The Pharma Innovation Journal 2022; SP-11(3): 522-524

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(3): 522-524

www.thepharmajournal.com
Received: 16-01-2022
Accepted: 20-02-2022

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Effect of feeding *Moringa oleifera* leaf powder on haemato-biochemical profile of growing female black Bengal goat under semi-intensive system of management

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Abstract
The goal of this study was to determine the haemato-biochemical profile of a growing female Black Bengal goat utilising four different concentrations of *Moringa oleifera* leaf powder in diet (0%, 10%, 15%, and 20% by weight). Twenty-four 4 to 5 month old goats weighing 6-8 kg were obtained and randomly placed into four experimental groups following a 10-day adjustment period. For a period of up to 9 months, several combinations of feed were provided to them. The average values of haematobio-chemical profiles *viz*. Hb %, TLC ($\times 10^3$ µL), Neutrophil (%), Eisonophil (%), Lymphocyte (%), Monocyte (%), ALT(IU/L), AST(IU/L), Total Protein (gm), Blood urea(mg/dl) were ranged from 9.67±0.88 to 12.33±0.88, 5.77±0.29 to 7.47±0.54, 29.33±5.78 to 43.33±6.06, 1.67±0.33 to 3.33±0.88, 52.33±1.85 to 64±5.03, 3.67±0.66 to 5±0.57, 15.97±2.89 to 55.67±2.33, 32.2±0.91 to 74.2±8.74, 33.8±1.56 to 43±9.50, 7.13±0.24 to 8.07±0.40.
The reported Plasma AST and ALT decreased with all levels of MOLP. Because the liver is said to contain enzymes like ALT and AST, when it is injured, it releases these enzymes into the bloodstream. As a result, the lack of significant variations in plasma AST between treatment diets in the current investigation may reflect normal liver function in goats fed MOLP-containing diets. Although the decrease in ALT activity reported in goats fed MOLP at various doses could indicate that MOLP has hepatoprotective effects.

Keywords: *Moringa oleifera* leaf powder (MOLP), black Bengal goat, growth performance

Introduction
Goat farming is important in the rural economy because it helps to supplement the income of rural households, especially landless, marginal, and small farmers. The goat is known as the poor man's cow because it may be profitably reared with little investment using various management strategies. Because of their short generation intervals, high rate of prolificacy, and ability to produce related items, they provide a speedy return. The value of goats is demonstrated by their different functional contributions, such as milk, meat, and skin, as well as their socioeconomic significance, security, income production, human nutrition, and farming system stability. Goats are the lifeblood of the rural economy in our country's dry, semi-arid, and hilly regions. Poor farmers and troubled women primarily rear goats with little capital investment (FAO, 1991).
They provide a substantial contribution to the Indian economy by supporting and supplementing the income of small farmers and rural impoverished people. According to the 19th census of 2012, India contributes roughly 135.17 million goats to the world's goat population, placing it in second place. Goats account for around 26.4 percent of India's overall animal population, with Jharkhand contributing 4.87 percent with a goat population of 65, 81, 449.
The black Bengal goat, *Capra hircus* bengalensis, is the most popular meat-producing indigenous breed of goat in India, owned by small farmers and landless labourers. Domestication of Indian goats began 10000 years ago, according to evidence from population structure and unique lineage (Manjunath B. *et al*.).
Its natural habitat is the sunderban region of West Bengal, where typical animals with unique characteristics such as black Bengal goats can be found. It is found in Jharkhand, sections of Orissa, Assam, and Bangladesh, among other places.

This breed makes a significant contribution, notably in India's eastern region.

As a meat animal, the growth performance of the black Bengal goat is a top priority to produce maximum output from the goat sector.

As a result, in order to increase overall meat output in Jharkhand, improving the growth performance of black Bengal goats is critical in the current situation.

Furthermore, due to a shortage of good quality pasture and enriched nutritional supplement, the performance of black Bengal goats in Jharkhand is poor. As a result, nutritional additions can boost the black Bengal goat's production performance, resulting in higher production yields. Furthermore, due to a shortage of good quality pasture and enriched nutritional supplement, the performance of black Bengal goats in Jharkhand is poor. As a result, nutritional additions can boost the black Bengal goat's production performance, resulting in higher production yields

Location

The research was carried out at Ranchi Veterinary College's (RVC) instructional small ruminant farm in Kanke, Ranchi.

Management of experimental animals and feeding

In this study, twenty-four (24) growing black Bengal (bb) female goats were chosen from the herd at RVC, instructional kanke's ruminant farm. They were 4-5 months old and weighed 6-8 pounds on average. Before the experiment began, all goats were given an antihelminthic treatment (albendazole @10 mg/kg body weight) to guarantee that they were clear of intestinal worms.

Individual feeders and water buckets were provided for the goats, who were maintained in 1.75sqm (1.75 m 1.0 m) pens under a semi-intensive management system. The goats were given a 10-day acclimatisation period before being gradually exposed to the experimental diets.

Dietary experimentation

Moringa oleifera leaf powder was acquired from a local market and tested for proximate principles before being used in the experiment. The concentrate mixture was taken from the b.p.d unit, RVC, Kanke. Green fodder was fed ad libitum to goats managed in a semi-intensive method.

Procedure and design of the experiment

A total of twenty-four (24) female goats aged four to five months were assigned.

All of the goats were divided into four groups, each with six animals. T1 = 100 percent concentrate mixture + 0 percent MOLP; T2 = 100 percent concentrate mixture + 0 percent MOLP; T3 = 100 percent concentrate mixture + 0 percent MOLP; T4 = T2 = 90% concentrate mixture + 10% MOLP, T3 = 85% concentrate mixture + 15% MOLP, and T4 = 80% concentrate mixture + 20% MOLP. On a dry matter basis, the mixture feed was administered twice daily at 3.5 percent of b.wt. The feed was delivered twice a day, between 8:30 a.m. and 15:00 p.m. Before offering the feed, the feeders and water buckets were cleaned on a daily basis. The feeding trial lasted a total of 120 days.

Materials and Procedures

Blood samples were taken before the start of the experiment and after the 120-day feeding trial for all treatment groups.

The results of the experiment were examined using the conventional statistical methods given by Snedecor and Cochran (2004)1, utilising IBM SPSS (Statistical Package for the Social Sciences) statistics software and one way ANOVA.

Result and Discussion

The average values of haematobio-chemical profiles *viz*. Hb %, TLC($\times^{103}$ µL), 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 Semi-intensive system of management were taken. Under Semi-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($\times^{103}$ µL), Neutrophil(%), Eisonophil (%), Lymphocyte (%), Monocyte (%), ALT (IU/L), AST (IU/L), Total Protein (gm), Blood urea(mg/dl) were ranged from 9.67±0.88 to 12.33±0.88, 5.77±0.29 to 7.47±0.54, 29.33±5.78 to 43.33±6.06, 1.67±0.33 to 3.33±0.88, 52.33±1.85 to 64±5.03, 3.67±0.66 to 5±0.57, 15.97±2.89 to 55.67±2.33, 32.2±0.91 to 74.2±8.74, 33.8±1.56 to 43±9.50, 7.13±0.24 to 8.07±0.40.

The findings of Asaulo*et al*. (2012) [2] and Bebekar and Bdalbagi (2015) [3], who found significantly greater HB percent in goats fed Moring Multi-Nutrient Block and moringa leaves, respectively, in their rations, contradict the current findings.

According to Kaneko *et al*. (1997) [4], all of the groups' serum total protein levels were within normal limits.

However, the findings differ from those of Bebekar and Bdalbagi (2015) [3], who found a significantly greater amount of total protein when goats were fed moringa leaves at various levels in their ration. However, when moringa leaves were fed at 1.5 percent to broiler chickens, Divya*et al*. (2014) [5] showed a significant drop in total protein levels, which cannot be compared to the current data.

The current findings are consistent with those of Damo *et al*. (2017) [5], who found no significant differences in SGPT values in Mehsana goat offspring fed moringa leaves when concentrate mixture was replaced at a rate of 0%, 50%, or 100%.

The AST readings in goats fed MOLM containing concentrate mixture are within normal range (Kaneko *et al*., 1997) [6], indicating that there is no deleterious effect on liver function. Damor *et al*. (2017) [5] found significantly (P0.05) elevated SGOT levels in Mehsana goats M. oleifera leaves, which contradicts the results of this investigation.

Table 1: Effect of molp on haemato-biochemical profiles under semi-intensive system of management

Parameters/ Treatment	Hb %	TLC (×10³/µL)	Lymphocyte (%)	Neutrophil (%)	Eisonophil (%)	Monocyte (%)	Basophil (%)	ALT (IU/L)	AST (IU/L)	Total protein (mg/dl)	Blood urea (mg/dl)
Pre treatment	10.83±0.72	6.07±0.40	52.33±1.85	40.00±2.88	3.33±0.88	3.67±0.66	0.67±0.33	7.43±0.31a	266.67±11.97b	7.47±0.24	13.60±0.11
T0	9.67±0.88	5.83±0.20	48.33±5.78	43.33±6.06	3.00±0.57	5.00±0.57	0.33±0.33	12.93±0.48b	251.00±9.07b	7.13±0.24	13.57±0.37
T1	12.33±0.88	6.57±0.53	63.00±10.01	30.00±8.71	2.33±0.66	4.33±0.66	0.33±0.33	7.47±0.38a	156.00±6.35a	8.07±0.40	13.40±0.11
T2	11.33±1.33	5.77±0.29	52.67±7.88	42.00±8.32	1.67±0.33	3.67±0.88	0.00±0	7.30±0.41a	161.33±3.84a	7.43±0.21	13.43±0.12
T3	12.00±1.52	7.47±0.54	64.00±5.03	29.33±5.78	3.00±0.57	3.67±1.20	0.00±0	8.17±0.58a	161.00±1.73a	7.50±0.25	13.40±0.26
F value	0.892NS	2.817NS	1.092NS	1.015NS	1.111NS	0.516NS	1.167NS	29.36**	52.813**	1.467NS	0.183NS

Table 2: Types of feed offered to the goats under semi-intensive system of management

Ingredients	T0 (Control) CP=18.1%	T1 (1.5%Molp) CP=18%	T2 (3%Molp) CP=18.2%	T3 (4.5%Molp) CP=18.1%
Yellow maize (%)	44	44	42	39
SBC (%)	20	16	14	11
Wheat bran (%)	33	27	26	27
Molp (%)	0	10	15	20
Min. mix (%)	2	2	2	2
Cocciodiostat (%)	0.5	0.5	0.5	0.5
Salt (%)	0.5	0.5	0.5	0. 5

Conclusion

The reduced levels of ALT and AST in goats fed various concentrations of *Moringa oleifera* leaf powder were attributed to the hepatoprotective nature of MOLP, as the liver is intended to release ALT and AST when it is damaged, as compared to the control group.

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