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An assessment of the effect of herbal additives amla (*Emblica officinalis*) and giloy (*Tinospora cordifolia*) on wool yield and quality of Magra lambs in the semi-intensive management system under arid zone of western 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 wool yield and wool quality of Magra lambs. Twenty eight Magra lambs of 3-4 months of age were selected for conducting the feeding trial in semi-intensive system for 90 days. The lambs were randomly distributed into four experimental groups of seven lambs in each group in semi-intensive management 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 T_1 and T_2 group, respectively except control group and T_3 in semi-intensive management system. Group T_3 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. The findings of the present study revealed that wool yield and other wool characteristics were not affected in all treatment groups under semi-intensive system by the supplementation of herbal feed additives in lamb ration but numerically highest improved in Giloy treated group.

Keywords: Wool, Magra, Amla, Giloy, semi-intensive management system.

INTRODUCTION

India ranks 6th amongst clean wool producer countries and 9th amongst greasy wool producers. Indian wool is almost exclusively of broader micron and used in manufacturing of carpets and rugs. India has 3rd largest sheep population in the world, having 74.26 million crores sheep, producing 45 million kg. of raw wool, and accounting for 3.1% of total world wool production. Out of 45 million kg. of wool produced in the country, about 85% is carpet grade wool, 5% apparel grade, and 10% coarser grade wool for making blankets, etc. (Anonymous, 2019b). The Magra sheep of Bikaner is a breed of sheep found in Rajasthan, India. It is a hardy breed and is known for its fine wool, which is used to make carpets and other textiles. It is also resistant to many diseases and parasites, making it ideal for rearing in arid regions. Magra sheep wool quality is renowned for its exceptional softness and fine texture. It is highly sought after in the textile industry due to its ability to provide warmth and insulation without being heavy or bulky. Additionally, Magra sheep wool is known for its durability and resistance to pilling, making it a preferred choice for high-quality garments and luxury products.

MATERIALS AND METHODS

The experimental trial was conducted to see the effect of herbal feed additive Amla (*Emblica officinalis*) fruit powder with seed and Giloy (*Tinospora cordifolia*) stem powder on wool quantity and quality of Magra lamb under semi-intensive system in Arid region of Rajasthan. 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 T_1 and T_2 group, respectively except control group and T_3 in semi-intensive management system. Group T_3 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 with concentrate as oral/feed. The weight of greasy fleece yield (GFY) was recorded after complete shearing of lambs at the time of shearing. The wool samples for laboratory analysis were taken from mid-side region above the last pair of ribs. Each sample was collected as close to skin as possible, kept in zip lock polythene bags along with identification card.

Thereafter, the wool samples were analyzed for quality analysis, which includes staple length, no. of crimp, medullation and fibre diameter in the State wool analysis laboratory, Bikaner.

RESULTS AND DISCUSSION

Wool is an important production parameter of sheep and it is investigated how supplementing lambs' diet with various plant-based feed additives affects the growth and production status of sheep, it is necessary to analyze the various attributes of wool, either quantitative (wool yield) or qualitative (staple length, average crimp with fibre metrology viz. fineness and medullation percentage. Therefore, in present study in text the parameters of wool, which may be affected by the supplementation of different feed herbal additives with diet were studied and results have been presented in Table 1 for semi-intensive.

(i) Wool yield (g). The mean values of greasy fleece yield (GFY) at the time of first shearing of different treatment groups of experiment have been presented in Table 01 and the statistical analysis of data for main effect of treatment i.e. supplementation of different feed herbal additives with diet of lambs under semi-intensive system has been presented in Table 2. The overall mean values for greasy fleece yield in lambs of different treatment groups at the time of first shearing were recorded to be 629.00, 681.00, 697.00, 630.00 g in Control, T_1, T_2 and T_3 treatment groups, respectively in the semi-intensive system.

The statistical analysis of variance due to supplementation of different feed herbal additives with diet of lambs revealed no significant effect on greasy fleece yield at the time of first shearing in the semi-intensive system. Though, the highest greasy fleece yield was recorded in lambs of group T_2 followed by T_1, T_3 and Control treatment group under semi-intensive system.

(ii) Fibre diameter. Due to effect of treatment i.e. supplementation of different feed herbal additives with diet of experimental lambs, the mean values of fineness of wool of lambs at first shearing were recorded to be 34.06 µ in Control, 32.66 µ in T_1, 32.61 µ in T_2 and 33.66 µ in T_3 group in the semi-intensive system. The statistical analysis of variance due to effect of treatment revealed no significant effect on average fibre diameter of wool in the semi-intensive system.

(iii) Medullation (per cent). The medullation per cent of wool due to effect of treatment i.e. supplementation of different feed herbal additives with diet of experimental lambs at first shearing were recorded to be 54.47 % in Control, 53.69 % in T_1, 52.93 % in T_2 and 54.29 % in T_3 group in the semi-intensive system. The statistical analysis of variance due to effect of treatment revealed no significant effect on average medullation percentage of wool in the semi-intensive system.

(iv) Staple length (cm). The staple length (cm) of wool due to effect of treatment i.e. supplementation of different feed herbal additives with diet of experimental lambs at first shearing were recorded to be 6.44 cm in Control, 7.07 cm in T_1, 7.66 cm in T_2 and 6.77 cm in T_3 group in the semi-intensive system. The statistical analysis of variance due to effect of treatment revealed no significant effect on average staple length (cm) of wool. The highest improvement in staple length was observed in T_2 which is followed by T_1, T_3 and Control treatment groups under semi-intensive system.

(v) Crimps (per cm). The crimps (per cm) of wool due to effect of treatment i.e. supplementation of different feed herbal additives with diet of experimental lambs at first shearing were recorded to be 1.11 per cm in Control, 1.06 per cm in T_1, 1.14 per cm in T_2 and 1.10 per cm in T_3 group. The statistical analysis of variance due to effect of treatment revealed no significant effect on average crimps (per cm) of wool. The highest improvement in Crimps (per cm) was observed in T_2 which is followed by T_1, T_3 and Control treatment groups under semi-intensive system.

(vi) Hairy fibers (per cent). The hairy fibers per cent of wool due to effect of treatment i.e. supplementation of different feed herbal additives with diet of experimental lambs at first shearing were recorded to be 36.52 % in Control, 36.68 % in T_1, 36.09 % in T_2 and 36.83 % in T_3 group. The statistical analysis of variance due to effect of treatment revealed no significant effect on average hetero fibers percentage of wool. The highest hairy fibers percentage was observed in T_3 which is followed by T_1, Control and T_2 treatment groups under semi-intensive system.

(vii) Hetro fibers (per cent). The hetro fibers per cent of wool due to effect of treatment i.e. supplementation of different feed herbal additives with diet of experimental lambs at first shearing were recorded to be 17.96 % in Control, 17.01 % in T_1, 16.84 % in T_2 and 17.45 % in T_3 group. The statistical analysis of variance due to effect of treatment revealed no significant effect on average hetero fibers percentage of wool. The highest hetro fibers percentage was observed in Control which is followed by T_3, T_1 and T_2 treatment groups under semi-intensive system.

(viii) Pure fibers (per cent). The pure fibers per cent of wool due to effect of treatment i.e. supplementation of different feed herbal additives with diet of experimental lambs at first shearing were recorded to be 45.53 % in Control, 46.31 % in T_1, 47.07 % in T_2 and 45.71 % in T_3 group. The statistical analysis of variance due to effect of treatment revealed no significant effect on average pure fibers percentage of wool. The highest pure fibers percentage was observed in T_2 which is followed by T_1, T_3 and Control treatment groups under semi-intensive system.

(ix) Colour. The colour of wool fibers due to effect of treatment i.e. supplementation of different feed herbal additives with diet of experimental lambs at first shearing was pel yellow in all treatment groups under semi-intensive system.

Table 1: Effect of Herbal additives on wool parameters in lambs in the semi-intensive system.

Treatment	Attributes								
	Wool Yield (g)	Fiber diameter (u)	Medullation (%)	Staple Length (cm)	Crimp per (cm)	Hairy fibers (%)	Hetro fibers (%)	Pure fibers (%)	Colour
C	629	34.06	54.47	6.44	1.11	36.52	17.96	45.53	Pel Yellow
T_1	681	32.66	53.69	7.07	1.06	36.68	17.01	46.31	Pel Yellow
T_2	697	32.61	52.93	7.66	1.14	36.09	16.84	47.07	Pel Yellow
T_3	630	33.66	54.29	6.77	1.10	36.83	17.45	45.71	Pel Yellow
SEM	18.01	0.36	0.35	0.26	0.02	0.16	0.25	0.35	-

Table 2: Analysis of variance for wool parameters in lambs in different treatment groups in the semi-intensive system.

	Source of Variation (MEAN SQUARES)					
Attributes	Treatment		Block		Remainder	
Wool Yield gm	8690.476	(3)	21655.95	(6)	13054.365	(18)
Fiber diameter (u)	3.670	(3)	0.90	(6)	3.553	(18)
Medullation (%)	3.388	(3)	4.78	(6)	23.480	(18)
Staple Length (cm)	1.864	(3)	2.42	(6)	1.786	(18)
Crimp per (cm)	0.009	(3)	0.03	(6)	0.035	(18)
Hairy (%)	0.717	(3)	2.35	(6)	21.605	(18)
Hetro (%)	1.783	(3)	2.09	(6)	1.248	(18)
Pure (%)	3.388	(3)	4.78	(6)	23.480	(18)
Figures in parentheses are the degree of freedom, * = Significant (P<0.05), ** = Highly Significant (P<0.01)						

The findings of present study revealed that wool yield and other wool characteristics did not affected by the supplementation of different feed herbal additives in lamb ration. These findings are in agreement with the results of Whitney *et al*. (2014), they also reported no effect of DDGS inclusion on wool characteristics in lambs.

The observations of present findings are in agreement with Prajapat (2020) who reported that wool parameter are not affected by incorporation of dried distillers grains with soluble in the total mixed ration (TMR) in Magra lambs. Musalia *et al.* (2000) observed no significant effect on wool yield of lambs supplemented with urea treated neem seed kernel cake. Similar findings are reported by Sheikh *et al*. (2018) who found that wool parameter are not affected by probiotic mix and fibrolytic enzyme in corriedale lambs. On contrary Paganoni *et al.* (2000) who reported significantly higher wool yield in Merino sheep supplemented with canola meal than fed barley. AL-Saadi *et al.* (2012) also found significant effect of *Nigella Sativa* and *Trigonella Foenum Graecum* seeds on greasy wool weights, clean wool weights, wool fiber lengths, wool staple lengths ,wool fiber diameters of Awassi lambs.

Al-Saigh and Al-Kass confirmed that wool growth and its physical traits improved when sheep fed on a diet of high protein and sulfur contents, causing an increase in amino acids such as methionin and cystine which have a vital role for wool growth and its physical traits. Al-Hellou (2005) also reported Vitamin-E plays a vital role for wool growth and its physical traits in which Fenugreek and Nigella sativa seeds of high content of Vitamin-E (Nergiz and Otles 1993).

CONCLUSION

The conclusion of this study is that many other factors such as genetics may have played a role in the results. Further research may be needed to explore alternative methods of improving wool production in lambs.

FUTURE SCOPE

This could involve investigating the potential benefits of genetic selection or exploring the use of different nutritional supplements. Additionally, studying the impact of environmental factors such as temperature and humidity on wool production could provide valuable insights for enhancing lamb wool quality.

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