ORIGINAL ARTICLE   **OPEN ACCESS**

Determination of blood metabolites in HF cattle at pre –parturient stage: Reference value

Kranti Sharma [a] S.Roy [b] and M.Roy [c] Mukesh Sharma [d]
a. Assistant Professor in Vety.Polytecnic, Rajnandgaon, Chhattisgarh
b. Professor in Veterinary Medicine Anjora Durg Chhattisgarh
c. Associate professor in Veterinary Biochemistry Anjora Durg, Chhattishgarh
d General manager ABIS Dairy Rajnandgaon Chhattisgarh

ABSTRACT
Metabolic profile test have widely been used as part of a multidisciplinary approach to identify metabolic disorders in dairy herds. Our goal was to identify constraints on productivity of crossbred Hostein friesen and set up baseline hematologic and serum biochemical values. In this study, total of 50 high yielding crossbred cows, apparently healthy pregnant cattle running in last trimester ranging from 5-8 years in and around Rajnandgaon district of Chattishgarh state. Almost all the haematological indices remain in normal range. Highest MCV and MCH and lowest MCHC in non pregnant cows as compared to pregnant cows. In this study an increase in eosinophil count (6.35±0.54), which may result from the stress (cortisol) mediation associated with prepartum stress . Calcium level was significantly drop (7.0± 0.33) than the normal values recorded for healthy cattle (12±11).The depressed trend in Ca++ levels could be a result of the impaired absorption of food metabolites from the gastrointestinal precursor. In last trimester serum phosphorus level was recorded is (2.83±±) which was significantly (p<0.05) lower Glucose, BUN, Creatinine, AST, ALT, Total serum protein and albumin level were found very close to standard reference values recorded in the literature in similar breeds.
Key words: Milk, Metabolic profile test, Calcium, phosphorus, enzymes.

INTRODUCTION

The Compton metabolic profile test was design to monitor the metabolic health of cow in dairy herds in relation to management, nutrition, milk production, disease and to aid in the diagnosis of metabolic disorders. In 1976 payne put together a group of metabolites in to a single package called the "Compton Metabolic Profile Test". Subsequently , many researchers have been applied MPT to improve feeding management. The metabolic profile test is also very useful for detection of subclinical health problems and prevention of production disease [1, 7].
Detailed study on the aspect of metabolic profile test of cattle in chattishgarh is lacking so we conducted metabolic profile test in different farm in Chattishgarh.

MATERIALS AND METHODS

For this study, total of 50 high yielding crossbred cows, apparently healthy pregnant cattle running in last trimester ranging from 5-8 years in and around Rajnandgaon district of Chattisgarh state. Blood samples were collected from cows in the morning (approximately 2 hours after milking and feeding). The blood samples were collected with a minimum excitement. About 15 ml of blood was collected from each cows by puncturing the jugular vein using a 16-20 gauge collection needle in thoroughly cleaned vial. Sample were kept in one plain test tube and allowed and allowed to stand in slanting position for overnight at room temperature. Serum was separated, transferred in to serum vial and stored in deep freeze until analysis the analysis. All the data were analysed statistically by using completely randomized design as per Snedechor and Cochran [2]. different haemato-biochemical parameter were estimated.

RESULT AND DISCUSSION

All the haematological indices associated with R.B.C. differed significantly (p<0.05) within the respective means except E S R. The ESR value were reported in the present study was 12.46± 0.95 there is no specific trend of ESR was observed in the present study. Significant increase in E.S.R. witness of as pregnancy advance (O). The mean Hb value were 9.21±0.40 which is significantly low as compared to mid stage pregnancy. PCV value were found highest in pregnant heifer [5].The value of total RBC were significantly low (p<0.05) during earlier stage of pregnancy. Kumar and Pachouri [5] reported highest MCV and MCH and lowest MCHC in non pregnant cows as compared to pregnant cows.

In this study an increase in eosinophil count (6.35±0.54), which may result from the stress (cortisol) mediation associated with prepartum stress. We assumed, some parasitic internal and external parasitic infestation might have played the role in increasing values for eosinophil. Other typical changes of acute stress in cow like neutropenia or lymphopenia [3, 9] were not observed. Significant decrease in basophil (0.28±11) also suggests that there might be parasitic infections which have some potential of causing allergy.

Monocyte values (6.01±0.33) were equal to [1], higher than.The extent of variation is affected by a variety of factors. The higher value suggests intestinal and/or liver parasites.

Rest component of blood were found within the normal range recorded for similar species of animal in different parts of world.The result obtained in the present study are in agreement with the reports of several other researchers [7]. The values trending towards lowers range could be due the dilution of blood which occurs as consequence of increase of plasma volume [3].Similar logic may apply in the present study. Although, the difference is in significant the lowered trend is attributable to dietary supplements and management as well as study pattern. Mean value for rest of the serum biochemical tested in this study (Table 2) were found within the referential range reported by Kaneko [4].

Table-1 Estimated values for Blood Parameters

S.No	Parameters	Mean ± SE
1	Hb (gm/dl)	11.23±0.11
2	PCV(%)	33.69±0.33
3	ESR(mm/24 hrs)	11.83±0.10
4	MCV(fl)	53.23±0.11
5	MCH(Pg)	14.23±0.51
6	MCHC(%)	30.23±0.11
7	Neutrophil(%)	30.23±0.21
8	Lymphocyte(%)	54.23±0.10
9	Eosinophil(%)	18.00±45
10	Monocytes(%)	6.01±.33
11	Basophil(%)	0.28±11

Table-2 Estimated values for Serum biochemical

S.No	Parameters	Mean ± SE
1	Glucose (gm/dl)	36.23±0.11
2	Ca(mg/dl)	7.09±0.33
3	P(mg/dl)	2.83±0.10
4	Mg(mg/dl)	3.23±0.11
5	AST U/l	114.23±0.51
6	ALT	70.23±0.11
7	Total protein(gm/dl)	6.23±0.21
8	Albumin(gm/dl)	0.63±0.10

In last trimester serum phosphorus level was recorded is (2.83±11) which was significantly (p<0.05) lower than the value recorded in the literature for normal healthy dairy cattle. Moderate depression in the levels of phosphorus might be due to its necessity for the colostrums synthesis [8] and enhanced carbohydrate metabolism. Calcium level was significantly drop (7.0± 0.33) than the normal values recorded for healthy cattle (12±11).The depressed trend in Ca++ levels could be a result of the impaired absorption of food metabolites from the gastrointestinal precursor. Excessive losses through the urine and more importantly overload of supplying mineral component to foetus. As the pregnancy advances the serum calcium level depletes . Reduction in Calcium intake of 100 to125g/day results in a higher incidence of milk fever than lesser amounts. Low calcium ,high phosphorus diets increase mobilizable calcium to 60% of body total compared to 37% for high calcium, low phosphorus diets [8, 9].The

incidence of milk fever can be reduced by prepartum feeding of diets low in calcium but more than adequate in phosphorus [6]. Glucose, BUN, Creatinine, AST, ALT, Total serum protein and albumin level were found very close to standard reference values recorded in the literature for similar level were found very close to standard reference values recorded in the literature for similar breeds.

CONCLUSION
This part of a broad study. The value obtained in this study can be used cautiously as reference value at pre-parturient stage of cross HF. The variable significantly different are not recommended as baseline value. Further, Several other studies should be conducted in different stages and season to exacting the standard reference value for this species of animal, Finally we thank ABIS dairy Rajnandgaon for providing me facilities.

REFERENCES
1. Canfield P.J.Best,F.G.Fairburn,A.J.Purdie,J. and Gilhum,M. (1984). "Normal Haematological and Biochemical values for the swamp Buffalo and dairy cattle in Australia"Aust Vet. J. Vol. 61,pp 89-93
2. Snedecor, G. W., & Cochran, W. G. (1994). Statistical methods (eighth edition). Calcutta, India: Oxford & IBH Publishing Co.
3. Jain,N.C. and Lasmanis J (1997). "Leucocytic Changes in Cows given Intravenous Injections of Escherichia coli Endotoxin"Res Vet Sci. Vol. 24 pp 386-387
4. Kaneko JJ (1989). Serum Protein and the Dysproteinemias", in kaneko JJ (Ed.), 4th Edition ,pp 142-165,Academic Press,San Diego.
5. Kumar,B. and S.P. Pachuri (2000). Haematological profile of crossbred dairy cattle to monitor herd, health, Status at medium elevation in central Himalayas Res.Vet.Sci 69:141-145
6. McCullough ME 1969,Optimum Feeding of Dairy Animals.University of Georgia Press,Athens,GA.
7. Mallard,B.A.J.C. Dekkers,M.J. Ireland,K.E.Lesile,S. Sharif,E.Lacey Vankampen,L Wagter and B.N.Wikie,(1998). Alteration in immune responsiveness during the paripartum period and its ramification in dairy cows and calf health J Daiy Sci 81:585-595
8. Wasserman R.H. (1960). Calcium and phosphorus Interactions in Nutrition and Physiology"Fed.Proc.,Vol 19p 636
9. Meglia,G.E.A. Johannisson, S. Agenas, K. Holtenius and K.P. Waller (2005). Effect of feeding intensity during the day period on leukocyte and lymphocyte to sub-population neutrophil function and health in periparturient dairy cows Vet.J 169:376-384