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Study on effect of feeding *Moringa oleifera* Leaf powder on haemato-biochemical profile of growing female black Bengal goat under intensive system of management

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Abstract

The present research work was designed to evaluate the Age and weight at attainment of sexual maturity of growing female Black Bengal goat under Intensive system of management by using the four different concentration of *Moringa oleifera* leaf powder (0%, 10%, 15% and 20%) by weight basis in feed. 4 to 5 months old goats having 6-8 kg body weight were selected for trial. Different combinations of feed were offered to them for a period upto 9 months of age. The investigation of above research work showed that Under Intensive system of management the mean value of most the haemato-biochemicals parameters were found to be differ non-significantly. The average values of haematobio-chemical profiles viz. Hb%, TLC($\times 10^3 \mu\text{L}$), Neutrophil(%), Eosinophil (%), Lymphocyte(%), Monocyte(%), ALT(IU/L), AST(IU/L), Total Protein (gm), Blood urea(mg/dl) were ranged from 9.83 ± 1.16 to 12 ± 0.99 , 5.7 ± 0.15 to 6.17 ± 0.27 , 36 ± 2.51 to 50 ± 3.99 , 2.33 ± 0.33 to 4.67 ± 0.33 , 42.67 ± 3.71 to 56.67 ± 3.28 , 3 ± 0 to 4.67 ± 0.33 , 21.67 ± 4.54 to 31.27 ± 14.37 , 27.87 ± 1.17 to 35.6 ± 8.08 , 21.67 ± 5.66 to 30 ± 4.04 , 7.5 ± 0.28 to 7.83 ± 0.12 . The present findings on lower levels of ALT and AST were due to hepatoprotective nature of MOLP, as the liver is supposed to release ALT and AST when it get damaged.

Keywords: *Moringa oleifera* leaf powder (MOLP), Black Bengal goat, haemato-biochemical profile

Introduction

Goat farming is one of the most important components of the livestock sector in India, particularly for small, marginal, and landless farmers. Goats are often termed as the “poor man’s cow” due to their low input requirement, high adaptability, and quick returns. Key Characteristics includes Multipurpose animal (meat, milk, skin, manure) High reproductive efficiency (twins/triplets common) Adaptability to harsh climatic conditions Suitable for extensive, semi-intensive, and intensive systems

India possesses one of the largest goat populations in the world (~148-150 million as per recent estimates). Goat population has shown steady growth (~10% increase between 2012-2019 livestock census). Major goat-producing states: Uttar Pradesh, Rajasthan, West Bengal, Bihar, and Jharkhand. In Jharkhand the Goat population is about 9.1 million (2019 census) And Growth rate approx 38.59% increase in last 5 years, one of the highest in India. There is a dominance of Black Bengal goat (high prolificacy and superior meat quality) in Jharkhand state. The reasons behind this rapid growth indicates Increasing dependence of tribal and rural households on goats as well as Expansion of goat-based livelihood systems.

Role of Goat Farming in Livelihood Promotion involves Provides regular income and financial security, Acts as a “living bank” for farmers, Generates employment in Rearing, Trading, Processing etc. Goat farming significantly contributes to Poverty alleviation, Nutritional security, Women empowerment etc.

Moringa (*Moringa oleifera*) “The Miracle Tree” commonly called as Munga or Sahjan has several advantages on feeding to the goats. Nutritional Importance of Feeding *Moringa* in Goats are mainly due to Rich in Protein (20-30%) Vitamins (A, C, E), Minerals (Ca, Fe), Highly digestible and palatable.

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It Enhances Growth performance, Milk yield and composition, Boosts Immunity and disease resistance Advantages of Moringa-Based Feeding Reduces feed cost, Improves feed conversion efficiency, Boosts growth rate in kids, Enhances reproductive performance, Acts as natural antioxidant and anti-parasitic. Goat farming is a highly viable and sustainable enterprise in India, especially in Jharkhand where it plays a crucial role in tribal livelihoods and rural economy. The incorporation of *Moringa oleifera* as a feed resource presents a promising strategy to enhance productivity, reduce feeding costs, and improve overall herd health.

Materials and Methods

Experimental animal and feeding management

Twenty four (24) growing female Black Bengal goats selected from the herd at the instructional ruminant farm of RVC, Kanke were used in this study. Average age were 4 to 5 month old and were maintained under intensive system of management. Standard feeding and watering facility were provided.

Experimental procedure and design

The four experimental treatments were: T₁ = 100 % concentrate mixture + 0% MOLP, T₂ = 90% concentrate mixture + 10% MOLP, T₃ = 85 %, concentrate mixture + 15% MOLP, T₄ = 80% concentrate mixture + 20% MOLP. Mixture feed were offered twice daily @ 3.5% of body weight on dry matter basis. Provision of adequate green fodder were done at stall through out the experimental period. Before the start and after the completion of feeding trial, haematological and biochemical studies were conducted. In this trial the Haemoglobin (Hb g%), TLC, DLC, blood urea, ALT, AST and total serum protein level were estimated. The duration of the feeding trial were of 120 days.

Statistical analysis

Data obtained after experiment were analyzed by using IBM SPSS (Statistical Package for the Social Sciences) statistics software.

Results and Discussion

Haemato-biochemical studies

The average values of haematobio-chemical profiles viz. Hb%, TLC($\times 10^3 \mu\text{L}$), Lymphocyte(%), Neutrophil(%), Eisonophil(%), Monocyte(%), Basophil(%), ALT(IU/L), AST(IU/L), Total Protein (gm), Blood urea(mg/dl) of Black Bengal goat raised with or without MOLP under Intensive of management are presented in (Table 1) and are depicted graphically in (Fig. 1)

Under Intensive system of management the mean value of most the haemato-biochemicals parameters were found to be differ non-significantly. The average values of haematobio-chemical profiles viz. Hb%, TLC($\times 10^3 \mu\text{L}$), Neutrophil(%), Eisonophil(%), Lymphocyte(%), Monocyte(%), ALT(IU/L), AST(IU/L), Total Protein (gm), Blood urea(mg/dl) were ranged from 9.83 ± 1.16 to 12 ± 0.99 , 5.7 ± 0.15 to 6.17 ± 0.27 , 36 ± 2.51 to 50 ± 3.99 , 2.33 ± 0.33 to 4.67 ± 0.33 , 42.67 ± 3.71 to 56.67 ± 3.28 , 3 ± 0 to 4.67 ± 0.33 , 21.67 ± 4.54 to 31.27 ± 14.37 , 27.87 ± 1.17 to 35.6 ± 8.08 , 21.67 ± 5.66 to 30 ± 4.04 , 7.5 ± 0.28 to 7.83 ± 0.12 .

The observations made by Asaulo *et al.* (2012) [2] as well as Bebekar and Bdalbagi (2015) [8] who reported significantly higher values of HB% in goats fed with Moring Multi-Nutrient Block and moringa leaves, respectively in their ration are not in agreement with present findings. The observations of total protein indicated comparable values and no significant effect of dietary treatment was seen on the serum total protein in experimental goats in either group. The observed levels of serum total protein in all the groups were in normal range as cited by Kaneko *et al.* (1997) [9]. But the results are not in tune with Bebekar and Bdalbagi, (2015) [8] with significantly higher level of total protein, when fed moringa leaves at different levels in the ration of goats. However, Divya *et al.* (2014) [6] reported significant decrease in total protein level in broiler chicken, when moringa leaves were fed at 1.5% which cannot be compared with the present findings.

The present findings are in agreement with report of Damor *et al.* (2017) [10], who observed non-significant difference in SGPT values in Mehsana goat kids fed on moringa leaves by replacing concentrate mixture at the rate of 0%, 50% and 100%.

The AST values are in normal range (Kaneko *et al.*, 1997) [9] which means that there is no adverse effect on liver function in goats fed MOLM containing concentrate mixture. Damor *et al.* (2017) [10] reported significantly ($p < 0.05$) high values of SGOT in Mehsana goats *M. oleifera* leaves, which is not in agreement with findings in present study.

The findings of the present study with regard to DLC were in agreement with Bebekar and Bdalbagi, (2015) [8] who reported no significant difference in the DLC values of blood.

The present findings were not in agreement with Bebekar and Bdalbagi, (2015) [8] and Asaulo *et al.* (2012) [2] who reported significant difference in the values of TLC due to dietary inclusion of *M. oleifera* in goat diet.

The present findings on lower levels of ALT and AST were due to hepatoprotective nature of MOLP, as the liver is supposed to release ALT and AST when it get damaged.

Table 1: Effect of MOLP on Haemato-biochemical profiles under intensive system of management

Parameters / Treatment	Hb%	TLC ($\times 10^3 \mu\text{L}$)	Lymphocyte (%)	Neutrophil (%)	Eisonophil (%)	Monocyte (%)	Basophil (%)	ALT (IU/L)	AST (IU/L)	Total protein (mg/dl)	Blood urea (mg/dl)
Pre treatment	10.17 ± 1.01	5.83 ± 0.20	49.67 ± 2.60	41.67 ± 2.02	4.00 ± 0.57	4.33 ± 1.20	0.33 ± 0.33	$7.63 \pm 0.31a$	$246.67 \pm 10.1b$	7.50 ± 0.28	13.37 ± 0.13
T ₀	9.83 ± 1.16	5.87 ± 0.17	50.00 ± 0.57	42.67 ± 0.33	2.33 ± 0.33	4.67 ± 0.33	0.33 ± 0.33	$12.97 \pm 0.57b$	$222.67 \pm 0.88b$	7.70 ± 0.25	13.27 ± 0.35
T ₁	12.00 ± 1.0	6.20 ± 0.11	52.00 ± 2.51	42.33 ± 1.85	2.33 ± 0.33	3.00 ± 0.00	0.33 ± 0.33	$7.60 \pm 0.55a$	$163.33 \pm 4.67a$	7.57 ± 0.23	12.53 ± 0.14
T ₂	10.33 ± 1.33	6.13 ± 0.40	53.00 ± 2.51	39.67 ± 2.84	2.67 ± 0.33	4.33 ± 0.88	0.33 ± 0.33	$6.97 \pm 0.73a$	$168.33 \pm 3.18a$	7.83 ± 0.12	12.90 ± 0.15
T ₃	11.50 ± 0.7	5.80 ± 0.58	56.67 ± 3.28	36.00 ± 2.51	2.33 ± 0.33	4.67 ± 1.76	0.33 ± 0.33	$6.47 \pm 0.64a$	$164.33 \pm 7.88a$	7.63 ± 0.1	12.63 ± 0.1

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F VALUE	0.756NS	0.680NS	1.304NS	1.716NS	3.357NS	0.439NS	0.000	20.624**	38.410**	0.329NS	3.307NS

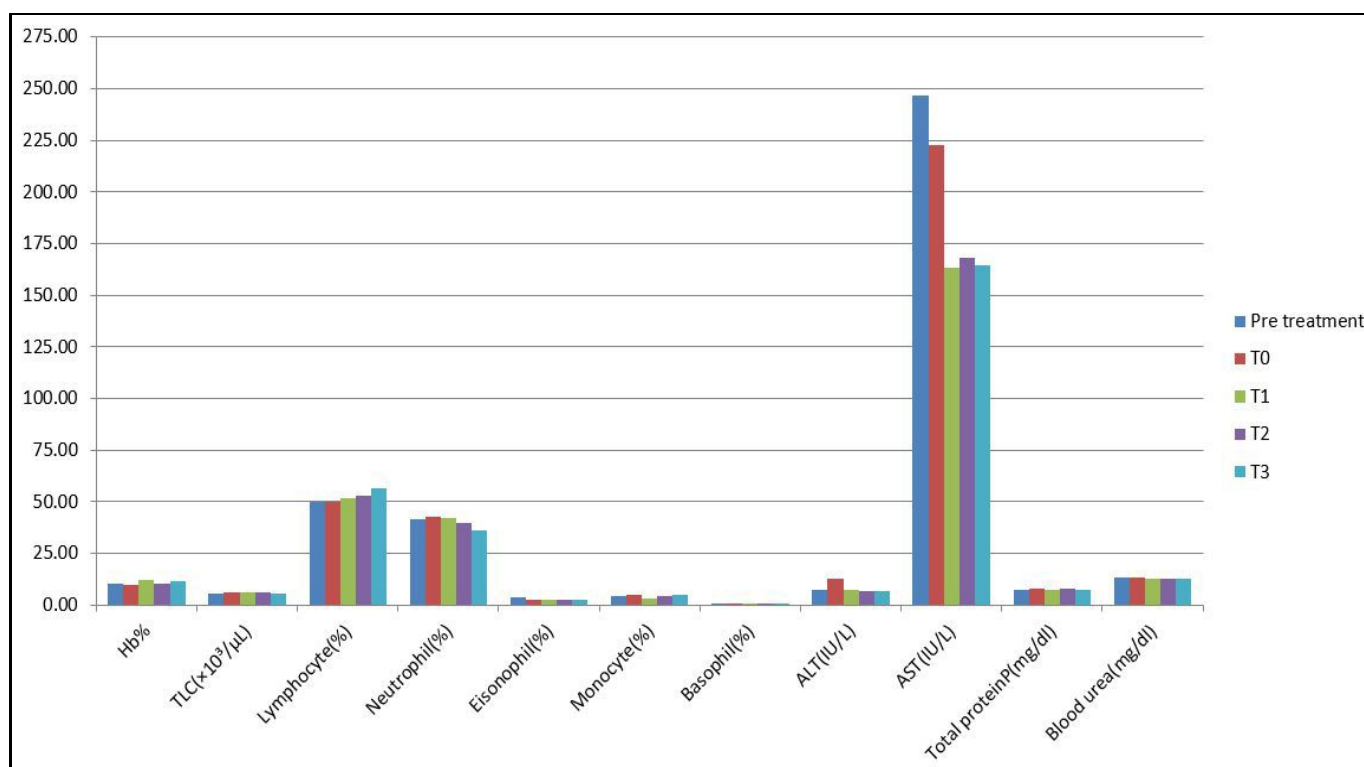


Fig 1: Effect of MOLP on Haemato-biochemical profiles under intensive system

Table 2: Chemical composition of MOLP

Constituents	Amount (per 100 g)
Moisture	9
Protein	28.65
Lipid	7.09
Ash	10.9
Carbohydrate	44.36
Calcium(mg)	2.97
Magnesium(mg)	1.9
Zinc	1.58

Table 3: Types of feed offered to the experimental goat

Ingredients	Control Ration (CP% = 18.1)	Treatment Ration 1 (CP% = 18)	Treatment Ration 2 (CP% = 18.2)	Treatment Ration 3 (CP% = 18.1)
Yellow Maize (%)	44	44	44	44
Soyabean Cake (%)	20	16	14	11
Wheat Bran (%)	33	27	26	27
MOLP (%)	0	10	15	20
Min.Mix (%)	2	2	2	2
Coccidiostat	0.50	0.50	0.50	0.50
Salt (%)	0.50	0.50	0.50	0.50

Conclusion

The present findings on lower levels of ALT and AST were due to hepatoprotective nature of MOLP, as the liver is supposed to release ALT and AST when it get damaged.

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