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## Effect of herbal additives Amla (*Emblica officinalis*) and giloy (*Tinospora cordifolia*) on biochemical parameters of Magra lambs in the semi intensive management system under the arid zone of western Rajasthan

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### Abstract

The aim of this study was to determine the effect of herbal feed additives amla (*Emblica officinalis*) and giloy (*Tinospora cordifolia*) on biochemical parameters of Magra lambs in the semi intensive management system. The experiment was performed on twenty eight magra lambs of three to four months of age under the semi intensive system, which were randomly distributed into four experimental groups of seven lambs in each group in a randomized block design (RBD). Herbal feed additive Amla (*Emblica officinalis*) fruit powder with seed and Giloy (*Tinospora cordifolia*) stem powder were supplemented at level of 1.5 g/kg body weight with concentrate as oral/feed supplemented in T<sub>1</sub> and T<sub>2</sub> group, respectively except control group and T<sub>3</sub> in semi-intensive management system. Group T<sub>3</sub> were supplemented with the combination of Amla (*Emblica officinalis*) fruit powder and Giloy (*Tinospora cordifolia*) stem powder at the level of 0.75 g/kg body weight with concentrate as oral/feed. At the end of experiment, no significant changes were found in biochemical parameters though; they were within normal biochemical range.

**Keywords:** Biochemical parameters, magra, serum, protein

### Introduction

The importance of biochemical parameters for Magra lamb lies in their ability to provide valuable information about the lamb's overall health and well-being. These parameters, such as blood glucose levels, liver enzymes, and kidney function, can help veterinarians and farmers assess the lamb's metabolic status, detect any potential diseases or infections, and monitor the effectiveness of treatment protocols. By regularly monitoring these biochemical parameters, farmers can ensure the optimal growth and development of Magra lambs, leading to healthier and more productive animals in the long run. By monitoring blood glucose levels, one can assess the lamb's ability to regulate its blood sugar levels and ensure proper energy metabolism. Lipid profiles, on the other hand, help in evaluating the lamb's fat content and composition, which directly affects its taste, tenderness, and juiciness. Furthermore, analyzing enzyme activities can provide information about the lamb's digestive health and nutrient absorption capabilities. Overall, understanding and optimizing these biochemical parameters are essential for ensuring the production of high-quality, nutritious, and delicious Magra lamb for consumers to enjoy.

### Materials and Methods

Blood samples from experimental lambs were collected in the morning hours before feeding and watering of lambs. Samples were collected at monthly interval by puncturing jugular vein following aseptic measures. The blood, so drawn was collected in sterilized test tubes containing adequate amount of anticoagulant.

Haematological studies were performed soon after collection of blood. For separation of serum, blood was collected in second tube, without anticoagulant, and kept in slanting position. These tubes were incubated for 1 h at 37 °C. Blood clots were broken and tubes were centrifuged at 2500 rpm for 30 minutes. The serum was pipetted out in small pyrex tubes and kept for further analysis of serum albumin (ALB), serum globulin, total serum protein (TP), serum glucose, serum creatinine, serum cholesterol, serum triglyceride and blood urea nitrogen.

### Biochemical parameter

Serum glucose, Total serum protein, Serum albumin, Serum globulin, Serum triglycerides, Serum cholesterol, Serum creatinine and Blood urea nitrogen were determined by Clinical Chemical Analyzer Model AGD2020.

## Results and Discussion

### Serum glucose (mg/dl)

The mean values of serum glucose (mg/dl) of lambs under various treatment groups at monthly intervals of experiment and overall mean for entire experimental period have been presented in Table 01. The average values of serum glucose (mg/dl) at 30 days in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups were found to be 52.43, 51.00, 52.71 and 53.71% respectively while at 60 days the values were found to be 51.43, 53.71, 50.71 and 51.86% for control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups in the semi-intensive system. At the 90 days serum glucose (mg/dl) in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups were found to be 54.71, 50.00, 52.00 and 55.00%, respectively which differed non significantly with each other. The overall mean contents of serum glucose (mg/dl) were found to be 52.29, 50.68, 51.82 and 52.93 in lambs of control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups, respectively in the semi-intensive system. The statistical analysis of variance revealed no significant effect of supplementation of herbal feed additives at each month of experimental period and also on overall mean serum glucose concentration of experimental lambs in the semi-intensive system.

**Table 1:** Average values of serum glucose (mg/dl) at different time intervals in different treatment groups in semi-intensive system

Treatment groups	Period (months)				
	0	I	II	III	Mean
C	50.57	52.43	51.43	54.71	52.29
T <sub>1</sub>	48.00	51.00	53.71	50.00	50.68
T <sub>2</sub>	51.86	52.71	50.71	52.00	51.82
T <sub>3</sub>	51.14	53.71	51.86	55.00	52.93
SEM	0.84	0.56	0.64	1.19	0.47
<b>Note:</b> Means with different superscripts in a column differ significantly					

The results obtained in semi-intensive management system for serum glucose (mg/dl) in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> group lies within the normal range of 50 to 80 mg/dl g percent (Radostitis *et al.*, 2007) [4]. It could be concluded that supplementation of the herbal feed additives Amla (*Emblca officinalis*) and Giloy (*Tinospora cordifolia*) in the diets of Magra lambs had no adverse effect on serum glucose (mg/dl) in different management systems. The present findings are similar to findings if Al-sherwany (2015) [7] who reported no significant effect of feeding fenugreek seeds on the blood stream glucose in ewes. Similarly,

Babekir (2015) [8] reported no significant effect of fenugreek seeds supplementation in Nubian goats and Arya (2019) [3] also reported no significant effect of Amla on blood glucose in Magra lambs. The present findings are not similar to findings if Madan *et al.* (2015) [6] as they reported significant decrease in blood glucose in Beetal kids on supplementation of *Emblca officinalis*.

### Serum total protein (g/dl)

The mean values of serum total protein (g/dl) of lambs under various treatment groups at monthly intervals of experiment and overall mean for entire experimental period have been presented in Table 02. The average values of serum total protein (g/dl) at 30 days in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups were found to be 6.94, 6.98, 6.92 and 7.16% respectively while at 60 days the values were found to be 6.94, 7.04, 6.98 and 7.06% for control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups in the semi-intensive system. At the 90 days serum total protein (g/dl) in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups were found to be 6.81, 6.96, 6.95 and 6.8%, respectively which differed non significantly with each other. The overall mean contents of serum total protein (g/dl) were found to be 6.93, 6.96, 6.98 and 7.01 in lambs of control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups, respectively in the semi-intensive system. The statistical analysis of variance revealed no significant effect of supplementation of herbal feed additives at each month of experimental period and also on overall mean serum total protein concentration of experimental lambs in the semi-intensive system.

**Table 2:** Average values of serum total protein (g/dl) at different time intervals in different treatment groups in semi-intensive system

Treatment groups	Period (months)				
	0	I	II	III	Mean
C	7.02	6.94	6.94	6.81	6.93
T <sub>1</sub>	6.86	6.98	7.04	6.96	6.96
T <sub>2</sub>	7.06	6.92	6.98	6.95	6.98
T <sub>3</sub>	7.03	7.16	7.06	6.80	7.01
SEM	0.05	0.05	0.03	0.05	0.02
<b>Note:</b> Means with different superscripts in a column differ significantly					

The results obtained in semi-intensive management system for serum total protein (g/dl) in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> group lies within the normal range of 6 to 7.9 g/dl (Radostitis *et al.*, 2007) [4]. It could be concluded that supplementation of the herbal feed additives Amla (*Emblca officinalis*) and Giloy (*Tinospora cordifolia*) in the diets of Magra lambs had no adverse effect on serum total protein (g/dl) in different management systems. The present findings are fall in line with findings of Ganai (2011) [1] found effects of supplementation of Bhringraj no significant for total serum protein in goats.

### Serum albumin (g/dl)

The mean values of serum albumin (g/dl) of lambs under various treatment groups at monthly intervals of experiment and overall mean for entire experimental period have been presented in Table 03. The average values of serum albumin (g/dl) at 30 days in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups were found to be 3.97, 3.82, 3.76 and 3.69% respectively while at 60 days the values were found to be 3.69, 3.68, 3.94 and 3.78% for control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups in the semi-intensive system.

At the 90 days serum albumin (g/dl) in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups were found to be 3.87, 3.70, 3.64 and 3.89%, respectively which differed non significantly with each other. The overall mean contents of serum albumin (g/dl) were found to be 3.83, 3.75, 3.73 and 3.75 in lambs of control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups, respectively in the semi-intensive system. The statistical analysis of variance revealed no significant effect of supplementation of herbal feed additives at each month of experimental period and also on overall mean serum albumin concentration of experimental lambs in the semi-intensive system.

**Table 3:** Average values of serum albumin (g/dl) at different time intervals in different treatment groups in semi-intensive system

Treatment groups	Period (months)				
	0	I	II	III	Mean
C	3.77	3.97	3.69	3.87	3.83
T1	3.82	3.82	3.68	3.70	3.75
T2	3.58	3.76	3.94	3.64	3.73
T3	3.64	3.69	3.78	3.89	3.75
SEM	0.06	0.06	0.06	0.06	0.02
<b>Note:</b> Means with different superscripts in a column differ significantly					

The results obtained in semi-intensive management systems for serum albumin (g/dl) in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> group lies within the normal range of 2.7-3.7 g/dl (Kahan, 2005) [5]. It could be concluded that supplementation of the herbal feed additives Amla (*Emblica officinalis*) and Giloy (*Tinospora cordifolia*) in the diets of Magra lambs had no adverse effect

**Table 4:** Average values of serum globulin (g/dl) at different time intervals in different treatment groups in semi-intensive system

Treatment groups	Period (months)				
	0	I	II	III	Mean
C	4.19	4.18	4.26	4.33	4.24
T1	4.22	4.18	3.94	3.95	4.08
T2	4.27	4.13	3.94	4.16	4.13
T3	4.28	4.16	4.10	4.29	4.21
SEM	0.02	0.01	0.08	0.09	0.04
<b>Note:</b> Means with different superscripts in a column differ significantly					

The results obtained in semi-intensive management system for serum globulin (g/dl) in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> group lies within the normal range of 3.2 to 5.0 g/dl (Kahan, 2005). It could be concluded that supplementation of the herbal feed additives Amla (*Emblica officinalis*) and Giloy (*Tinospora cordifolia*) in the diets of Magra lambs had no adverse effect on serum globulin (g/dl) in different management systems.

### Serum creatinine (mg/dl)

The mean values of serum creatinine (mg/dl) of lambs under various treatment groups at monthly intervals of experiment and overall mean for entire experimental period have been presented in Table 05.

The average values of serum creatinine (mg/dl) at 30 days in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups were found to be 1.66, 1.70, 1.79 and 1.72% respectively while at 60 days the values were found to be 1.73, 1.74, 1.74 and 1.73% for control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups in the semi-intensive system. At the 90 days serum creatinine (mg/dl) in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups were found to be 1.72, 1.73, 1.81 and 1.73%, respectively which differed non significantly with each other.

on serum albumin (g/dl) in different management systems. These findings are in agreement with the findings of Arya (2019) [3] who reported no significant effect of supplementation of Amla on serum albumin in Magra lambs. The present findings are contrary to findings of Madan *et al.* (2015) [6] as they reported significant increase in albumin in Beetal kids on supplementation of Amla.

### Serum globulin (g/dl)

The mean values of serum globulin (g/dl) of lambs under various treatment groups at monthly intervals of experiment and overall mean for entire experimental period have been presented in Table 04.

The average values of serum globulin (g/dl) at 30 days in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups were found to be 4.18, 4.18, 4.13 and 4.16% respectively while at 60 days the values were found to be 4.26, 3.94, 3.94 and 4.1% for control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups in the semi-intensive system. At the 90 days serum globulin (g/dl) in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups were found to be 4.33, 3.95, 4.16 and 4.29%, respectively which differed non significantly with each other.

The overall mean contents of serum globulin (g/dl) were found to be 4.24, 4.08, 4.13 and 4.21 in lambs of control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups, respectively in the semi-intensive system. The statistical analysis of variance revealed no significant effect of supplementation of herbal feed additives at each month of experimental period and also on overall mean serum globulin concentration of experimental lambs in the semi-intensive system.

The overall mean contents of serum creatinine were found to be 1.69, 1.73, 1.78 and 1.74 in lambs of control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups, respectively in the semi-intensive system.

The statistical analysis of variance revealed no significant effect of supplementation of herbal feed additives at each month of experimental period and also on overall mean serum creatinine concentration of experimental lambs in the semi-intensive system.

**Table 5:** Average values of serum creatinine (mg/dl) at different time intervals in different treatment groups in semi-intensive system

Treatment groups	Period (months)				
	0	I	II	III	Mean
C	1.63	1.66	1.73	1.72	1.69
T1	1.76	1.70	1.74	1.73	1.73
T2	1.76	1.79	1.74	1.81	1.78
T3	1.78	1.72	1.73	1.73	1.74
SEM	0.035	0.027	0.004	0.022	0.019
<b>Note:</b> Means with different superscripts in a column differ significantly					

The results obtained in semi-intensive management system for serum creatinine (mg/dl) in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> group lies within the normal range of 1.2-1.9 mg/dl (Radostitis *et al.*, 2007)<sup>[4]</sup>. It could be concluded that supplementation of the herbal feed additives Amla (*Emblica officinalis*) and Giloy (*Tinospora cordifolia*) in the diets of Magra lambs had no adverse effect on serum creatinine (mg/dl) in different management systems. The present findings are in with findings of Manju (2010)<sup>[2]</sup> who reported no significant difference in serum creatinine on supplementation of Shatavri, Brahmi, Bhringraj and Jiwanti in sheep. Similarly, Ganai (2011)<sup>[1]</sup> who reported no significant effect of supplementation of Bhringaraj on serum creatinine in Marwari goats. Arya (2019)<sup>[3]</sup> also reported no significant effect of supplementation of Amla on serum creatinine in Magra lambs.

### Conclusion

It could be concluded that supplementation of the herbal feed additives Amla (*Emblica officinalis*) and Giloy (*Tinospora cordifolia*) in the diets of Magra lambs had no adverse effect on physiological parameters in the semi-intensive management system.

### Future scope

These findings suggest that Amla and Giloy may not directly impact the metabolic processes in Magra lambs, but they can enhance their immune system and promote healthy development. Further research is needed to understand the underlying mechanisms and potential long-term effects of these herbal supplements on lamb health.

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