

## CLINICO-THERAPEUTIC STUDIES ON DEGNALA DISEASE IN BUFFALOES

Ramesh, R., Vaikunta Rao, V.\* and Suresh, K.

## ABSTRACT

The study revealed that the overall prevalence of bovine dermatological disorders was 25%. Specifically the prevalence of degnala disease was 14. Cultural isolation and identification of scrapes of the mouldy rice straw revealed *Aspergillus flavus*, *Aspergillus niger*, *Pencillium notatum* and *Ochracious* spp. The most prominent clinical signs observed in bovines with degnala disease were edematous swelling of the hind limbs, cracks on the skin of the limbs, ulcerative wounds at inter digital space of hooves and gangerene of the tail and ear tips. Haematological studies showed anemia and normal leukogram. Serum biochemical profile showed fall in blood urea nitrogen, albumin and normal serum zinc, copper and aspartate aminotransferase levels. However there was an increase in total protein values. Combination of Destrox, Chlorphenaramine maleate, Streptopencillin and Zinc oxide found to be useful in the treatment of degnala disease in bovines.

**Keywords:** *Bubalus bubalis*, buffaloes, therapeutics, degnala disease, dermatological

## INTRODUCTION

Degnal disease occurred in winter months when fungal infested paddy straw was fed to bovines. The disease was known to exist along the Indo-Pakistan border as more number of cases were recorded stemming from monsoon rain water stream in the area of murdike, near Nala deg river in Pakistan. The wide spread occurrence of the disease in buffaloes has been reported from rice growing areas of indo-Pakistan border, which causes considerable economic losses. The disease causes necrosis and gangrene in dependent parts of bovines. The most frequently found fungi are *Aspergillus niger*, *Aspergillus fumigatus*, *Aspergillus flavus* and *Pencillium notatum*. Patient history, results of physical examination and diagnostic aids provide practical means of diagnosing bovine skin diseases. The therapeutic regimen for management of degnala disease includes pentasulphate, anti-degnala liquor (arsenic sulphate) and topical application of nitroglycerin ointment. Recent studies suggested that nutritional supplementation of destrox as a toxin binder and topical application of zinc oxide ointment were quite safe even after long therapy of degnala disease in bovines. Destrox is biotechnologically

derived products formulated with multiple actions to combat and destroy the toxins at multiple levels. Destrox as a toxin binder has been used successfully in the management of aflatoxicosis in poultry (Kumar *et al.*, 2012). However toxin binding activity of destrox in bovines with degnala disease is yet to be sufficiently explored. Perusal of available literature revealed that not much attention has been paid towards degnala disease in India. Keeping in view of above facts, the present study was designed with following objectives.

- To make an attempt to identify the etiology of degnala disease in bovine.
- To study the clinical signs and haemato-biochemical findings in bovines with degnala disease.
- To formulate an effective managemental regimen for Degnala disease in bovines.

## MATERIALS AND METHODS

The study comprised apparently healthy bovines and clinical cases. Ten apparently healthy bovines were selected as control group for obtaining normal data for comparison of parameters under study. The study was conducted in 186 clinical cases brought to large animal outpatient medicine ward of Teaching Veterinary Clinical Complex, NTR College of Veterinary Science, Gannavaram. Bovines with clinical signs suggestive of dermatological disorders were screened by using specially designed dermatological data sheet and subjected to detailed clinical examination, haematology, serum biochemical profile, skin scrapings and cultural isolation to confirm the bovine dermatological disorders. Paddy straw samples were collected in sterile polythene bags from suspected bovine cases of degnala disease.

Martin rose bengal agar medium was used for isolation of fungi. Staining reagent new methylene blue was used. All the dehydrated media used in this study were obtained from Hi-media Laboratories Pvt Ltd., Mumbai, Glassware from M/S Borosil, Mumbai. Cases of dermatological disorders were selected non-randomly based on detailed history, clinical examination, examination skin scrapings and cultural study. The bovines selected for present study were subjected for detailed clinical examination and the data were recorded in proforma specially designed for the data collection. The plate method was used for isolation of fungi. The media used for isolation of fungi was Martin rose Bengal agar medium. The media was incubated at 32°C, for 5 days. The colonies appeared after 48 h. The colony morphology was studied after 72 h.

By using lacto phenol cotton blue staining method identify the different fungi morphology under microscope. Two milliliters of whole blood was collected from the jugular vein of the bovines in a sterile vial containing 10% EDTA for the estimation of total erythrocyte count (TEC), haemoglobin (Hb), packed cell volume (PCV), total leukocyte count (TLC) and peripheral smears were made for Differential leukocyte count (DLC) as per the methods described by Coles (1986). Three milliliters of whole blood was collected into a test tube for separation of serum and the following estimations were done. Serum creatinine was estimated modified jaffès alkaline picrate method (Bowers, 1980) in Erba chem. 5 plus semi automatic biochemical analyzer with Erba diagnostics commercial kits. It was expressed in mg/dl. Blood Urea Nitrogen was estimated by kinetic, enzymatic method. (Tietz, 1995) 5 plus semi automatic biochemical analyzer with Erba diagnostics commercial kits. It was expressed

in mg/dl. Albumin is estimated by Bromo cresol green end point assay method (Tietz, 1986) (b) in Erba chem 5 plus semi automatic bio chemical analyzer with Erba diagnostics commercial kits. It was expressed in g/dl. Total protein was estimated by modified Biuret and Bromo cresol green dye method (Tietz, 1986) (b) in Erba chem 5 plus semi automatic bio chemical analyzer with Erba diagnostics commercial kits.

It is expressed in g/dl. AST was estimated by modified IFCC method (Tietz, 1982) (a) in Erba chem. 5 plus semi bio chemical analyzer with Erba doignostics commercial kits. It was expressed in IU/l. Copper was estimated by using atomic absorption spectrometer (Spectra AA). It was expressed in ppm. Zinc was estimated by using atomic absorption spectrometer (Spectra AA). It was expressed in ppm. Out of 186 bovines diagnosed as suffering from dermatological disorders, 20 bovines were randomly selected and divided into 2 groups for the therapeutic trials. The criteria for selection of therapeutic trials were history and clinical signs suggestive of degnala disease, infected paddy straw samples which were positive for fungal organisms and animals that were free from other dermatological disorders. Twenty confirmed cases of degnala disease were randomly selected in two groups of ten animals each for clinical trials using different therapeutic regimens. The bovines in Group I were treated with Destrox powder 30 g/animal p/o once daily for a period of ten days. The bovines in Group II were treated with Toxol powder 50 Gm/animal, once daily orally for a period of ten days. The following supportive therapy was given to both the groups for a period of five days.

- Chlor pheneramine maleate 0.5 mg/kg b.wt once in a day i/m for five days.

- Strepto pencillin 5 g i/m for 5 days.

- Zinc oxide ointment topically.

The owners were advised to stop feeding of infected paddy straw to the affected bovines, and to give palatable green fodder and balanced diet. The bovines under the therapeutic trials were monitored for a period of five days and the two treatment regimens were evaluated at ten days period based on the improvement in clinical signs, haematology and serum biochemical profile. The data collected were subjected to statistical analysis as per Snedecor and Cochran (1994) and critically discussed.

## RESULTS AND DISCUSSION

In the present study, the clinical cases showed signs of improvement after 5 days of treatment in both the groups. After 10 days of treatment, clinical signs resolved and improved in physical activity in both the groups. The present findings concur with earlier reports (Mallick *et al.*, 1990; Basak, 1994; Maqbool *et al.*, 1998; Prasad *et al.*, 2000; Sekhar *et al.*, 2012). Recovery in response to treatment in two groups indicated that, discontinuation of feeding fungal contaminated paddy straw and symptomatic treatment in early stages of the disease might help in controlling the disease (Mallick *et al.*, 1990) (Figure 1, 2, 3 and 4).

It was probable that in Group I treatment had the ability to directly neutralise the mycotoxin. Destrox can bind the aflotoxins in the gastrointestinal tract and thus significantly reduce their intoxication (Maqboole *et al.*, 1998; Sekhar *et al.*, 2012; Kumar *et al.*, 2012). The present study revealed that significant elevation in haemogram (haemog - lobin, packed cell volume, and total erythrocyte count) and blood urea nitrogen and albumin values in both the treatment groups

compared to their pretreatment values. The present findings concur with earlier reports (Basak *et al.*, 1994). The elevation in haemogram, and protein status could be attributed to the increased feed intake and hepato protective action of toxol in Group II and toxin binding action of destrox in Group I. (Maqbool *et al.*, 1997; Kumar *et al.*, 2012)

(Table 1 and Table 2).

The present study revealed that the severity of the disease subsided. Granulation tissue was quite apparent after 10 days of treatment indicating the healing process. All 20 animals completely recovered within 10 days of treatment. Significant elevation in haemogram, (haemoglobin, packed



Figure 1. Fungus growth from infected paddy straw samples on MRB agar.



Figure 2. Fungus growth from infected paddy straw samples on MRB agar.



Figure 3. Fungus growth from infected paddy straw samples on MRB agar.



Figure 4. Fungus growth from infected paddy straw samples on MRB agar.

Table 1. Haematological findings in treatment groups.

SL. No.	Parameter	Control group	Treatment Group I		Treatment Group II	
			Pre treatment	Post treatment	Pre treatment	Post treatment
1	Hb (gm/dl)	11.06 <sup>al</sup> ±0.223	8.53 <sup>2</sup> ±0.233	11.34 <sup>a</sup> ±0.149	8.62 <sup>2</sup> ±0.314	11.46 <sup>a</sup> ±0.147
2	PCV (%)	36.1 <sup>al</sup> ±0.887	23.08 <sup>2</sup> ±0.727	36.7 <sup>a</sup> ±0.76	23.6 <sup>2</sup> ±0.618	38.1 <sup>a</sup> ±0.924
3	TEC (10 <sup>6</sup> /cmm)	7.38 <sup>al</sup> ±0.093	4.69 <sup>2</sup> ±0.114	8.16±0.176	4.94 <sup>2</sup> ±0.085	8.35 <sup>b</sup> ±0.199
4	Total leucocyte count (10 <sup>3</sup> /cmm)	4.46 <sup>al</sup> ±0.089	7.17 <sup>2</sup> ±0.072	4.31 <sup>a</sup> ±0.866	7.06 <sup>2</sup> ±0.07	4.84 <sup>b</sup> ±0.075
5	Lymphocytes	57 <sup>al</sup> ±2	48.5 <sup>1</sup> ±1.33	57.2 <sup>1</sup> ±0.86	42 <sup>a</sup> ±1.80	49 <sup>a</sup> ±1.50
6	Neutrophils	32.5 <sup>al</sup> ±1.12	28.7 <sup>1</sup> ±1.54	32 <sup>1</sup> ±0.81	34 <sup>a</sup> ±1.45	36 <sup>a</sup> ±1.7
7	Monocytes	4.9 <sup>al</sup> ±0.26	5.7 <sup>1</sup> ±0.77	3.6 <sup>1</sup> ±0.411	6.3 <sup>a</sup> ±0.566	6.2 <sup>a</sup> ±0.88
8	Eosiniphylis	6 <sup>al</sup> ±0.54	5.7 <sup>1</sup> ±0.57	4.0 <sup>1</sup> ±0.41	4.4 <sup>a</sup> ±0.48	3.9 <sup>a</sup> ±0.6

\*Statistically Significant (P≤0.05), \*\*Statistically Highly Significant (P≤0.01), NS - Statistically Not Significant (P≥0.05),

abc : After treatment group, 1,2,3 : Before treatment group, Means with Similar Super scripts does not differ significantly.

Table 2. Serum biochemical profile in treatment groups.

SL. No.	Parameter	Control group	Treatment Group –I		Treatment Group –II	
			Pre treatment	Post treatment	Pre treatment	Post treatment
1	Creatinine (mg/dl)	1.01 <sup>a</sup> ±0.044	0.96 <sup>12</sup> ±0.04	1.07 <sup>a</sup> ±0.062	1.15 <sup>13</sup> ±0.05	1.17 <sup>a</sup> ±0.047
2	BUN (mg/dl)	17.0 <sup>a1</sup> ±0.555	17.7 <sup>1</sup> ±0.667	18.8 <sup>a</sup> ±0.554	17.6 <sup>±</sup> 0.838	18.6 <sup>a</sup> ±0.718
3	Total protein (g/dl)	6.1 <sup>a1</sup> ±0.011	8.47 <sup>±</sup> 0.11	6.43 <sup>b</sup> ±0.07	8.87 <sup>±</sup> 0.068	6.48 <sup>b</sup> ±0.084
4	Albumin (g/dl)	3.1 <sup>a1</sup> ±0.095	1.44 <sup>±</sup> 0.109	3.23 <sup>a</sup> ±0.05	1.31 <sup>±</sup> 0.112	3.23 <sup>a</sup> ±0.084
5	AST (IU/L)	64.2 <sup>a1</sup> ±1.218	63.2 <sup>1</sup> ±1.971	62.9 <sup>a</sup> ±1.696	61.1 <sup>1</sup> ±2.26	60.6 <sup>a</sup> ±1.543
6	Zinc (ppm)	1.017 <sup>a1</sup> ±0.416	0.908 <sup>±</sup> 0.057	0.852 <sup>±</sup> 0.026	1.266 <sup>a</sup> ±0.012	1.22 <sup>a</sup> ±0.051
7	Copper (ppm)	1.003 <sup>a1</sup> ±0.04	0.803 <sup>±</sup> 0.041	0.803 <sup>a</sup> ±0.039	0.730 <sup>±</sup> 0.041	1.1 <sup>a</sup> ±0.064

\*Statistically significant ( $P \leq 0.05$ ), \*\* Statistically highly significant ( $P \leq 0.01$ ), NS - Statistically not significant ( $P \geq 0.05$ )

abc: After treatment group, 1,2,3 : Before treatment group, Means with Similar Super scripts does not differ significantly

cell volume, total erythrocyte count) blood urea nitrogen and albumin levels were observed in treatment groups. The marked improvement in clinical condition and disappearance of the skin lesions in Group I animals indicated that the compound destrox acted as a toxin binder and helped in controlling the mycotoxins besides additional benefit from symptomatic treatment as reported by earlier studies ( Kumar *et al.*, 2012). The improvement in clinical condition and disappearance of skin lesions in Group II animals might be attributed to hepato protective action of toxol and additional benefit from symptomatic treatment as reported by earlier studies (Basak *et al.*, 1994; Bhatia and Kalra, 1981). Combination of Destrox, Chlorphenaramine maleate, Streptopencillin and Zinc oxide found to be useful in the treatment of degnala disease in bovines.

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