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## Effect of incorporation of dried distillers grains with solubles (DDGS) in total mixed ration of magra lambs on blood parameters

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### Abstract

The present experiment was conducted at ARC-CSWRI for thirteen weeks on Magra lambs of 3-4 months of age to observe the effect of incorporation of dried distillers grains with solubles (DDGS) in total mixed ration of magra lambs on blood parameters. The lambs were used in a randomized block design and divided into four groups of 5 lambs in each group (T<sub>1</sub>-T<sub>4</sub>). Blood samples were collected at monthly interval by puncturing jugular vein following aseptic measures. No significant effect of incorporation of dried distillers grain with solubles i.e. DDGS was observed at each month of experimental period and also on overall mean values of haemoglobin (Hb), packed cell volume, total erythrocyte count (TEC) and total leukocytes count (TLC). 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:** Blood parameters, DDGS, Magra, TEC, TLC

### Introduction

Sheep rearing is an option of sustainable livelihood particularly in semi arid and arid region (De *et al.*, 2015) <sup>[1]</sup>. Economical and balanced feeding to livestock is one of the fundamental contributions for the productive returns from the livestock. The diverse utilization of conventional feed resources may cause value heightening in not so distant future. The alarming multidimensional shortage of nutrient alongside high costs of traditional feed ingredients will be real constraining component for sustainable animal production. Therefore, the available resource should be used judiciously with the help of technical knowledge, skill and latest scientific research. 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) <sup>[2]</sup>. Currently, DDGS is a most economic protein feed for livestock. To determine the nutritional status of animals and for undertaking prophylactic measures for health problems and to increase production from animals, it is necessary to evaluate the influence of feed upon blood parameters, particularly in adverse climatic conditions as exists in arid region like western Rajasthan. Therefore, present study was designed to see the effect of incorporation of dried distillers grains with solubles (DDGS) in total mixed ration of Magra lambs on blood parameters in arid zone of Rajasthan.

### Materials and Methods

Present experiment of thirteen weeks 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.

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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. The blood, so drawn was collected in sterilized test tubes containing adequate amount of anticoagulant. Haematological studies were performed soon after collection of blood. All the parameters of blood estimated in the laboratory of the Department of Animal Nutrition, College of Veterinary and Animal Science, Bikaner. Haemoglobin (Hb) and packed cell volume were determined by Sahli-Hellige haemoglobinometer and microhaematocrit method, respectively. Total erythrocyte count (TEC) and total leukocytes count (TLC) were carried out manually through haemocytometer as per standard method of Benjamin (1978) [3]. The data obtained in the experiment were analyzed statistically for effect of treatment in complete randomized block design as per Snedecor and Cochran (2004) [4] and significance of mean differences was tested by Duncan's New Multiple Range Test (DNMRT) as modified by Kramer (1956) [5].

### Results and Discussion

The mean values of haemoglobin (Hb), packed cell volume (PCV), total erythrocyte count (TEC) and total leukocytes count (TLC) of lambs under different treatment groups at

monthly intervals of experiment have been presented in Table 1, 2, 3 and 4 as well as in Figure 1 and 2. Due to main effect of treatment *i.e.* incorporation of DDGS in lamb ration, the mean values of haemoglobin (g/dl) were found to be 10.46, 10.10, 10.20 and 10.07 in lambs of T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> treatment groups, respectively. The overall mean values of packed cell volume (%) were found to be 31.34, 31.26, 31.55 and 30.48 in lambs of T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> treatment groups, respectively. The overall mean values of total erythrocyte count (10<sup>6</sup>/cumm) were found to be 8.71, 9.16, 9.26 and 9.22 in lambs of T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> treatment groups, respectively. The overall mean values of total leukocyte count (10<sup>3</sup>/cumm) were found to be 10.64, 11.16, 10.65 and 11.20 in lambs of T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> treatment groups, respectively. The statistical analysis of variance revealed no significant effect of incorporation of dried distillers grain with soluble *i.e.* DDGS at each month of experimental period and also on overall mean values of haemoglobin (Hb), packed cell volume (PCV), total erythrocyte count (TEC) and total leukocytes count (TLC). These results of present study are in agreement with the findings of Konia (2016) [6] who also observed no significant effect of DDGS incorporation in piglet ration on haemoglobin (Hb), packed cell volume (PCV) and total erythrocyte count (TEC).

**Table 1:** Average values of haemoglobin (%) at different time intervals in different treatment groups

Treatment groups	Period (months)				
	0	I	II	III	Mean
T <sub>1</sub>	9.98	10.10	11.06	10.70	10.46
T <sub>2</sub>	9.98	10.10	10.14	10.14	10.10
T <sub>3</sub>	9.94	10.00	10.32	10.54	10.20
T <sub>4</sub>	9.68	9.82	10.10	10.68	10.07
SEM	0.2782	0.2779	0.3554	0.3060	0.2257

**Table 2:** Average values of packed cell volume (%) at different time intervals in different treatment groups

Treatment groups	Period (months)				
	0	I	II	III	Mean
T <sub>1</sub>	29.46	29.66	32.86	33.34	31.34
T <sub>2</sub>	31.39	31.52	30.52	31.58	31.26
T <sub>3</sub>	30.18	30.32	32.5	33.16	31.55
T <sub>4</sub>	29.02	29.04	31.3	32.52	30.48
SEM	0.89587	0.95247	1.55704	0.98691	0.61627

**Table 3:** Average values of total erythrocyte count (10<sup>6</sup>/cumm) at different time intervals in different treatment groups

Treatment groups	Period (months)				
	0	I	II	III	Mean
T <sub>1</sub>	9.00	8.96	8.39	8.50	8.71
T <sub>2</sub>	9.40	9.27	8.44	9.51	9.16
T <sub>3</sub>	9.45	9.38	8.97	9.23	9.26
T <sub>4</sub>	9.11	8.97	9.52	9.25	9.22
SEM	0.38854	0.35391	0.59857	0.59997	0.33934

**Table 4:** Average values of total leukocyte count (10<sup>3</sup>/cumm) at different time intervals in different treatment groups

Treatment groups	Period (months)				
	0	I	II	III	Mean
T <sub>1</sub>	10.54	10.58	10.42	10.98	10.64
T <sub>2</sub>	11.30	11.78	10.14	11.38	11.16
T <sub>3</sub>	10.40	10.46	11.12	10.58	10.65
T <sub>4</sub>	10.68	10.78	12.32	11.02	11.20
SEM	0.51434	0.5121	0.50516	0.54794	0.29341

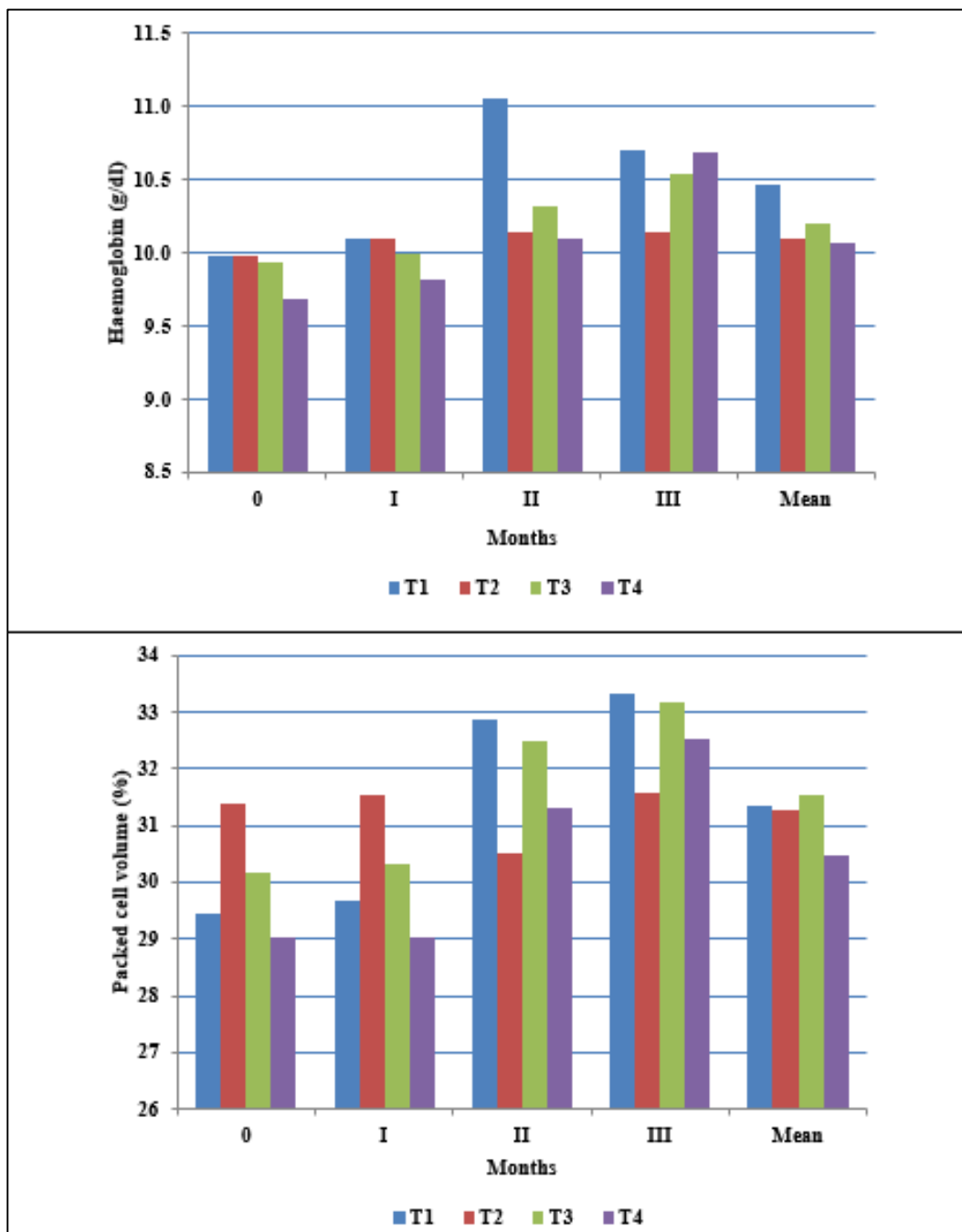


Fig 1: Heamoglobin and PCV at different time intervals in different treatment groups

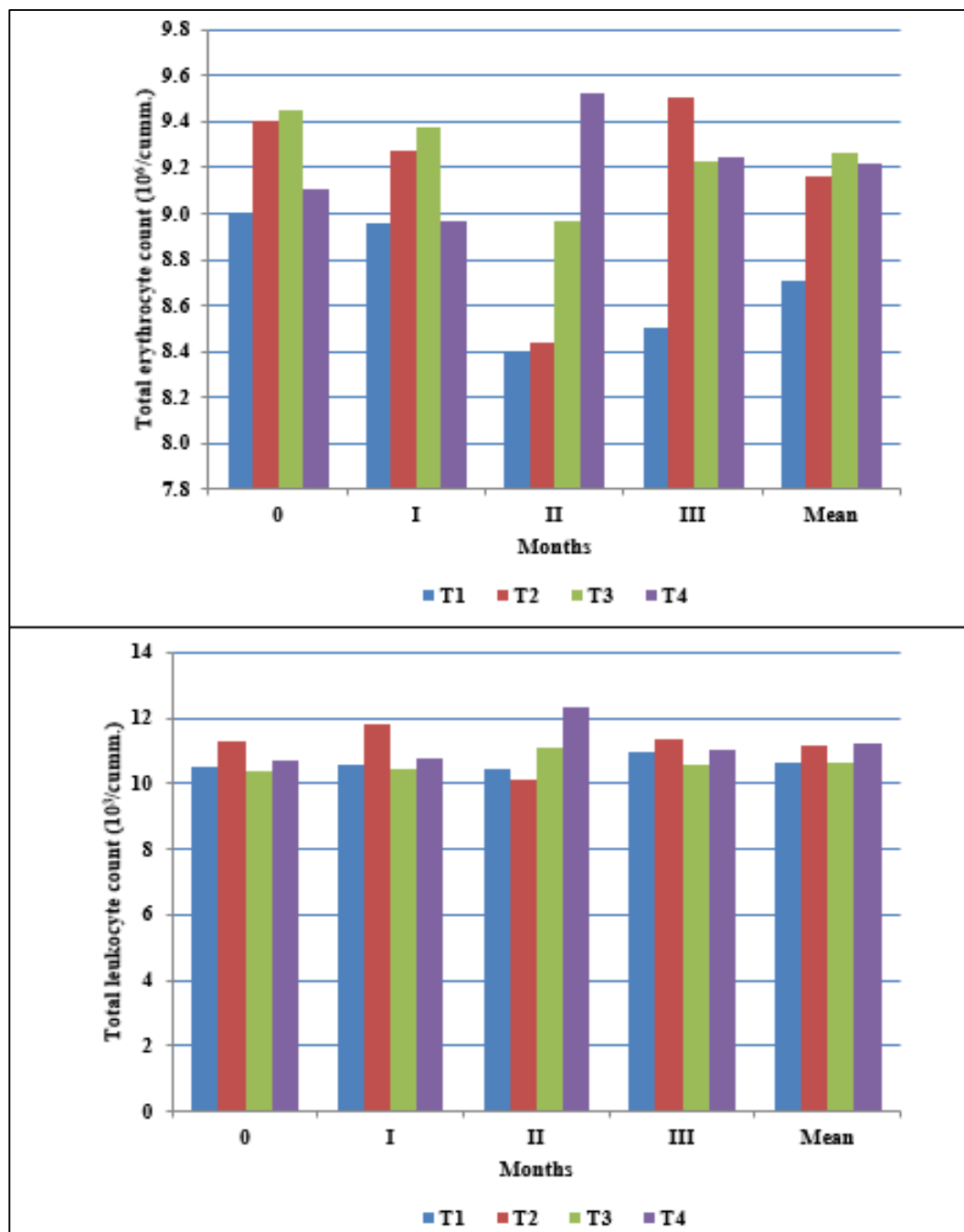


Fig 2: TEC and TLC at different time intervals in different treatment groups

## Conclusion

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

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