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Research Article

Clinico-therapeutic evaluation of Ruchamax and Ruchamax-N in various digestive disorders and restoration of normal ruminal function

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Abstract

Productivity of dairy animals depends not only on good nutritional diet but also on its proper digestion and assimilation. A study was conducted to evaluate the efficacy herbal appetite stimulants and digestive tonics Ruchamax and Ruchamax-N (supplied by M/s Ayurvet Ltd. Baddi, India) in various digestive disorders in cows. Thirty animals suffering from ruminal disorders like simple indigestion, ruminal Acidosis and post-parturient indigestion were divided in to three groups of ten animals each. Group- T1: positive control treated with Magnesium sulphate as rumenotoric @ 100g/day/animal for 3 days, group-T2: treated with product Ruchamax @ 15 g/day/animal bid orally for 5 days, group-T3: treated product Ruchamax N@ 15 g/day/animal bid orally for 5 days. The efficacy was evaluated on the basis of Rumen fluid parameters, clinical signs and haemato-biochemical parameters at day 0, 3, 5 and 7 post-treatment. All the parameters were normalized in all the groups post treatment, but the recovery rate were more significant and were recorded as early as 3rd day of treatment in Ruchamax and Ruchamax-N treated groups as compared to group I. from the result of the present study it can be concluded that both the products can be used for various digestive disorders as they are very effective in restoring normal rumen functions.

Keywords: Appetite, digestive tonic, indigestion, herbal, rumen

1. Introduction

Ruminant species occupy an important niche in modern agriculture because of their unique ability to digest certain foodstuffs, especially roughages efficiently. Rumen ecology plays vital role in the digestion, absorption and assimilation of ingesta in ruminants[1]. The rumen is a fermentation vat par excellence, providing an anaerobic environment, constant temperature and pH and good mixing[2]. A basic understanding of ruminant digestive tract and digestion is essential for good management, sound nutrition and for making intelligent feeding decisions[3]. The physiology of digestion of ruminants is unique among domestic animals in that bacterial enzymes play an integral part in absorption, assimilation and metabolism. Actual digestion of feed is aided by the microbial population in the rumen i.e rumen microflora. Cellulose and related compounds found in hays and roughages consumed by ruminants is dependent upon enzymes elaborated by micro- organisms living within the digestive tract[4]. Microbial fermentation is the most important facet of ruminant digestion. The rumen microbial population has the first opportunity to digest any feed consumed by the ruminant and anything that affects the rumen ecosystem will ultimately affect what and how nutrients are available to the animal for productive purposes. When the rumen becomes dysfunctional, feed digestion is impaired and animal become susceptible to a range of metabolic diseases and digestive disorders such as simple indigestion, acidic and alkaline indigestion, post parturient indigestion, which are predominant clinical problem in buiatrics practice[5]. Almost any dietary factor that can alter the intraruminal environment can cause impairment of the digestive process. Digestive disorders in cattle directly affect the economics of dairy farm due to impact on production. In order for animals to achieve their genetic potential for milk production and remain healthy, it is critical that the rumen environment be kept in a "healthy" state. Keeping the rumen healthy means that fiber will be digested at a maximal rate and feed intake will be maximized[6]. Treatment of animals suffering from primary indigestion in ruminants by conventional drugs is expensive compared to use of herbal drugs, which are cheap, safe and without any side effect[7, 8, 9]. Present investigation was undertaken to know the efficacy of two products viz: Ruchamax and Ruchamax-N (*Supplied by M/s Ayurvet Ltd, Baddi, HP; India*) in restoring the normal rumen function in various digestive disorders in ruminants.

2. Material and Methods

The present study was conducted in the clinical cases presented to Department of Medicine, Veterinary College, KVAFSU, Nandinagar, Bidar, Karnataka, India.

2.1 Experimental design

Thirty animals suffering from ruminal disorders like simple indigestion, ruminal Acidosis and post-parturient indigestion were selected for the present study. The animals were randomly divided into three equal groups of ten (n=10) animals each. Group- T1: positive control treated with Magnesium sulphate as rumenotoric @ 100g/day/animal for 3 days, group- T2: treated with herbal appetite stimulant and

digestive tonic products Ruchamax @ 15g/day/animal bid orally for 5 days, group- T3: treated product Ruchamax N@ 15 g/day/animal bid orally for 5 days.

2.2 Parameters estimated

Rumen fluid parameters (colour, consistency, odour, pH, protozoal motility/concentration and MBRT), clinical signs (Gross appearance, body temperature, ruminal contractions, rumination, appetite, resumption of feed and water intake and restoration of normal rumen function) and haemato-biochemical parameters (Hb, PCV, serum glucose and SGPT) were estimated at day 0, 3, 5 and 7 post-treatment as per standard procedures.

2.3 Statistical analysis

All the results were analyzed statistically by analysis of variance to determine the means and standard error by using student's `t' test[10].

3. Results and Discussion

The results of present investigation were suggestive of altered ruminal environment in all the affected animals on the day of presentation (before treatment) indicated by significant changes in the ruminal parameters.

3.1 Effect on Ruminal fluid parameters

The colour, odour and consistency of ruminal fluid along with pH, MBRT and protozoal concentration showed significant changes before treatment in all the three groups. These parameters showed gradual improvement towards normalcy after treatment in all the treated groups. But the changes were more significant and were recorded as early as 3rd day post treatment in Group T2 and III as compared to the control group (Group T1) which showed slower recovery. Average rumen liquor pH level in control group T1 was 6.62 ± 0.12 while in T2 & T3 group 7.03 ± 0.05 and 7.16 ± 0.04 respectively (Table 1) at 7th day of treatment as compared to 6.15 ± 0.23, 6.15 ± 0.20, 6.12 ± 0.18 in group T1, T2 and T3 respectively at day 0. Normal rumen liquor pH ranges between 6.3 to 7.0[11]. The decrease in the rumen liquor pH was due to production of lactic acid in rumen, as a result of increase in lactic acid fermenting bacteria and regeneration microflora. The colour, consistency and odour in group T1, T2 and T3 on 0 day was mild greenish brown with watery consistency with mild sour odour. The colour, consistency and odour in changed to green, aromatic and viscous at 3rd day of treatment in group T2 and III as compared to group T1, where the parameters were normalized at day 7 post treatments. Similarly the protozoal motility also improved significantly in group T2 and T3 on 3rd day as compared to group T1 where protozoal motility restored at day 7. The protozoal motility decreases when the pH declines[12]. The increased protozoal motility may be attributed to normalization of pH. The methylene blue reduction time is an indirect measure of the redox potential and bacterial activity of rumen fluid. Reduced microbial activity in the rumen after a prolonged period with reduced appetite will also cause an increase in reduction time[13]. The MBRT time was increased before treatment in all the groups indicating decreased microbial activity. However after treatment the MBRT time was reduced significantly at 3rd day in group T2 and T3 as compared to 7th day in group T1. These results are similar to the earlier findings where similar observations were reported with polyherbal formulation Ruchamax in goats[14].

Table 1: Mean±SE values of ruminal fluid parameters before and after treatment

Parameter	Grp	Before Treatment	After treatment				Test of Significance between groups
			1	3	5	7	
pH	I	6.15 ± 0.23	6.31 ± 0.18	6.45 ± 0.15	6.56 ± 0.13*	6.62 ± 0.12*	S
	II	6.15 ± 0.20	6.37 ± 0.19	6.68 ± 0.11*	6.90 ± 0.05*	7.03 ± 0.05*	
	III	6.12 ± 0.18	6.42 ± 0.13	6.79 ± 0.05*	7.01 ± 0.06*	7.16 ± 0.04*	
MBRT (minutes)	I	24.50 ± 3.27	19.60 ± 2.40	15.00 ± 1.15*	11.90 ± 0.82*	9.60 ± 0.58*	S
	II	23.90 ± 2.91	15.90 ± 2.02	8.40 ± 0.58*	6.60 ± 0.31*	5.00 ± 0.26*	
	III	22.70 ± 2.60	13.40 ± 1.63	7.20 ± 0.44*	5.50 ± 0.40*	4.20 ± 0.20*	

***: The values differ significantly at P<0.05**

3.2 Haemato-biochemical changes

Haemoglobin, Packed Cell Volume and Serum Glutamate Oxaloacetate transaminase values did not show any significant difference ($P > 0.05$) before and after treatment. On the contrary, the blood glucose was significantly low ($P \leq 0.05$) in all the three groups before treatment (46.75, 47.75 and 45.90 mg/dl in group T1, T2 and T3 respectively) suggestive of a state of hypoglycemia which could be due to prolonged anorexia due to various digestive disorders.

These values showed gradual improvement after treatment but the hyperglycemia (≥ 50 mg/dl) was more markedly observed in groups treated with Ruchamax (54.80 at day 7) and Ruchamax-N (56.00 at day 7) suggestive of improved glycemic status of the animals. This may be due to restoration of appetite and normal ruminal function in animals of these two groups when compared to control group.

Table - 2: Mean±SE values of haemato-biochemical parameters before and after treatment

Days /Parameter	Grp	Before Treatment	After treatment				Test of Significance between groups
			1	3	5	7	
HB (g/dl)	I	9.28 ± 0.16	9.30 ± 0.14	9.32 ± 0.15	9.38 ± 0.11	9.38 ± 0.12	NS
	II	9.26 ± 0.15	9.32 ± 0.13	9.48 ± 0.12	9.60 ± 0.14	9.82 ± 0.11	
	III	9.46 ± 0.24	9.50 ± 0.22	9.64 ± 0.21	9.72 ± 0.21	9.88 ± 0.20	
PCV (%)	I	38.80±0.51	37.10±0.43	36.80 ± 0.44	36.50 ± 0.40	36.40 ±0.50	NS
	II	38.20±0.76	37.60±0.93	37.40 ± 0.85	36.20 ± 0.63	35.60 ± 0.65	
	III	38.90±0.67	36.80±0.47	36.90 ± 0.48	36.30 ± 0.37	35.90 ± 0.43	
Glucose (Mg/dl)	I	46.75±1.72	47.50±1.50	46.90 ±1.05*	46.15±1.05*	45.90±0.67*	S
	II	47.75±2.19	48.90±1.72	50.20 ±1.53*	52.50±1.09*	54.80±0.80*	
	III	45.90±2.17	48.80±1.85	51.30 ±1.27*	53.70±1.01*	56.00±0.77*	
SGOT (U/l)	I	54.00±1.83	51.10±2.04	48.70 ± 1.94	46.10 ± 1.89	43.80 ± 1.49	NS
	II	54.30±1.81	51.45±1.67	48.00 ± 1.18	45.55 ± 1.08	42.20 ± 1.16	
	III	52.20±1.71	48.35±1.71	45.20 ± 1.81	41.60 ± 1.52	38.00 ±0.65	

***: The values differ significantly at P<0.05**

3.3 Clinical observations

All the clinical cases were presented with loss of appetite, absence of ruminal contractions and suspended rumination. Rectal temperature was within the physiological limits in all the cases on the day of presentation and thereafter, during the post treatment period. Improvement in appetite indicated by increased feed intake, re-appearance of ruminal contraction accompanied with rumination cycles were observed during post-treatment period in all the three groups. The improvement was observed earlier and in more number of animals in the Group T2 and T3 as compared to Group T1. The early clinical improvement in the animals of Group T2 and T3 are clear indication of restoration of normal rumen function.

Our results are in agreement with the earlier findings where Feeding of stomachic and rumen tonics have been shown to treat indigestion, anorexia and other digestive disorders in cattle[15, 16, 17]. Ruchamax N is a potent herbal formulation, which contains 28 different herbs and some minerals. The ingredients of Ruchamax include *Phyllanthus emblica, Terminalia belerica, Allium sativum, Zingiber officinale, Trachyspermum ammi* & many more. These individual constituent herbs are scientifically well known to possess appetizer, restorative, carminative, stomachic and tonic activity. The results of the present study may be attributed to the synergistic effect of the constituent herbs.

4. Conclusion

The clinical trial on herbal appetite stimulant and digestive tonic products Ruchamax and Ruchamax N showed that both the products can be used for various digestive disorders as they are very effective in restoring normal rumen function at the earliest. From the results of present investigation it can be concluded that both the products are safe as their use did not show any untoward effect at recommended therapeutic dose.

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