International Journal of Livestock Research, Vol. 10 (5) May' 2020
http://www.ijlr.org
eISSN: 2277-1964
NAAS Rating 2020 – 5.36

Original Research

Effect of Feeding Dried Distillers Grains with Solubles (DDGS) to Magra Lambs on Sero-Biochemical Parameters

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How to cite this paper: Prajapat, U., Sharma, T., Saini, N., Arya, R., & Jain, D. (2020). Effect of Feeding Dried Distillers Grains with Solubles (DDGS) to Magra Lambs on Sero-Biochemical Parameters. *International Journal of Livestock Research,* 10(5), 34-38. doi: http://dx.doi.org/10.5455/ijlr.20200229064013

Received : Feb 29, 2020
Accepted : Apr 10, 2020
Published : May 31, 2020

Abstract

The present experiment was conducted on Magra lambs of 3-4 months of age at ARC-CSWRI for thirteen weeks to observe the effect of feeding dried distillers grains with solubles (DDGS) to magra lambs on sero-biochemical parameters. The lambs were used in a randomized block design and divided into four groups of 5 lambs in each group (T1-T4). Blood samples were collected at monthly interval by puncturing jugular vein following aseptic measures and serum was separated from each sample by standard procedure. No significant effect of incorporation of dried distillers grain with soluble i.e. DDGS was observed at each month of experimental period and also on overall mean values of serum glucose, serum creatinine, serum cholesterol and serum triglyceride. It was concluded that DDGS can be incorporated in lamb ration up to level of 15% without having any detrimental effect on health of lamb.

Keywords: DDGS, Magra, Sero-biochemical Parameters

Introduction

In India, livestock play a pivotal role in economy especially small ruminants like sheep and goat. Sheep rearing is an option of sustainable livelihood particularly in semi-arid and arid region (De *et al*., 2015). Economical and balanced feeding to livestock is one of the fundamental requirements for the profitable returns from the livestock. There is a deficit of 23.4% in the availability of dry fodder, 11.24% in that of green fodder and 28.9% for concentrates in India (Roy *et al.,* 2019). In this context, non-conventional feeds may be the viable alternative feeds. Decreasing land for cultivation of traditional resources of livestock feeding and increasing industrialization in turn also results in an increase availability of agro-industrial by-products (AIBPs) like brewer's dried grains, palm oil cake, winery mash etc. which can be efficiently utilized in livestock feeding. DDGS is an agro industrial byproduct and it is end product once a cereal grain has gone through the fermentation process in ethanol production (Belyea *et al.,* 2004). Currently, DDGS is a most economic protein feed for livestock feeding. To determine the effect of feedstuffs on production and physiological parameters, it is necessary to evaluate the influence of feed upon blood and serum parameters, particularly in adverse climatic conditions as exists in arid region like western Rajasthan. Therefore, present study was designed to evaluate the effect of feeding dried distillers' grains with solubles (DDGS) in Magra lambs on sero-biochemical parameters in arid zone of Rajasthan.

Materials and Methods

A thirteen weeks experiment was conducted on twenty 3-4 months old male Magra lambs at the sheep farm of ARC-CSWRI, Bikaner under "Network Project on Sheep Improvement of Magra Sheep". Animals were housed in well ventilated, hygienic and protected sheds. The experimental lambs were distributed in complete randomized block design into four groups having five lambs in each group. Four combinations of total mixed rations were prepared by substituting the groundnut cake with DDGS at different levels and were used for *ad lib* feeding of experimental lambs. Four isonitrogenous and isocaloric total mixed rations were prepared by using groundnut straw, ground nut cake, wheat bran, molasses, urea, mineral mixture and salt with varying levels of DDGS at 0, 5, 10 and 15 per cent by using roughage to concentrate ratio of 60:40 and processed at feed processing plant of ARC-CSWRI, Bikaner.

Blood samples from experimental lambs were collected in the morning hours before the feeding and watering of lambs. Samples were collected at monthly interval by puncturing jugular vein following aseptic measures. For separation of serum, blood was collected in a 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 glucose, serum creatinine, serum cholesterol and serum triglyceride. All the serum parameters estimated in the laboratory of the Department of Animal Nutrition, College of Veterinary and Animal Science, Bikaner. The sero-biochemical parameters were determined by the double beam UV spectrophotometer using standard kits, as per the manufacturers subscribed procedure.

Statistical Analysis

The data obtained in the experiment were analyzed statistically for effect of treatment by analysis of variance as per Snedecor and Cochran (2004) and significance of mean differences was tested by Duncan's New Multiple Range Test (DNMRT) as modified by Kramer (1956).

Results and Discussion

The mean values of serum glucose, serum creatinine, serum cholesterol and serum triglyceride of lambs under different treatment groups at monthly intervals of experiment have been presented in Table 1, 2, 3 and 4 as well as depicted in Figure 1 and 2. Due to main effect of treatment *i.e.* incorporation of DDGS in lamb ration, the mean values of serum glucose (mg/dl) were found to be 55.76, 55.88, 56.08 and 56.16 in lambs of T_1, T_2, T_3 and T_4 treatment groups, respectively. The overall mean values of serum creatinine (mg/dl) were found to be 1.64, 1.66, 1.62 and 1.59 in lambs of T_1, T_2, T_3 and T_4 treatment groups, respectively. The overall mean values of serum cholesterol (mg/dl) were found to be 113.79, 113.73, 112.98 and 113.58 in lambs of T_1, T_2, T_3 and T_4 treatment groups, respectively. The overall mean values of serum triglyceride (mg/dl) were found to be 20.39, 20.66, 21.31 and 21.68 in lambs of T_1, T_2, T_3 and T_4 treatment groups, respectively.

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

Treatment Groups	Period (months)				
	0	I	II	III	Mean
T_1	69.4	69.6	67.8	69	55.76
T_2	67.8	69	69.8	69.8	55.88
T_3	68.6	68.4	68.6	71.8	56.08
T_4	69.6	66.6	68.4	73.2	56.16
SEM	1.8735	2.6718	3.2995	2.777	1.0768

Table 2: Average values of serum creatinine (mg/dl) at different time intervals in different treatment groups

Treatment Groups	Period (months)				
	0	I	II	III	Mean
T_1	1.59	1.59	1.67	1.7	1.64
T_2	1.64	1.74	1.7	1.57	1.66
T_3	1.61	1.62	1.59	1.67	1.62
T_4	1.61	1.57	1.67	1.52	1.59
SEM	0.0646	0.0756	0.0621	0.0598	0.0438

Table 3: Average values of serum cholesterol (mg/dl) at different time intervals in different treatment groups

Treatment Groups	Period (months)				
	0	I	II	III	Mean
T_1	111.93	113.13	113.48	116.61	113.79
T_2	113.48	114.29	112.07	115.07	113.73
T_3	113.58	111.71	113.57	113.05	112.98
T_4	113.78	112.42	113.77	114.35	113.58
SEM	1.2982	1.6226	1.355	1.7281	0.8857

Table 4: Average values of serum triglyceride (mg/dl) at different time intervals in different treatment groups

Treatment Groups	Period (months)				
	0	I	II	III	Mean
T_1	20.3	20.03	20.81	20.42	20.39
T_2	20.52	20.07	20.54	21.5	20.66
T_3	21	21.01	21.23	22	21.31
T_4	21.41	21.02	22.29	21.99	21.68
SEM	0.7125	0.831	0.8329	0.6998	0.6251

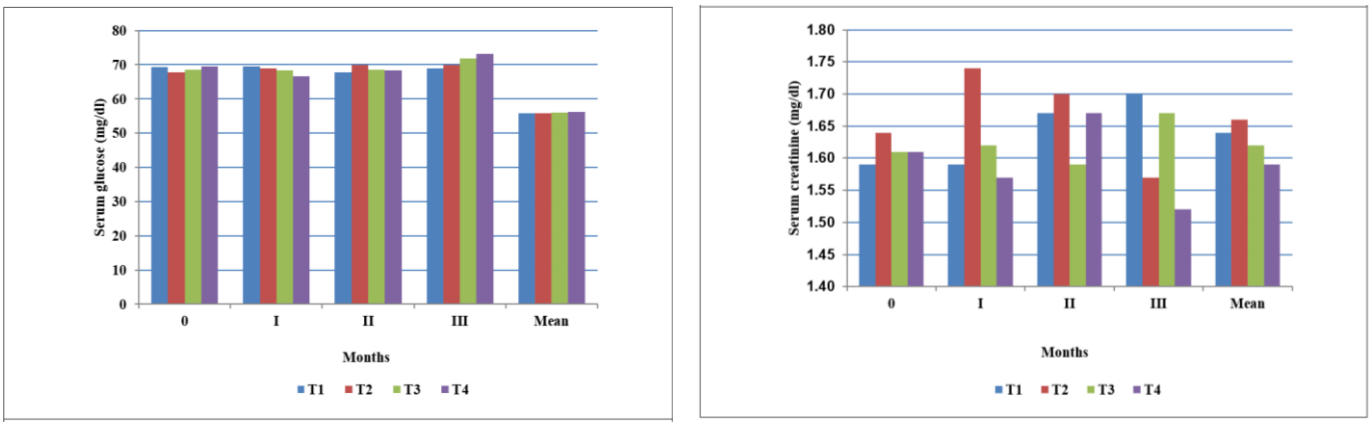

Figure 1: Serum glucose and serum creatinine at different time intervals in different treatment groups

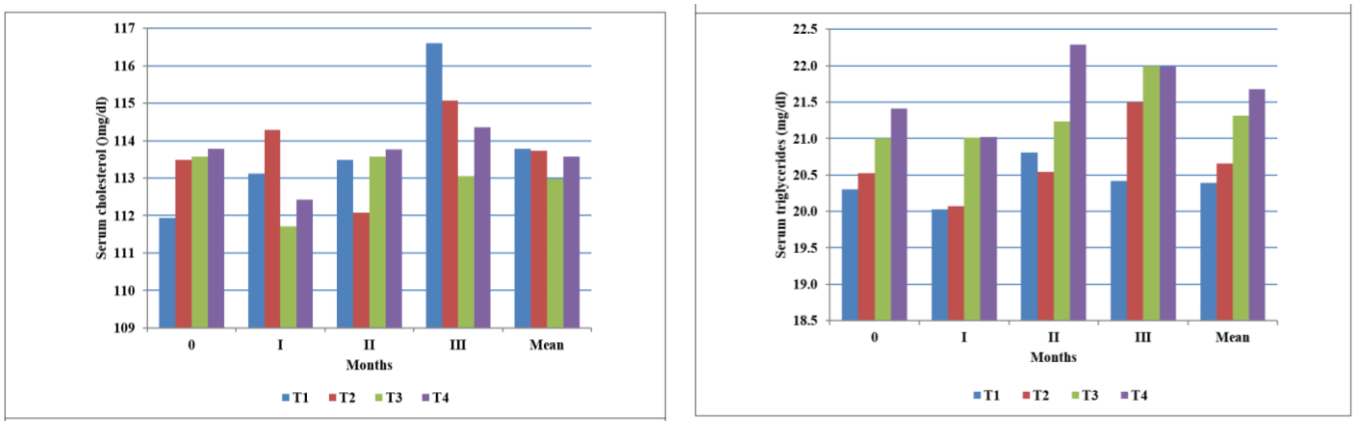

Figure 2: Serum cholesterol and serum triglyceride at different time intervals in different treatment groups

The statistical analysis of variance revealed no significant effect of incorporation of DDGS at each month of experimental period and also on overall mean values of serum glucose, serum creatinine, serum cholesterol and serum triglyceride. These results of present study are in agreement with the findings of Etman *et al.* (2014) who also observed no significant effect of DDGS incorporation in lamb ration on serum creatinine. These results also get support by Mohi-EL Din *et al.* (2008), Lopez *et al.* (2010), Etman *et al.* (2011). Gurung *et al.* (2009) reported no significant difference in the concentrations of serum glucose levels due to DDGS incorporation in goat, but contrary to present findings they reported significant improvement in serum cholesterol in DDGS fed goats. The findings for serum glucose corroborate well with the results reported by Obediat (2018).

Conclusion

In present study, all the sero-biochemical parameters recorded were within normal range established for sheep. Therefore, it was concluded from present study that dried distillers' grains with solubles *i.e.* DDGS can be incorporated in lamb ration up to level of 15% without having any detrimental effect on health of lambs.

Acknowledgement

We gratefully acknowledge the help offered by Dean, College of Veterinary and Animal Science, Bikaner and Head, ARC-CSWRI, Bikaner for providing facilities to conduct the experiment.

Conflict of Interests

There is no conflict of interest.

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