

Seasonal effect on the composition of blood in cattle

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Abstract

A group of 84 Lactating cows was selected for study. Haemoglobin, blood glucose level, total serum proteins, albumin, globulin, calcium, inorganic phosphorous & magnesium were studied in these 84 lactating cows. However haemoglobin, blood glucose, total serum protein was higher during summer season, while calcium, magnesium, inorganic phosphorous did not show any variation.

Keywords: Blood, Cattle, Comptons Metabolic Profile Test, Haemoglobin, Total Serum Protein, Albumin, Globulin, Calcium, Phosphorus.

Introduction

To detect the metabolic status, blood chemistry is a vital diagnostic aid. It is therefore, essential that its application should be based on firm scientific foundations. The Comptons Metabolic Profile Test (CMPT) is only one approach to this. CMPT is not primary nutritional test but it is index of nutritional status (Blood *et al.* 1983). Information of blood biochemistry of Indian cattle particularly cows under different climatic conditions in rural areas is very inadequate. Hence present study was undertaken with objective to study the changes in biochemical constitution of blood in different season i.e. summer, rainy and winter.

Materials and methods

The present study was carried on three different locations and different condition of management. A group of 84 lactating cows selected for study, irrespective of their breeds from three different locations. These animals were maintained in typical rural housing and without any standard of feeding.

The entire experiment was split in three phases:

- Phase I - Rainy season (June to September)
- Phase II - winter season (October to January)
- Phase III - summer season (February to May)

All blood samples were collected from the animal in morning between 8.00 a.m. to 10.00 a.m. (approximately two hours after the feeding and milking). This sampling time was rigidly maintained during the entire period of study. Immediately after collection, 0.5ml blood was used for estimation of hemoglobin and glucose. The remaining blood was allowed to clot for separation of serum.

Sahli's method was used for estimation of

haemoglobin. The blood glucose was estimated by Reflox 11 reflectance photometer and blood urea nitrogen (BUN) by Dam method. Total serum (TSP), albumin and globulin by Dam method; serum, calcium by Trinder's method and inorganic phosphorus by Gomorr's method by using kits supplied by Span Diagnosis.

Serum magnesium was determined by Atomic Absorption Spectrophotometry.

Results and Discussion

In the present study Table no I, the higher average hemoglobin level (10.14%) was recorded during summer season. However, there was no significant difference in hemoglobin levels of rainy and winter season. Rowland's *et al.* (1979) reported similar findings. The higher level of hemoglobin during summer may be because of higher total binding capacity of fe⁺ during summer season.

In summer season the average blood glucose level was higher (47.98 mg/dl) whereas, lowest level (44.20 mg/dl) was recorded during rainy season. Change in blood glucose level during various seasons was associated with change in the plasma concentration of blood. (Rowland's *et al.*, 1974).

BUN level did not differ significantly during summer and winter but was significantly low (10.86mg/dl) during rainy season. Similar observations were reported by Moldovan *et al.* (1979 and Lee, *et al.* (1978).

TSP level (7.22g/dl) was higher during summer season. Hooda and Naqvi (1990) stated that there is no variation in concentration of TSP at different season. Higher serum albumin level (3.30g/dl) was recorded during winter and summer season whereas lowest

Table- 1. Haemo-biochemical values in different season.

Sr.No.	Haemato-biochemical Parameters	N	Seasons		
			Rainy	Winter	Summer
1.	Haemoglobin(g %)	84	9.20a ± 0.34	10.07b± 0.34	10.14b± 0.38
2.	Blood glucose (mg/dl)	84	44.26a±1.27	47.23b±0.87	47.98b±1.30
3.	BUN(mg/dl)	84	10.86a±0.40	11.68b± 0.45	11.48b± 0.36
4.	Total serum protein (g/dl)	84	7.05a ± 0.28	7.20b ± 0.39	7.22b ± 0.20
5.	Serum albumin (g/dl)	84	3.14a ± 0.24	3.30b ± 0.21	3.28b ± 0.21
6.	Serum globulin (g/dl)	84	3.91 ± 0.27	3.89 ± 0.26	3.60 ± 0.23
7.	Calcium (mg/dl)	84	9.20a± 0.27	9.14a ± 0.27	9.45b ± 0.24
8.	Inorganic phosphorus (mg/dl)	84	4.60 ± 0.21	4.57 ± 0.18	4.60 ± 0.21
9.	Serum magnesium(mg/dl)	84	2.60 ± 0.19	2.64 ± 0.18	2.61 ± 0.13

during rainy season. Similar observation reported by *Hiratsuka et al.* (1987). The variation in the serum globulin may be due to various physiological, manegmental and genetic factor. *Payne et al.* (1974) and *Hewett*(1975) reported similar findings.

Serum Calcium level did not differ significantly during rainy season but higher (9.45mg/dl) in summer season. This may be due to dietary variation and inadequate supply of calcium through diet.

Serum Magnesium values and inorganic Phosporus did not show any variation in season. According to *Patel et al.* (1966) serum P level depends on climatic variation and nature of feed. *Pande and Shukla* (1975) observed herd differences between villages for serum Magnesium level.

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