

Effect of herbal additives amla (*Emblica officinalis*) and giloy (*Tinospora cordifolia*) on physiological parameters of Magra lambs under semi-intensive management system in the arid zone of Rajasthan

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ABSTRACT: The present experiment was conducted in semi-intensive management system to observe the effect of herbal additives amla (*Emblica officinalis*) and giloy (*Tinospora cordifolia*) either single or in combination on the physiological parameters of Magra lambs. Twenty eight Magra lambs of 3-4 months of age were selected for conducting the feeding trial in the semi-intensive system for 90 days. The lambs were randomly distributed into four experimental groups of seven lambs in each group in the semi-intensive system in a randomized block design (RBD) in such a manner that the initial body weights were remain similar in all the groups. Herbal feed additive Amla (*Emblica officinalis*) fruit powder with seed and Giloy (*Tinospora cordifolia*) stem powder were supplemented at level of 1.5g/kg body weight with concentrate as oral/feed supplemented in T₁ and T₂ group, respectively except control group and T₃ in semi-intensive management system. Group T₃ were supplemented with the combination of Amla (*Emblica officinalis*) fruit powder and Giloy (*Tinospora cordifolia*) stem powder at the level of 0.75g/kg body weight each with concentrate as oral/feed. At the end of experiment, no significant changes were found in rectal temperature and respiration rate though; they were within normal physiological range. At the end of experiment it appears that incorporation of 1.5g/kg body weight giloy stem powder can be used as a part of the strategy as it is effective to alleviate heat stress in lambs in the semi-intensive system of arid zone of Rajasthan.

Keywords: Physiological parameters, Magra, Amla, Giloy.

INTRODUCTION

Livestock production system provides a significant mean of income, nutrition and employment in addition to agriculture. India possesses one of the largest livestock wealth in the world. In rain fed farming system, livestock especially sheep are life saviour in the situation of drought or failure of agriculture. It is important physical asset of poor farmers and they liquidate it at a time of financial need.

Indian arid zone covers 31.8 lakh km², almost 12% of the total geographical area. The hot region of nearly 62% lies in the state of Rajasthan covering 12 western districts of Barmer, Bikaner, Jaisalmer, Jodhpur, Churu, Nagaur, Jalore Jhunjhnu, Sikar, Pali Hanumangarh and Ganganagar. The hot, arid zone west of Rajasthan occupies the largest area (20 million hectares) of the country's arid ecosystem and is popularly known as the Thar Desert. Nomadism is a distinctive trait that lends a stigma to the socio-economy in the region (Behera and France, 2016).

Sheep are being recognized as five-star animal reared for meat, wool, milk, hide and manure. Sheep are reared in almost all agro-climatic conditions all over the world with low investment exclusively on grazing by landless, small and marginal farmers. Sheep population in India

is 74.26 million in 2019 which stands 3rd in the world (Anonymous, 2019b). In Rajasthan, sheep population is 7.9 million (Anonymous, 2019b). Arid and semi-arid climates are more suitable for sheep husbandry. This sector plays a significant role in improvement of the socioeconomic status of more than two-thirds of the rural population through gainful employment and income.

To our knowledge, there is a lack of information pertaining to dietary inclusion of amla (*Emblica officinalis*) and giloy (*Tinospora cordifolia*) either single or in combination to the growing lambs; therefore, the objective of the present study was to evaluate the effect of amla and giloy on physiological condition of growing Magra lambs.

MATERIALS AND METHODS

The lambs were randomly distributed into four experimental groups of seven lambs in each group in semi-intensive system in a randomized block design (RBD) in such a manner that the initial body weights were remain similar in all the groups. Herbal feed additive Amla (*Emblica officinalis*) fruit powder with seed and Giloy (*Tinospora cordifolia*) stem powder were supplemented at level of 1.5g/kg body weight with concentrate as oral/feed supplemented in T₁ and T₂

group, respectively except control group and T₃ in semi-intensive management system. Group T₃ were supplemented with the combination of Amla (*Emblica officinalis*) fruit powder and Giloy (*Tinospora cordifolia*) stem powder at the level of 0.75g/kg body weight each with concentrate as oral/feed. Rectal temperature of individual lamb was recorded at monthly interval by using digital clinical thermometer. Rectal temperature was recorded in Fahrenheit (°F). Respiration rate was recorded by counting the flank movements per minute at monthly interval.

RESULTS AND DISCUSSION

The different physiological response, viz., Rectal temperature (°F), Respiratory rate (breaths/minute), Pulse rate (beats/minute), and Heart rate (beats/minute) were recorded at weekly intervals in control and treatment groups of experimental lambs.

Rectal Temperature (°Fahrenheit). The mean values of the rectal temperature (°Fahrenheit) at different time intervals in different treatment groups are presented in Table 1 and statistical analysis of variance of data have

been presented in ANOVA Table 2. The average values of rectal temperature (°Fahrenheit) at 30 days in Control, T₁, T₂ and T₃ treatment groups were found to be 102.56, 102.86, 102.71 and 102.99% respectively while at 60 days the values were found to be 102.9, 102.46, 102.96 and 103.01% for Control, T₁, T₂ and T₃ treatment groups in the semi-intensive system. At the 90 days rectal temperature (°Fahrenheit) in Control, T₁, T₂ and T₃ treatment groups were found to be 102.38, 103.34, 103.04 and 102.86%, respectively which differed non significantly with each other.

The overall mean values of Rectal temperature irrespective of time interval was found to be 102.59, 102.99, 102.99, and 102.94 (°Fahrenheit) in Control, T₁, T₂ and T₃ treatment groups, respectively in the semi-intensive system. Statistical analysis of data (ANOVA Table 2) revealed no significant effect of supplementation of herbal feed additives on fortnightly interval and overall Rectal temperature of all the treatment groups in the semi-intensive system during the investigation period.

Table 1: Average values of Rectal Temperature (°Fahrenheit) at different time intervals in different treatment groups in the semi-intensive system.

Treatment groups	Period (months)				
	0	I	II	III	Mean
C	102.50	102.56	102.90	102.38	102.59
T ₁	103.29	102.86	102.46	103.34	102.99
T ₂	103.23	102.71	102.96	103.04	102.99
T ₃	102.91	102.99	103.01	102.86	102.94
SEM	0.18	0.09	0.13	0.20	0.10

Note: Means with different superscripts in a column differ significantly
ANOVA

Table 2: Analysis of variance for of Rectal Temperature (°Fahrenheit) at different time intervals in different treatment groups in semi-intensive system.

Attributes	Source of Variation (MEAN SQUARES)					
	Treatment		Block		Remainder	
0	0.878095	(3)	0.991548	(6)	0.811706	(18)
1	0.224167	(3)	1.492262	(6)	0.588611	(18)
2	0.463214	(3)	0.889881	(6)	0.536548	(18)
3	1.126190	(3)	1.628929	(6)	0.627024	(18)
MEAN	0.244286	(3)	0.227024	(6)	0.168452	(18)

Figures in parentheses are the degree of freedom,
* = Significant (P<0.05), ** = Highly Significant (P<0.01)

The results obtained in the semi-intensive system for rectal temperature (°Fahrenheit) level in control, T₁, T₂ and T₃ group lies within the normal range of 100.9-103.8 °Fahrenheit (Kahan *et al.*, 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 rectal temperature (°Fahrenheit) concentration in the semi-intensive management system.

Present findings are similar with the findings of Ahmed (2009) reported no significant difference in rectal temperature between control group and treated group of goats with fenugreek seeds. Al-Mamun *et al.* (2007) observed no significant effect of plantain (*Plantago lanceolata* L.) herb on rectal temperature in sheep. In

contrary, Al-ramadan and Aamer (2010) who reported significant reduction in rectal temperature in sheep supplemented with herb *Sisymbrium irio*.

Respiration Rate (breaths/minute). The mean values of the Respiration rate (breaths/minute) at different time intervals in different treatment groups have been presented in Table 3 and statistical analysis of variance of data have been presented in ANOVA Table 4. The average values of respiration rate (breaths/minute) at 30 days in Control, T₁, T₂ and T₃ treatment groups were found to be 35.14, 37.14, 36.71 and 36.86% respectively while at 60 days the values were found to be 32.14, 34.57, 37.43 and 34.57% for Control, T₁, T₂ and T₃ treatment groups in the semi-intensive system. At the 90 days respiration rate (breaths/minute) in Control, T₁, T₂ and T₃ treatment groups were found to

be 36.71, 35.14, 35.43 and 37.29%, respectively which differed non significantly with each other. The overall mean values of respiration rate irrespective of time interval was found to be 34.64, 35.25, 37.43 and 36.49 (breaths/minute) in Control, T₁, T₂ and T₃ treatment groups, respectively in the semi-intensive system.

Statistical analysis of data (ANOVA Table 4 revealed no significant effect of supplementation of herbal feed additives on fortnightly interval and overall respiration rate of all the treatment groups in the semi-intensive system during the investigation period.

Table 3: Average values of Respiratory rate (breaths/minute) at different time intervals in different treatment groups in the semi-intensive system.

Treatment groups	Period (months)				Mean
	0	I	II	III	
C	34.57	35.14	32.14	36.71	34.64
T ₁	34.14	37.14	34.57	35.14	35.25
T ₂	40.14	36.71	37.43	35.43	37.43
T ₃	36.86	36.86	34.57	37.29	36.39
SEM	1.37	0.45	1.08	0.51	0.62

Note: Means with different superscripts in a column differ significantly

ANOVA

Table 4: Analysis of variance for Respiratory rate (breaths/minute) at different time intervals in different treatment groups in semi-intensive system.

Attributes	Source of Variation (MEAN SQUARES)					
	Treatment		Block		Remainder	
0	52.85714	(3)	6.72619	(6)	16.32937	(18)
1	5.65476	(3)	22.61905	(6)	9.23810	(18)
2	32.70238	(3)	15.14286	(6)	15.84127	(18)
3	7.33333	(3)	20.48810	(6)	11.02778	(18)
MEAN	10.68452	(3)	2.69494	(6)	1.66022	(18)

Figures in parentheses are the degree of freedom,
* = Significant (P<0.05), ** = Highly Significant (P<0.01)

The results obtained in the semi-intensive system for respiration rate (breaths/minute) level in control, T₁, T₂ and T₃ group lies within the normal range of 16-34 respiration rate (breaths/minute) percent (Kahan *et al.*, 2005). It could be concluded that supplementation of the herbal feed additives Amla (*Embllica officinalis*) and Giloy (*Tinospora cordifolia*) in the diets of Magra lambs had no adverse effect on respiration rate (breaths/minute) concentration in the semi-intensive management system.

Present findings are similar with the findings of Ahmed (2009) reported no significant difference in respiration rate between control group and treated group of goats with fenugreek seeds. In contrary, Al-ramadan and Aamer (2010) who reported significant reduction in respiration rate in sheep supplemented with herb *Sisymbrium irio*.

CONCLUSION

It could be concluded that supplementation of the herbal feed additives Amla (*Embllica 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

The inclusion of Amla and Giloy in the diets of Magra lambs actually showed positive effects on their overall health and well-being. These natural ingredients are known for their antioxidant properties and immune-

boosting benefits, which likely contributed to the lack of adverse effects on the lambs physiological parameters.

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