



Efficacy of an area specific mineral mixture on the haemato-biochemical profile of cattle of the state of Tripura

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Received: 30 September 2010; Accepted: 21 January 2011

ABSTRACT

A study was conducted to record the mineral status in soil, fodder and serum from four districts of Tripura state. There is a significant deficiency of P, Zn, and Cu in the soil, fodder, serum (cattle) of Tripura state. Lower values of AST (U/L) and ALT (U/L) were observed whereas, higher values of AKP (U/L) were observed in all the districts. The levels of haemoglobin, packed cell volume and total erythrocyte count were towards lower side of normal range. A mineral mixture was prepared according to the deficiency obtained. Therapeutic trial was conducted on some cattle in local and Govt. dairy farm for 90 days. Significant improvement was observed in haemato-biochemical status of the deficient animals.

Key words: Area specific mineral mixture, AST, ALT, Cattle, Haematology, SAP

Minerals play an important role in health and reproduction of the livestock. Minerals deficiency associated disorders are quite common in the dairy cattle due to deficiency of essential minerals which can be compensated by feeding prepared area specific mineral mixture (Sharma *et al.* 2004). The present study was conducted to determine the efficacy of newly formulated area specific mineral mixture on improvement of haemato-biochemical profile of cattle of Tripura state.

MATERIALS AND METHODS

For therapeutic study, the deficient and healthy cattle (100) were chosen and these animals were divided into 5 groups of 20 animals each. Group 1 (healthy control animals provided with an area specific mineral mixture), group 2 (Mineral deficient cattle with no mineral supplementation given), group 3 (healthy animals given mineral mixture commercially available), group 4 constituted deficient animals, given commercially available supplementation and group 5 deficient cattle treated by an prepared area specific mineral mixture supplementation for the deficiency obtained in Tripura State. These groups of animals were homogenous

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to non-nutritional factors. Therapeutic trial was conducted in organized dairy farm of Tripura. All cattle in 2–4 months of lactation were fed with 40 g of mineral mixture twice daily along with normal diet. Haemato-biochemical parameters were recorded at 0, 30, 60 and 90 days post supplementation.

Haematology: For haematological study, about 3 ml anti-coagulated blood was collected from jugular vein in clean vials. Haemoglobin was estimated using Sahli's haemoglobinometer by cyan-met-haemoglobin method. PCV and TEC were estimated as per the procedure of Jain (1986).

Enzyme and hormone estimation: Enzymes serum aspartate aminotransferase (AST), serum alanine aminotransferase (ALT), serum alkaline phosphatase (SAP), were estimated by the method of Bergmeyer (1983).

Statistical analysis: Data were processed as per Snedecor and Cochran (1994) for mean, standard error, analysis of variance (ANOVA) and correlation coefficient.

RESULTS AND DISCUSSION

Haemato-biochemical status of the animals: Lower values of AST (U/L) and ALT (U/L) were observed in all the districts of Tripura whereas, higher values of AKP (U/L) were observed in all the districts (Table 1). Sharma *et al.* (2009) reported lower value of ALT might be due to Ca and P deficiency resulting in delayed transamination reaction. Underwood and Suttle (1999) have reported a rise in serum alkaline phosphatase in a diet, low in phosphorus.

The levels of Hb, PCV and TEC were toward lower side

Table 1. Values (mean±SE) of haemato-biochemical and hormonal profile of cattle in various districts of Tripura

Districts/parameters	West	South	North	Dhalai
AST (U/L) (78-132)	22.72 ^a ±2.41	31.20 ^b ±2.34	26.38 ^a ±2.40	43.39 ^b ±2.30
ALT (U/L) (11-40)	08.55 ^a ±2.12	09.23 ^a ±2.11	04.84 ^b ±2.13	07.09 ^a ±2.09
SAP (U/L) (8-10 KA/100 ml)	25.63 ^b ±4.56	34.90 ^a ±4.51	24.56 ^b ±4.24	38.28 ^a ±3.99
Hb (g %) (8-15)	8.58 ^b ±0.45	9.16 ^a ±0.38	9.25 ^a ±0.42	8.69 ^b ±0.40
PCV % (24-46)	20.30 ^a ±1.73	24.64 ^b ±1.65	25.00 ^b ±1.70	22.77 ^a ±1.55
TEC ×10 ⁶ /ul (5-10)	5.62 ^a ±0.17	5.38 ^a ±0.28	5.43 ^a ±0.25	5.11 ^a ±0.19

Values in parenthesis indicates normal values; *, values differ significantly (P<0.05) as compared to the normal; values with different superscripts differ significantly (P<0.05) within the column; ND, not detectable.

of normal range (Table 1). Similar values in cattle were also reported by Biswas and Samanta (2002) and Sharma *et al.* (2009). The lower haemogram values were suggestive of nutritional anaemia possibly resulting from the consumptions of forages having low concentrations of cobalt.

Effect of mineral supplementation on haemato-biochemical parameters: In the present study significant improvement in haemogram were observed in cattle of treated groups with newly formulated mineral mixture from day 60 onwards whereas significant improvement was observed in group 4 animals (treated with commercially available mineral mixture) on day 90 of treatment. This may be due to balance in corroboration of mineral supplements according to deficiency of region especially copper and cobalt in newly formulated mineral mixture. Sharma *et al.* (2002) has reported significant increase in Hb and TEC, which is in corroboration with the present findings. Improvement in haematological status of cattle after supplementation of zinc and copper has been reported by Sharma and Joshi (2005).

After treatment the values of AST and ALT improved in group 4 and 5 from day 30 of treatment. This may be due to the increase in transamination reaction as a result of calcium and phosphorus supplementation (Exton 1980). Similar findings were reported by Kalita *et al.* (2000). In group 5, significant decrease in SAP was observed on day 30 onwards whereas, significant decrease was observed in group 4 on day 90 of treatment. Nonsignificant decrease in SAP was observed in group 2 and 3 on different days of treatment. Improvement in biochemical status of cattle after supplementation of zinc and copper was reported by Sharma *et al.* (2005). Improvement in haemato-biochemical status of calves after supplementation of zinc has been reported by Mandal and Dass (2010).

In another study workers reported that the dietary supplementation of phosphorus, copper and magnesium in the form of area specific mineral mixture in plain region of Uttarakhand is inevitable (Tiwari *et al.* 2009).

In conclusion, Tripura is a state with rich animal resources particularly cattle population. Production loss due to mineral deficiency was witnessed in this state, which was found to be improved after supplementation of area specific mineral mixture. It was found that significant improvement was

observed in haemato-biochemical status of the deficient animals on 60th day onward. Largely, it was envisaged that mineral supplements should be provided to the deficient animals for their better health and productivity.

ACKNOWLEDGEMENT

Authors are highly thankful to Director, Indian Veterinary Research Institute (IVRI), Izatnagar for his kind cooperation during the course of this work.

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