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## Effect of herbal additives amla (*Emblica officinalis*) and giloy (*Tinospora cordifolia*) on liver function 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 LFT 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 1.5g/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 0.75g/kg body weight with concentrate as oral/feed. At the end of experiment, no significant changes were found in LFT parameters though; they were within normal range of LFT.

**Keywords:** LFT, SGPT, SGOT, liver

### Introduction

The liver function test of lambs is an important diagnostic tool used to evaluate the health and functionality of the liver in these young animals. This test assesses key liver enzymes and other markers to detect any abnormalities or diseases that may impact the overall well-being and growth of lambs. Regular liver function testing in lambs can help identify conditions such as liver fluke infestation, fatty liver disease, or even viral infections. By monitoring these enzymes and markers, veterinarians can intervene early and provide appropriate treatment to ensure the lambs' optimal health and development. Additionally, this test is also crucial for assessing the effectiveness of any therapeutic interventions and adjusting the treatment plan accordingly.

### 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. Biochemical 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.

### Liver Function Test

ALT, AST, ALP and ACP were determined by Clinical Chemical Analyzer Model AGD2020.

#### Alanine aminotransferase (ALT) (IU/L) SGPT

The ALT (SGPT) test is a blood test used to measure the amount of the enzyme alanine transaminase (ALT) in the blood. This enzyme is found primarily in the liver, and high levels can indicate liver damage or disease.

#### Aspartate aminotransferase (AST) (IU/L) SGOT

AST (SGOT) is an enzyme found in many organs, but primarily in the liver. It is released into the blood when the liver is damaged. High levels of AST in the blood can indicate liver disease or injury, and can be used to monitor the effectiveness of treatment.

#### Alkaline phosphatase (ALP) (IU/L)

ALP is an enzyme that is primarily found in the liver and bones. It plays a crucial role in various physiological processes, including the metabolism of proteins and fats. Elevated levels of ALP in the blood may indicate liver damage or disease, such as hepatitis or cirrhosis. Additionally, ALP levels can also be elevated during pregnancy or due to certain medications. Therefore, measuring ALP levels through a liver function test can provide valuable insights into the overall health and functioning of the liver.

#### Acid phosphatase (ACP) IU/L

Acid phosphatase is an enzyme that is found in the livers of

humans and other animals. It is used as an indicator of liver health, as its levels can indicate the presence of liver disease or inflammation. In a liver function test, acid phosphatase levels are measured to assess the functioning of the liver.

### Results and Discussion

#### Liver Function Test

##### Alanine aminotransferase (ALT) (IU/L) SGPT

The mean values of Alanine aminotransferase (IU/L) 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 ALT (IU/L) at 30 days in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups were found to be 10.71, 10.57, 10.54 and 10.63% respectively while at 60 days the values were found to be 10.64, 10.78, 10.74 and 10.64% 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 ALT (IU/L) in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups were found to be 10.46, 10.66, 11.04 and 10.66%, respectively which differed non significantly with each other.

The overall mean contents of Alanine aminotransferase (IU/L) were found to be 10.60, 10.67, 10.77 and 10.64 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 Alanine aminotransferase (IU/L) concentration of experimental lambs in the semi-intensive system.

**Table 1:** Average values of Alanine aminotransferase (IU/L) at different time intervals in different treatment groups in the semi-intensive system

Treatment groups	Period (months)				
	0	I	II	III	Mean
C	10.76	10.71	10.64	10.46	10.60
T <sub>1</sub>	10.63	10.57	10.78	10.66	10.67
T <sub>2</sub>	10.49	10.54	10.74	11.04	10.77
T <sub>3</sub>	10.70	10.63	10.64	10.66	10.64
SEM	0.06	0.04	0.04	0.12	0.04

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

The results obtained in semi-intensive systems for ALT (IU/L) in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> group lies within the normal range of 26-34 (IU/L) (Kahan, 2005) [4]. 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 ALT (IU/L) in different management systems.

#### Aspartate aminotransferase (AST) (IU/L) SGOT

The mean values of Aspartate aminotransferase (AST) (IU/L) 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 AST (IU/L) at 30 days in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups were found to be 70.39, 70.29, 69.97 and 70.67% respectively while at 60 days the values were found to be 69.35, 70.53, 70.57 and 69.94% 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 AST (IU/L) in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>

treatment groups were found to be 70.46, 69.57, 70.07 and 69.73%, respectively which differed non significantly with each other.

The overall mean contents of Aspartate aminotransferase (AST) (IU/L) were found to be 70.07, 70.13, 70.20 and 70.11 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 Aspartate aminotransferase (AST) (IU/L) concentration of experimental lambs in the semi-intensive system.

The results obtained in semi-intensive systems for AST (IU/L) in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> group lies within the normal range of 60-280 (IU/L) (Kahan, 2005) [4]. 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 AST (IU/L) in different management systems.

**Table 2:** Average values of Aspartate aminotransferase (IU/L) at different time intervals in different treatment groups in the semi-intensive system

Treatment groups	Period (months)				
	0	I	II	III	Mean
C	70.62	70.39	69.35	70.46	70.07
T <sub>1</sub>	69.04	70.29	70.53	69.57	70.13
T <sub>2</sub>	69.54	69.97	70.57	70.07	70.20
T <sub>3</sub>	69.97	70.67	69.94	69.73	70.11
SEM	0.33	0.14	0.29	0.20	0.03
<b>Note:</b> Means with different superscripts in a column differ significantly					

**Alkaline phosphatase (ALP) (IU/L)**

The mean values of Alkaline phosphatase (ALP) (IU/L) 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 ALP (IU/L) at 30 days in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups were found to be 70.25, 69.96, 69.75 and 70.50% respectively while at 60 days the values were found to be 71.69, 73.07, 72.45 and 72.33% 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 ALP (IU/L) in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups were found to be 72.20, 71.56, 72.96 and 71.43%, respectively which differed non significantly with each other.

The overall mean contents of Alkaline phosphatase (ALP) (IU/L) were found to be 71.38, 71.53, 71.72 and 71.42 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 Alkaline phosphatase (ALP) (IU/L) concentration of experimental lambs in the semi-intensive system.

**Table 3:** Average values of Alkaline phosphatase (ALP) (IU/L) at different time intervals in different treatment groups in the semi-intensive system

Treatment groups	Period (months)				
	0	I	II	III	Mean
C	70.67	70.25	71.69	72.20	71.38
T <sub>1</sub>	70.58	69.96	73.07	71.56	71.53
T <sub>2</sub>	70.12	69.75	72.45	72.96	71.72
T <sub>3</sub>	70.19	70.50	72.33	71.43	71.42
SEM	0.14	0.16	0.28	0.35	0.08
<b>Note:</b> Means with different superscripts in a column differ significantly					

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 ALP (IU/L) in different management systems and agreement with Babekir (2015) [2].

**Acid phosphatase (ACP) IU/L**

The mean values of Acid phosphatase (ACP) (IU/L) of lambs under different treatment groups at monthly intervals of experiment and overall mean for entire experimental period have been presented in Table 04. The average values of ACP (IU/L) at 30 days in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups were found to be 1.26, 1.25, 1.25 and 1.29% respectively while at 60 days the values were found to be 1.24, 1.25, 1.27 and 1.25% 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 ACP (IU/L) in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment groups were found to be 71.75, 72.15, 72.40 and 72.72%, respectively which differed non significantly with each other. The overall mean contents of Acid phosphatase (ACP) (IU/L) were found to be 1.24, 1.25, 1.27 and 1.26 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 Acid phosphatase (ACP) (IU/L) concentration of experimental lambs in the semi-intensive system.

**Table 4:** Average values of Acid phosphatase (ACP) (IU/L) at different time intervals in different treatment groups in the semi-intensive system

Treatment groups	Period (months)				
	0	I	II	III	Mean
C	1.23	1.26	1.23	1.24	1.24
T <sub>1</sub>	1.24	1.25	1.25	1.25	1.25
T <sub>2</sub>	1.22	1.25	1.28	1.27	1.27
T <sub>3</sub>	1.31	1.29	1.25	1.25	1.26
SEM	0.020	0.008	0.011	0.006	0.005
<b>Note:</b> Means with different superscripts in a column differ significantly					

The results obtained in semi-intensive system for ACP (IU/L) in control, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> group lies within the normal range of 0-12 (IU/L) (Kahan, 2005) [4]. 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 ACP (IU/L) in different management systems. These findings of Liver function test are not in agreement with Beigh *et al.* (2017) [3] and Arya (2019) [1] who reported that the supplementation of feed additives had a significant impact on mean A:G ratio ( $p < 0.01$ ) and ALT levels ( $p < 0.05$ ), while a significant effect on total mean total serum proteins was recorded in the T<sub>2</sub> and T<sub>3</sub> groups.

**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 LFT 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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