



SHORT COMMUNICATION

Nutritional and Therapeutic Management of Ruminal Dysfunction in Dairy Cows Affected with Trypanosomosis

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ABSTRACT

It is well established that trypanosomosis as well as trypanocidal drugs elicit their adverse effects on rumen microflora and fauna, leading to severe depression of appetite in ruminants. Despite the fact, a very less attention has been paid to restore rumen functions using nutritional and therapeutic interventions during its treatment under field conditions. This report considered two dairy cows affected with *Trypanosoma evansi* that were treated by trypanocidal drug and exhibiting anorexia for more than five days. The supportive therapy included supplementing probiotics plus rumen stabilizing/conditioning agents (*i.e.*, ruminototics and stomachics), which normalized the appetite by day three post therapy and the cows recovered uneventfully. Thus, the current findings reinforce to consider nutritional interventions to restore ruminal health when treating cows suffering from trypanosomosis under field conditions.

Key words: Anorexia, Cattle, Feed additives, Nutritional therapy, Trypanosomosis

The tick-borne hemoprotozoan parasites- namely *Trypanosoma* spp., *Babesia* spp. and *Theileria* spp.-cause a significant economic loss to livestock industry every year in India by adversely affecting health and productivity, besides causing mortality (Uilernberg, 1995; Maharana *et al.*, 2016; Parashar and Singla, 2019). Particularly, in trypanosomosis caused by *T. evansi*, the course of treatment is expensive and the prognosis is not always favourable, primarily due to the stage of disease and host immune competence. On top of it, treatment with trypanocidal drugs further exacerbate the ruminal microbial balance leading to depression of appetite (anorexia). If not addressed at proper time, the rumen microflora and fauna could be severely affected, resulting in complete anorexia and subsequently death (Radostits *et al.*, 2009; Rathore *et al.*, 2016; Senapati *et al.*, 2018). Hence, it becomes imperative to restore rumen functions as soon as possible by additional supportive therapy through a nutritional approach.

In Mangarajpur village of Odisha, the cattle population was predominated by local indigenous breeds

and there was no reported incidence of hemo-parasitic diseases. However, recently in 2018, two dairy entrepreneurs started rearing crossbred cows. On seeing the remunerative economics of crossbred cows, villagers were inspired and purchased some cows from a village in Jagatsinghpur district with known incidence of hemo-parasitic disease. These cows showed the symptoms of trypanosomosis. After treatment with typanocidal drugs and supplementary regimen two of the cows became anorectic. In this field study, the supportive therapy protocol particularly involving nutritional supplements in dairy cows affected with trypanosomosis to reverse the ruminal dysfunctions was attempted.

Outbreaks of hemoparasitic diseases particularly trypanosomosis and theileriasis were reported in the village among crossbred cows along with two reported deaths. After treatment by the local veterinarian, some animals recovered, whereas two became anorexic with a characteristic rumen hypomotility. When presented, both the animals were diagnosed with trypanosomosis, appeared emaciated and treated with diminazene

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aceturate (1st case) or suramin (2nd case) along with fluid therapy, rumen buffer (Rumen FS Powder™) and supplementation of mineral-vitamin mixture. The animals showed recovery with near normal body temperature. However, the first animal showed severe depression in appetite and remained anorexic for 12 days. The feces had foul smell and turned brownish black to blackish with watery consistency after 11th day of developing anorexia. Furthermore, the animal could not drink more than 2-3 l of water per day. Although to a lesser extent than first, the second animal too exhibited off-feed condition for five days. Both the animals were supplemented with feed supplements, Floratone Forte™ (Sodium bicarbonate 660 mg, magnesium trisilicate 1000 mg, vitamin B₁ 145 mg, nicotinamide 165 mg, methionine 40 mg, copper sulphate 0.44 mg, ginger powder 44 mg, gentian powder 220 mg, dried yeast 700 mg, dextrose 500 mg, cobalt sulphate 0.88 mg, sodium phosphate 100 mg) at one bolus per day for three days along with Ecotas™ (*Saccharomyces cerevisiae* 25×10⁹ CFU, *Lactobacillus* sp. 25×10⁶ CFU, *Aspergillus oryzae* 25×10⁶ CFU, fructo-oligosaccharide 250 mg, biotin 10 mg DL-methionine 1 g, zinc sulphate 200 mg, cobalt sulphate 40 mg, copper sulphate 100 mg) at two boluses daily for six days. Himalayan Batisa™ (10 g) and powdered jaggery (20 g) acted as vehicle to administer boluses orally. Furthermore, to stabilize the general body functions, improve immunity and reduce stress level, Restobal™ (a herbal performance enhancer and stress modulator) was drenched at the rate of 100 ml twice daily for two days followed by 100 ml once on the following day.

Mouth was washed with baking soda thrice daily

along with rubbing with tamarind (*Tamarindus indica*) pulp and/or potassium permanganate solution on the gum. In addition, the feed supplements, K-Zyme™ (each 100 g containing cellulase 20.2 mg, xylanase 116 mg, pectinase 48.5 mg, phytase 50 mg, cobalt 50 mg, copper 200 mg, iron 100 mg, zinc 200 mg), was added at 30 g daily from day two post therapy along with 20 g common salt (NaCl) dissolved in the rice gruel and offered regularly for 10 days. As ticks were found in the shed, which act as vectors to transmit *Trypanosoma* hemoprotozoa, cypermethrin 100 EC was sprayed to the cracks and crevices of the shed. The animal was fed on locally available bamboo (*Bambusa* sp.) leaves when it gained appetite on the second day. Therapeutic evaluation was based on the estimation of hemoglobin (Hb), differential leukocyte count (DLC), prevailing anorexia and the presence of *T. evansi* in peripheral blood which were conducted at Animal Disease Research Institute, Nakhara, along with fecal consistency, color and odor by personal observation on daily basis. The values obtained from healthy cow examined for trypanosomosis and when found negative for the parasites was considered as control to compare hematological values.

On manual examination, the swollen prescapular lymph nodes became clearly palpable along with rough and dehydrated skin. Table 1 presents the data on hematological parameters of both the cows at 15-days prior to the start of the study and 7-days post therapy. The results revealed improvement with respect to Hb and DLC by 7 days post therapy with the aforesaid medication.

The first cow gained appetite after 12 h of

Table 1. Effect of treatment on blood parameters of the two dairy animals affected with trypanosomosis

Parameter	Before treatment		7 th day after treatment		Control
	Cow-1	Cow-2	Cow-1	Cow-2	
<i>Trypanosoma evansi</i>	+ve	+ve	+ve	-ve	-ve
Hemoglobin (g %)	4	6	6	8	10.5
Neutrophils (%)	48	46	41	35	35
Lymphocytes (%)	41	42	49	55	53
Monocytes (%)	6	6	5	6	6
Basophils (%)	1	1	1	0	1
Eosinophils (%)	4	5	4	4	5

supplementation and started consuming bamboo leaves, voluntarily drank water as well as rice gruel. The colour of feces also changed 32 h post therapy and the odour tended towards normal, indicating restoration of ruminal and gastro-intestinal functions. The second cow also recovered from anorexia within one-day post therapy, started nibbling and within three days began consuming the normal diet.

T. evansi infection decreased Hb level, increased neutrophil concentration and decreased lymphocyte count as compared with non-infected healthy cow (Pandya *et al.*, 2016). As the blood parasite infection resulted in severe blood loss, when treated with trypanocidal drugs, the stress in the animal becomes aggravated, resulting in side effects such as ruminal dysfunction and anorexia (Radostits *et al.*, 2009).

As summarized by different reports, diminazene aceturate is the most extensively used curative trypanocidal agent against trypanosomosis followed by isometamidium chloride, suramin and quinapyramine (Maharana *et al.*, 2016; Singh and Maharana, 2018). The curative or prophylactic effect of these drugs is much effective against the parasite. However, these trypanocidal drugs cause several side effects including oxidative stress affecting ruminal fermentation as well as body functions in animals (Rathore *et al.*, 2016; Hussain *et al.*, 2018; Senapati *et al.*, 2018). The rationale behind addition of herbal anti-stress and immune booster was to stabilize the body by removing metabolic stressors, which otherwise increase the body stress load causing anorexia. Furthermore, the therapy also included some beneficial microbes (probiotics) to stimulate rumen fermentation, ruminal enzymes, which might have also enhanced microbial fermentation of fibre (Mahesh *et al.*, 2021). Other feed additives including appetizers were used with the objective to improve intake, stabilize the rumen ecology and improve ruminal fermentation. Both the cows responded well to the above nutritional and therapeutic regimen.

The current study reiterates the significance of optimal rumen health that is achieved through nutritional means along with other supportive therapy when using trypanocidal drugs in dairy cows. This

cost-effective and safe, yet highly crucial approach to reinstating ruminal functions through a combination of feed additives, could save dairy cows from succumbing to trypanosomosis in tropical countries.

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