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Study on effect of improved shelter management practices on haematological parameters of sahiwal cattle in arid region of Rajasthan

R Arora**Abstract**

The present study was conducted on 24 lactating sahiwal cows by dividing them into four homogeneous groups randomly. The cows of control were kept on cement concrete floor. The cows of treatment group (G-2) were kept in shed having rubber mat flooring, whereas G-3 group animals were reared on cement concrete floor with physical modification, in G-4 group providing rubber mat flooring with physical modification the objective was to study the effect of improved shelter management on haematological parameters (AST) of cattle. Reared in arid region of Rajasthan, the overall mean values of aspartate amino transferase (AST/SGOT)s housed under different shed were recorded as 74.14 ± 2.74 , 72.3 ± 4.41 , 69.34 ± 5.83 , 70.47 ± 1.65 in group-I (Control group), group-II group-III and group 4, respectively. As per the analysis of variance, no significant ($p > 0.05$) effect of treatment was recorded in relation to the control group. However the value were higher numerically in G-1 & G-2 Groups. However there was no significant difference in animal haematobiochemical parameters such as AST/SGOT level in blood of sahiwal cattle.

Keywords: haematological parameters, lactating cow, rubber mat, cement concrete floor, AST/SGOT

Introduction

Livestock sector is an integral part of agriculture of India and an important part of the whole economy with reference to employment, income and earning of foreign exchange for the country. Cattle are economically explored for dairy purposes. The total Cattle contributes around 37.28% of the total livestock population. Rajasthan is the largest state of India endowed with huge livestock production which is at present 57.73 million (Livestock Census, 2012) [1].

Sahiwal is one of the heaviest milker of all Zebu breeds and display a well – developed udder. Due to their heat tolerance, disease resistance and high milk production potential and low maintenance cost, this breed has higher demand among the Indigenous breeds

During the year 2015-16 the country had nearly 22.50 million crossbred cows and 30.45 million indigenous cows in milk production. The average milk production of the respective categories was 8.44 Kg/day and 3.97Kg/ day (Reddy, 2016) [7]. Despite large genetic resources, productivity per animal is low in our country. Thus, there is a need for agents to alleviate environmental stressors for improving productivity this breed of cattle one of the greatest challenges being faced by producers and livestock due to high ambient temperature is thermal stress due to high ambient temperature. The effect of thermal stress is aggravated when accompanied with high humidity (Marai and Habeeb 2010). An ideal housing enables in moderating the range of microclimate to which the animals are exposed and the degree of comfort depends upon the shelter management and type of floor which can be used.

In recent years several technological innovations in animal shelter and housing that include the use of better roofing, flooring materials, provision of sand/ rubber mat bedding, installation of controlled fogger system, sprinkling, splashing of water during hotter period of the day with proper air circulation during summer season Housing system and microclimatic conditions affects the physiological reaction and levels of different blood parameters in the animal body (Wojcik *et al.*, 2004) [10].

During heat stress, reduction in the feed intake causes alteration in the thermal neutral energy balance resulting in the majority of the affected dairy cows entering into negative energy

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Balance. This negative energy balance is associated with a variety of metabolic changes like marked alteration in both carbohydrate and lipid metabolisms (Baumgard *et al.*, 2014)^[2]. Thus Testing of haematological parameters is fundamental to assessment of the health status in dairy herds still the usefulness of improved shelter management is not well studied with respect to Haematological Parameters of indigenous cow.

Therefore, present study was conducted to study effects of improved shelter management on blood biochemical meters of lactating Sahiwal cows.

Materials and Methods

The present study was conducted at Livestock Research Station, livestock Research Station, Kodamdesar. Twenty four Sahiwal milch cattle were selected in early lactation (1-3 months) from L.R.S., Kodamdesar. They were randomly divided into 4 homogenous groups of six each. Group-I without any shelter management reared on pucca floor made up of cement concrete blocks in covered area were act as control. (G1). The experimental cows in group -II were reared on rubber mat bedding over pucca floor in covered area (G2). In group -III were reared on pucca floor (made up of cement concrete blocks) in covered area with physical modification in shelter (G3). In group -IV were reared on rubber mat (width-4 foot, length-7 foot, thickness-25mm, from SUMANGLAM DAIRY FARM SOLUTION PVT. LTD., GHAIZABAD). In floor in covered area with physical modification in shelter (G4). The data for various observations were recorded for 150 days from June to November-2018. In physical modification (provided with fan & splashing of water on body surfaces for two times a day 11.00 AM & 3.00PM daily). Feed offered in all treatment groups were similar throughout the experiment. Individual cow were offered green fodder & dry fodder *ab*

libitium and 2.5 kg concentrate mixture daily. After calving 1 kg extra concentrate mixture was given for every 2.5 kg milk production. All cows were receive the basal diet. Milking of cows was mainly done by hand milking by milkers twice a day at 5.00AM and 4.00PM at milking parlour. In the present study, for serum biochemical analysis, the blood samples were collected monthly. The blood for serum analysis was collected in clean sterile blood collection tubes and was immediately placed on ice. After completion of sample collection, the samples were centrifuged at 3000 rpm for 15 minutes; the serum so separated was then collected in clean sterile serum tubes and stored in deep freezer till further analysis. The serum samples were subjected to biochemical analysis for estimation of serum enzyme such aspartate amino transferase (AST/SGOT). The serum analysis for these parameters was done by Idexx chemistry analyzer machine using vet test kits supplied by Idexx laboratories, as per procedure outlined by the manufacturers.

The data collected, scored, compile and tabulated were subjected to statistical analysis by appropriate method of analysis as per Snedecor and Cochran (1994)^[8] for Analysis of Variance and Duncan's multiple range tests was conducted to test the significance of difference between means ($P < 0.05$).

Results and Discussion

Blood biochemical analyses

Serum aspartate aminotransferase (AST) activity (IU/L)

The mean \pm SE values including range of SGOT/AST (U/L) were recorded as 74.14 \pm 2.74, 72.3 \pm 4.41, 69.34 \pm 5.83, 70.47 \pm 1.65 in group-I (control group), group-II group-III and group 4, respectively. As per the analysis of variance, no significant ($p > 0.05$) effect of treatment was recorded in relation to the control group.

Table 1(A): Mean \pm SE values of serum aspartate aminotransferase (AST) activity (IU/L) in Sahiwal cattle of different shed.

DAYS(AST)	Group-1(G-1)	Group-2(G-2)	Group-3(G-3)	Group-4(G-4)
0 DAY	73 \pm 9.1	81 \pm 6.3	92.17 \pm 13.44	89.34 \pm 11.52
30 DAY	71.84 \pm 4.4	90.17 \pm 4.93	75.84 \pm 10.87	81.67 \pm 10.38
60 DAY	76.3 \pm 4.295	78.67 \pm 3.87	73.5 \pm 7.23	75.5 \pm 6.52
90 DAY	72.84 \pm 3.19	68.17 \pm 2.76	71.84 \pm 5.28	69.34 \pm 3.05
120 DAY	73.5 \pm 5.52	61.67 \pm 4.18	61.17 \pm 4.88	62.17 \pm 3.08
150 DAY	76.17 \pm 2.86	62.84 \pm 2.65	64.34 \pm 3.74	63.67 \pm 2.53
OVERALL MEAN	74.14 \pm 2.74	72.3 \pm 4.41	69.34 \pm 5.83	70.47 \pm 1.65

Table 1(B): Analysis of variance of serum aspartate aminotransferase (AST) activity (IU/L) in Sahiwal cattle of different shed.

	DF	SumSqr	MeanSqr	F(calculat)
GROUP	3	79.93833	26.64611	0.279008
Error	20	1910.06	95.50302	
total	23			

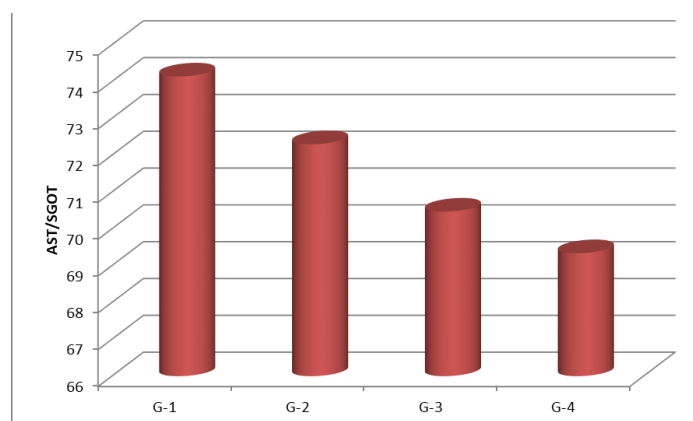


Fig 1(a): Mean OF AST/SGOT in different groups

However the value were higher numerically in G-1 & G-2 GROUPS.

However, the serum SGOT activity was higher in G-1 and G-2 cattle because of higher temperature inside the shed which increases the serum SGOT activity in order to compensate the other negative effects of thermal stress on the physiological and biochemical homeostatic mechanisms.

Present finding were also accordance with; Chandra Bhan *et al.* (2012) [5], Calmari *et al.* (2011); Nazifi *et al.* (2003) [6] and Brijesh (2012) [3] as they reported an increase in serum SGOT activity during thermal stress under different situation. However, Srikandakumar *et al.* (2003) reported a significant decrease in the plasma AST activity in both Merino and Omani sheep during heat stress and they ascribed this decrease to the slowdown of function of the liver enzymes due to reduced metabolism in animals exposed to heat stress.

Conclusion

During summer season, provision of the improved shelter in terms of cooling the environment and providing rubber mat flooring provided a favourable microenvironment to the Sahiwal cattle which resulted in maintaining the physiological, biochemical and behavioural responses in the normal range though, the finding of study in text are concrete and encouraging, but more trial are required to arrive at recommendation for raising cattle farming in Arid region of Rajasthan.

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