23 % CP and ME 2800 Kcal/ Kg feed (BIS 2007). The birds were reared up to the attainment of the age at which control group attains 1.0 kg average live body weight.

Table 1: Experimental birds with dietary treatment

Group	Basal diet with Berseem
Group 1	fed a basal diet
Group 2	Basal diet and 5% Berseem replaced with basal diet
Group 3	Basal diet and 10% Berseem replaced with basal diet

Hematological Parameter

Blood (01 ml/bird) was drawn in sterile tuberculin syringe \ Normal 2ml syringe from wing vein puncture, posing minimum disturbance to the bird on day 0 and after every 14^{th} day at 10.00 A.M. in the morning . Immediately after collection the tubes were transported to the laboratory in ice for further processing. A part of blood sample was used for hematological studies (RBCs, WBCs, DLC, Hb, PCV, MCV, MCH, and MCHC).

Biochemical parameters

Serum was isolated from the blood sample collected after every 14 days of interval from 6 birds of each group in 3000 rpm 15 minutes. Biochemical parameters were Glucose, Total protein, Albumin, Globulin, A/G ratio and Cholesterol by using standard diagnostic kits.

STATISTICAL ANALYSIS

The recorded data obtained were analyzed by analysis of variance (Snedecor and Cochran, 1994) using SPSS software version 23 statistical package.

RESULT AND DISCUSSION

Haematological parameter

Hematological parameters of Kadaknath breed after Berseem supplemented diet is depicted with table no. 2. In the present study, the RBC value ((million/µl), the lowest and highest mean and standard error of RBC (million/µl) value in G_1, G_2 and G_3 was ranged from 1.72 ± 0.02 and 3.53 ± 0.11, 1.74 ± 0.01, 3.68 ± 0.06 and 1.71 ± 0.01, 1.70 ± 0.02 respectively. . In spite of, day 42, 56, 70 and 84, groups differ significantly ($p<0.05$) with highest value at each interval under group 2. In present study the value of RBC increases with increasing of age in different groups and this study is agreed by (Sjaastad *et al*., 2003) and Kundu *et al*.(1993).

Likewise, the present study revealed WBC (Thousand/µl) , the lowest and highest mean and standard error of WBC (Thousand/µl) value in G_1, G_2 and G_3 was ranged from 17.60 ± 0.12 and 28.70 ± 0.21, 17.61 ± 0.02, 24.27 ± 0.09 and 17.58 ± 0.02, 32.71 ± 0.23 respectively. WBC (Thousand/µl) value on day 28, 42, 56, 70 and 84th differ significantly ($p<0.05$) with highest value at each interval under G3 that was 23.16 ± 0.18, 42.54 ± 0.26, 72.12 ± 1.84, 28.42 ± 0.23 and 32.71 ± 0.23, respectively. Whereas, DLC (%) was significantly higher in G_3 followed by G_2 and G_1. In present investigation the value of WBC along with Differential leucocytes count (%) are significantly higher in group 3 followed by group 2 and group 1 similar to that of Alagbe (2017).

The haemoglobin value and PCV(%) differ non- significantly with group 2 when compared with control group. The highest value being obtained under group 1 upto 56 days that was 3.59 ± 0.09, 7.55 ± 0.19, 9.53 ± 0.19, 12.24 ± 0.10 and 13.78±0.25 which was gradually increases and group 3 on 70and 84 days that was 12.78±0.22 and 11.81±0.19 & 38.02±0.53 and 35.43±0.58 (PCV %). Likewise the value of Hb and PCV is significantly higher on day 84 and this study is agreed with Pandian *et al*. (2012).

The value of MCV(μ^3) and MCH(pg/cell) was non-significantly($P<0.05$) higher in G_3 thas was 208.33 ± 2.72 & 69.42 ± 0.89.While the value of MCHC (g/dl) differ non-significant ($P<0.05$) among all three groups. The mean value of MCV, MCH and MCHC was higher in group 3 followed by group 1 and group 2 recorded at last week of age in Kadaknth,and agree with Tehrani *et al*. (2012) , Khan *et al*. (2017) and Alagbe(2017).

Table 01: Hematological parameters of Kadaknath in different groups at biweekly interval

Parameter	n	Day old Mean ± SE	14 Day Mean ± SE	28 Day Mean ± SE	42 Day Mean ± SE	56 Day Mean ± SE	70 Day Mean ± SE	84 Day Mean ± SE
Hb (g/dl)	6	3.59±0.09^{aA}	7.55±0.19^{bA}	9.53±0.19^{cC}	12.24±0.10^{eC}	13.78±0.25^{deA}	12.53±0.18^{eB}	11.23±0.21^{dBC}
		3.36±0.07^{aA}	7.46±0.18^{bA}	8.37±0.19^{cA}	12.04±0.14^{eBC}	13.21±0.29^{A}	10.92±0.23^{dA}	8.88±0.18^{cA}
		3.39±0.07^{aA}	7.74±0.11^{bA}	9.31±0.33^{cBC}	11.84±0.08^{dB}	13.61±0.27^{A}	12.78±0.22^{eB}	11.81±0.19^{dC}
PCV (%)	6	10.67±0.28^{aA}	22.66±0.56^{bA}	28.58±0.57^{cC}	36.67±0.31^{eB}	41.33±0.76^{eA}	37.58±0.53^{eB}	33.68±0.62^{dBC}
		10.07±0.21^{aA}	22.27±0.47^{bA}	25.10±0.58^{cA}	36.13±0.42^{eB}	39.63±0.88^{A}	32.77±0.68^{dA}	26.64±0.55^{cA}
		10.17±0.22^{aA}	23.21±0.33^{bA}	27.91±1.00^{cBC}	35.53±0.23^{dB}	40.83±0.82^{eA}	38.02±0.53^{dB}	35.43±0.58^{dC}
MCHC (g/dl)	6	33.67±0.25^{aA}	33.33±0.00^{aA}	33.33±0.00^{aA}	33.38±0.05^{aA}	33.33±0.00^{aA}	33.33±0.00^{aA}	33.33±0.00^{aA}
		33.33±0.00^{aA}	33.46±0.13^{aA}	33.33±0.00^{aA}	33.33±0.00^{aA}	33.33±0.00^{aA}	33.33±0.00^{aA}	33.33±0.00^{aA}
		33.33±0.00^{aA}	33.33±0.00^{aA}	33.38±0.05^{aA}	33.33±0.00^{aA}	33.33±0.00^{aA}	33.62±0.29^{aA}	33.32±0.01^{aA}
RBC (million/ µl)	6	1.72±.02^{aA}	2.33±0.07^{bAB}	3.31±0.13^{dB}	3.14±0.15^{cC}	2.80±0.06^{bA}	3.83±0.17^{eB}	3.53±0.11^{eB}
		1.74±0.01^{aA}	2.44±0.09^{bB}	2.44±0.06^{bA}	2.33±0.04^{bA}	2.79±0.08^{cA}	4.14±0.13^{eB}	3.68±0.06^{dB}
		1.71±0.01^{aA}	2.15±0.02^{bA}	2.83±0.04^{eAB}	2.68±0.04^{deB}	2.56±0.12^{dA}	2.55±0.02^{dA}	1.70±0.02^{aA}
MCH (pg/cell)	6	20.80±0.36^{aA}	32.52±1.01^{bA}	29.01±0.90^{bA}	39.98±2.79^{dA}	49.32±0.95^{eA}	33.25±1.70^{bB}	32.10±1.35^{bB}
		19.33±0.43^{aA}	30.73±1.00^{cA}	34.26±0.27^{cB}	51.83±1.04^{eB}	47.67±1.51^{dA}	26.53±0.67^{bA}	24.18±0.65^{bA}
		19.81±0.41^{aA}	35.99±0.24^{bC}	32.89±0.81^{bAB}	44.29±0.61^{cA}	54.25±3.32^{dA}	50.19±0.96^{cdC}	69.42±0.89^{eC}
MCV (µ^3)	6	61.80±1.16^{aA}	97.57±3.03^{bA}	87.04±2.70^{bA}	119.78±8.40^{dA}	147.95±2.86^{eA}	99.75±5.10^{bB}	96.30±4.06^{bB}
		57.99±1.29^{aA}	91.81±2.86^{cA}	102.79±0.81^{cB}	155.50±3.13^{eB}	143.02±4.54^{dA}	79.59±2.02^{bA}	72.55±1.95^{bA}
		59.42±1.23^{aA}	107.98±0.73^{bC}	98.55±2.52^{bAB}	132.87±1.82^{cA}	162.75±9.96^{dA}	149.22±2.19^{cdC}	208.33±2.72^{eC}
WBC (thousand/µl)	6	17.60± 0.12^{aA}	19.96±0.07^{aA}	22.25±0.17^{aA}	42.63±0.46^{cA}	67.86±1.72^{dA}	21.70±2.71^{aA}	28.70±0.21^{bB}
		17.61±0.02^{aA}	20.46±0.023^{abA}	23.14±0.28^{bcB}	41.66±0.24^{dA}	70.17±2.27^{eA}	23.19±0.30^{bcA}	24.27±0.09^{cA}
		17.58±0.02^{aA}	22.44±0.16^{bB}	23.16±0.18^{bB}	42.54±0.26^{eA}	72.12±1.84^{A}	28.42±0.23^{cA}	32.71±0.23^{dC}
Heterophil (%)	6	25.04±0.06^{aA}	25.72±0.13^{aA}	27.42±0.19^{bB}	31.92±0.18^{cA}	36.06±0.47^{eB}	33.84±0.30^{dA}	35.82±0.21^{eA}
		25.04±0.00^{aA}	26.34±0.11^{bB}	32.63±0.43^{cC}	34.24±0.08^{dB}	35.72±0.28^{eB}	40.33±0.20 ^{fB}	41.08±0.23 ^{fB}
		25.05±0.01^{aA}	27.22±0.25^{bC}	26.35±0.11^{abA}	32.59±0.28^{cA}	33.79±0.61^{cA}	45.79±0.52^{dC}	46.70±0.44^{dC}
Eiosinophil (%)	6	0.67±0.01^{aA}	0.85±0.01^{bA}	1.85±0.01^{cB}	2.06±0.02^{d}	2.23±0.09^{eC}	1.82±0.02^{cA}	2.08±0.04^{deA}
		0.65±0.01^{aA}	0.83±0.01^{bA}	1.65±0.01^{cA}	1.84±0.01^{dC}	2.14±0.09^{eC}	2.07±0.01^{eB}	2.16±0.01^{eA}
		0.65±0.01^{aA}	0.83±0.01^{aA}	1.55±0.08^{bA}	1.64±0.01^{bB}	1.51±0.06^{bB}	2.04±0.03^{cB}	2.39±0.11^{dB}
Basophil (%)	6	0.34±0.01^{aA}	0.64±0.01^{bAB}	1.75±0.01^{cB}	2.16±0.01^{eD}	1.90±0.08^{dAB}	1.81±0.02^{cdA}	2.12±0.04^{eA}
		0.45±0.04^{aB}	0.66±0.01^{bB}	1.63±0.03^{cA}	1.84±0.02^{dC}	2.12±0.10^{eB}	1.78±0.01^{cdA}	2.07±0.02^{eA}
		0.34±0.01^{aA}	0.64±0.01^{bAB}	1.65±0.01^{cA}	1.65±0.01^{cB}	2.05±0.12^{dB}	2.96±0.11^{eB}	3.24±0.03 ^{fB}
Monocyte (%)	6	0.53±0.01^{aA}	1.34±0.01^{bB}	2.33±0.01^{cB}	4.25±0.01^{eC}	6.89±0.46^{eA}	2.76±0.02^{cdA}	3.10±0.01^{dA}
		0.53±0.01^{aA}	1.33±0.01^{aB}	2.32±0.05^{bcdB}	2.14±0.01^{bcA}	4.13±0.62^{eA}	3.09±0.01^{cdB}	3.17±0.01^{deA}
		0.54±0.01^{aA}	1.34±0.01^{bB}	2.14±0.01^{cA}	4.64±0.03^{D}	7.91±0.41^{B}	3.19±0.02^{dC}	3.33±0.08^{dB}
Lypmphocyte (%)	6	41.24±0.20^{aA}	46.16±0.25^{bAB}	49.35±0.22^{cA}	58.76±0.28^{dC}	65.26±0.57^{eAB}	57.98±0.18^{dA}	60.35±0.41^{eA}
		41.50±0.27^{aA}	45.93±0.09^{bA}	54.05±0.41^{cB}	59.36±0.15^{dC}	63.39±1.17^{eA}	67.36±0.18 ^{fB}	68.66±0.24 ^{fB}
		40.85±0.23^{aA}	46.76±0.22^{bB}	54.65±0.26^{cBC}	56.13±0.51^{cB}	67.23±0.29^{dB}	70.38±0.57^{eC}	74.13±0.22 ^{fC}

*G1 = Control, G2= 5% Berseem level and G3 = 10% Berseem level

* Significant different on ($p<0.05$) a, b, c indicate interval wise significant, A, B, C indicate group wise significant

Biochemical parameter

Biochemical parameters of Kadaknath breed after Berseem supplemented diet is depicted with table no. 3. The blood glucose value (mg/dl) on day 0, 28, 42, 70 and 84 day are found significantly differ ($p<0.05$) at each interval with highest value are found in group 2 that was 134.08± 0.47 and 144.91± 0.26 and group 3 that was 116.06 ± 0.16, 149.04 ± 0.17 and 150.28 ± 0.44, respectively. In our study, the mean value of blood glucose was significantly higher in group 3 followed by group 2 and group 1 at each interval after grouping randomly. Present finding is agreed by Barik *et al*. (2018) reported serum glucose was lower in group 1.

Total protein (g/dl) and Albumin(g/dl) were significantly ($p<0.05$) higher in group 2 and 3 shows increasing trend with increasing age. Total protein (g/dl) value on day 28, 42, 56, 70 and 84 day are found significantly differ ($p<0.05$) at each interval with highest value are found in group 3 and lowest value are found in group 1 whereas in Albumin, the mean and standard error of albumin (g/dl) value on day 42, 56 and 84 day are found significantly differ at each interval with highest value are found in group 3 and lowest value are found in group 1. The highest value of total protein and albumin in group 2 and group 3 were 4.70±0.03, 2.32 ± 0.02 and 4.80±0.01, 2.53 ± 0.01 respectively. Likewise, the globulin (g/dl) value increases in group 1 as increases with age and similar trend is follow in group 2 and group 3 with significantly ($p<0.05$) higher value was obtained in group 1 that was 2.54 ± 0.01.This finding is not similar with Silva *et al*. (2007) reported that there was no influence of total protein with age. While the value of albumin and A:G ratio in our investigation is significantly higher ($p<0.05$) in group 3 followed by group 2 and group 1.

The cholesterol (mg/dl) value in day 70 and 84 are differ significantly in all three groups with higher value was obtained in group 1 that was 107.27±0.20 while difference in between group 1, group 2 and group 3 on day 0, 14, 28, 42 and 56 are non- significant. Along with the mean value of cholesterol is significantly higher ($p<0.05$) in group 1 that was 107.27 ± 0.20 mg/dl at 84 day of age. In contrast to that of Silva *et al*. (2007) and Barik *et al*. (2018).

Table 02: Biochemical parameters of Kadaknath in different groups at biweekly interval

Parameter	n	Group	Day old Mean ± SE	14 Day Mean ± SE	28 Day Mean ± SE	42 Day Mean ± SE	56 Day Mean ± SE	70 Day Mean ± SE	84 Day Mean ± SE
Blood Glucose	25	1	113.57 ±0.49^{aA}	121.29 ±0.23^{bc} ^{AB}	122.45 ±1.47^{cA}	121.87 ±1.12^{ca} ^{A}	146.05 ±0.34^{eB}	121.29 ±0.25^{bc} ^{A}	119.90 ±0.32^{bA}

(mg/dl)		2	115.78 ±0.16^{aB}	122.48 ±0.10^{bC}	134.08 ±0.47^{cC}	144.91 ±0.26^{dC}	145.20 ±0.14^{dB}	146.98 ±0.17^{dC}	147.53 ±0.44^{dB}
		3	116.06 ±0.16^{aB}	114.38 ±1.08^{aA}	131.15 ±0.47^{bC}	140.87 ±0.26^{cB}	140.11 ±0.14^{cA}	149.04 ±0.17^{dD}	150.28 ±0.44^{dC}
Total protein (g/dl)	25	1	2.92±0.10^{aA}	3.64±0.01^{cC}	3.11±0.00^{bA}	3.23±0.01^{bA}	4.71±0.01^{eD}	3.65±0.01^{cA}	3.84±0.01^{dA}
		2	3.11±0.01^{bA}	3.03±0.01^{aA}	4.03±0.01^{cB}	4.39±0.02^{eB}	4.22±0.02^{dB}	4.63±0.01 ^{fB}	4.70±0.03 ^{fB}
		3	3.11±0.01^{aA}	3.25±0.03^{bB}	4.41±0.01^{cD}	4.57±0.01^{dD}	4.37±0.02^{cC}	4.65±0.01^{eB}	4.80±0.01 ^{fC}
Albumin (g/dl)	25	1	1.5±0.01^{aA}	2.04±0.01^{bB}	2.12±0.01^{cB}	2.32±0.01^{dB}	2.84±0.02 ^{fC}	2.70±0.02^{eB}	2.33±0.02^{dA}
		2	1.48±0.01^{aA}	2.07±0.01^{bB}	2.11±0.01^{bB}	2.43±0.01^{eC}	2.27±0.06^{cA}	2.31±0.01^{cdA}	2.4±0.01^{deB}
		3	1.50±0.01^{aA}	1.96±0.01^{bA}	2.03±0.02^{cA}	2.11±0.00^{dA}	2.52±0.02^{eB}	2.70±0.01 ^{fB}	2.53±0.01^{eC}
Globulin (g/dl)	25	1	1.51±0.01^{aB}	1.60±0.01^{bA}	1.92±0.01^{cC}	2.09±0.01^{dB}	2.29±0.02^{eD}	2.47±0.01 ^{fC}	2.54±0.01 ^{fB}
		2	1.50±0.01^{aB}	1.57±0.02^{aA}	1.81±0.02^{bB}	2.06±0.02^{cAB}	2.12±0.01^{cC}	2.29±0.01^{dB}	2.32±0.02^{dA}
		3	1.40±0.01^{aA}	1.58±0.02^{bA}	1.76±0.02^{cAB}	2.04±0.01^{dA}	2.00±0.03^{dB}	2.26±0.02^{eAB}	2.30±0.02^{eA}
A:G Ratio	25	1	0.99±0.01^{bA}	1.27±0.01^{dC}	1.11±0.01^{cA}	1.11±0.01^{cB}	1.24±0.01^{dC}	1.09±0.01^{cB}	0.92±0.01^{aA}
		2	0.99±0.01^{aA}	1.32±0.02^{dBC}	1.17±0.01^{cB}	1.18±0.01^{cC}	1.07±0.03^{bA}	1.01±0.00^{abA}	1.04±0.01^{abB}
		3	1.08±0.02^{abB}	1.24±0.02^{eA}	1.15±0.01^{cdAB}	1.03±0.01^{aA}	1.26±0.02^{eC}	1.20±0.01^{dC}	1.10±0.01^{bcC}
Cholesterol (mg/dl)	25	1	45.70± 0.25^{aA}	80.93± 0.21^{bA}	86.42± 0.19^{cA}	90.71± 0.16^{dA}	101.11 ±0.01^{eC}	102.81 ±0.11 ^{fB}	107.27 ±0.20 ^{fC}
		2	47.95± 0.18^{aB}	81.13± 0.20^{bA}	86.15± 0.26^{cA}	91.49± 0.22^{dA}	101.25 ±0.35 ^{fC}	95.50± 1.01^{eA}	101.25 ±0.13 ^{fA}
		3	45.05± 0.38^{aA}	80.65± 0.29^{bA}	86.73± 0.29^{cA}	92.72± 0.23^{eB}	88.08± 0.42^{dA}	96.38± 0.18 ^{fA}	102.22 ±0.19 ^{gB}

*G1 = Control, G2= 5% Berseem level and G3 = 10% Berseem level

* Significant different on ($p<0.05$) a, b, c indicate interval wise significant, A, B, C indicate group wise significant

CONCLUSION

From the experiment, it can be achieved that G_2 (5% Berseem level) is better than G_3 (10% Berseem level).There was significantly higher hemato-biochemical values in G_2 followed by G_3 .

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