



E-ISSN: 2320-7078

P-ISSN: 2349-6800

[www.entomoljournal.com](http://www.entomoljournal.com)

JEZS 2020; 8(2): 1631-1633

© 2020 JEZS

Received: 10-01-2020

Accepted: 12-02-2020

**Juripriya Brahma**

Junior Scientist, Department of  
Veterinary Clinical Medicine,  
Livestock Research Station,  
Assam Agricultural University,  
Mandira, Assam, India

**Mihir Sarma**

Junior Scientist, Department of  
Poultry Science, Livestock  
Research Station, Assam  
Agricultural University,  
Mandira, Assam, India

**Jitendra Saharia**

Chief Scientist, Department of  
Livestock Production and  
Management, Livestock  
Research Station, Assam  
Agricultural University,  
Mandira, Assam, India

**Mridushmita Sonowal**

Junior Scientist, Department of  
Animal Nutrition, Livestock  
Research Station, Assam  
Agricultural University,  
Mandira, Assam, India

**Prasanta Boro**

Junior Scientist, Department of  
Livestock Production and  
Management, Livestock  
Research Station, Assam  
Agricultural University,  
Mandira, Assam, India

**Dipankar Bharali**

Junior Scientist, Department of  
Animal Reproduction,  
Gynecology and Obstetrics,  
Livestock Research Station,  
Assam Agricultural University,  
Mandira, Assam, India

**Corresponding Author:****Juripriya Brahma**

Junior Scientist, Department of  
Veterinary Clinical Medicine,  
Livestock Research Station,  
Assam Agricultural University,  
Mandira, Assam, India

## Rumen acidosis in goats under Agro-climatic conditions of Assam

**Juripriya Brahma, Mihir Sarma, Jitendra Saharia, Mridushmita Sonowal, Prasanta Boro and Dipankar Bharali**

**Abstract**

The present clinical study was carried out in Kamrup district of Assam under Tribal Sub Plan (TSP) Project. Twelve Assam Hill Goats showing clinical signs of rumen acidosis were selected for the trial. The results revealed that the ruminal pH, ruminal motility, odour, colour, consistency of rumen liquor, ruminal microflora and protozoal motility were differed from healthy goats. Haematological parameters showed increased haemoglobin, packed cell volume and total leukocyte counts. Biochemical examination showed increased blood lactic acid level, blood glucose level, total protein, AST, ALT, BUN and creatinine level. The animals were treated with sodium bicarbonate solution intravenously (7.5% w/v) @ 1 ml/kg body weight mixed with normal saline solution, Pheneramine maleate Injection intramuscularly @ 0.5 mg/kg body weight, Injection Vitamin B-complex intramuscularly, Rumenotoric bolus (Rumentus) and powder Bufzone orally @ 50g once a day until recovery. The clinical signs were gradually disappeared after treatment.

**Keywords:** Ruminant acidosis, rumen fluid ph, goat, fluid flashing sound, blood lactic acid

**Introduction**

Ruminal acidosis is one of the most important digestive disorders in goat and in some cases is lethal in less than 24 hours. Acidosis is a carbohydrate fermentation disorder of the rumen that can affect goats of all breeds and ages. Acidosis is caused by the misfeeding of highly fermentable carbohydrates, underfeeding of effective fiber, poor management practices or a combination of the three. Goats are mostly reared under free range system and have the history of accidental ingestion of large amount of highly fermentable carbohydrates such as wheat grain, stale chapattis and roti, stale rice, mangoes, banana, vegetables waste, ceremonial waste, vegetables market waste, hotel waste, feed with excessive amount of jowar grains, corn, wheat flour and these goats develops ruminal acidosis resulting in heavy economic losses due to high morbidity and mortality.

The condition has been named lactic acidosis, toxic indigestion, grain engorgement, grain overload and D-lactic acidosis. It occurs by accidental ingestion of highly fermentable carbohydrates as corn, which leading to increase lactic acid production in rumen<sup>[1]</sup>. Production of a large quantity of lactic acid in rumen initiates profound changes in the biochemical profile of rumen liquor and blood<sup>[2, 3]</sup>.

Lactic acidosis was associated with heamatological changes such as significant elevation in erythrocytes, leukocytes, hemoglobin concentration, packed cell volume<sup>[4]</sup>. Biochemical changes such as decreased total protein, hyperglycemia<sup>[5]</sup>, hyponatremia, hyperkalemia, hypocalcemia and increase AST, ALT<sup>[6]</sup>, urea nitrogen, creatinine level and serum lactic acid<sup>[7]</sup>.

**Materials and methods**

The present study was carried out in Kamrup district of Assam under Tribal Sub Plan (TSP) Project. The goats having history of dietary abnormalities, excessive ingestion of carbohydrate-rich diet viz. immature leaf, grains paddy, Cabbage, leafy vegetables and ceremonial wastes were particularly included in the present study. Twelve Assam hill Goats showing the symptoms of diarrhoea, abdominal distension, anorexia, distension of rumen, grinding of teeth, regurgitation of ruminal contents and reduced motility to atony of rumen

were selected and screened for ruminal acidosis based on ruminal fluid pH. Rumen liquor was collected for analysis and confirmative diagnosis. Rumen fluid was collected by following aseptic precaution from left paralumbar fossa<sup>[8]</sup>(Ruminocentesis). The color of the rumen fluid was recorded immediately after collection by visual inspection of the sample. The pH of ruminal fluid was measured immediately after collection without much exposure to atmospheric air using indicator paper. Microbial examination of rumen fluid was performed as per the procedure<sup>[9]</sup>. The protozoal motility of rumen fluid was estimated<sup>[10]</sup>.

A drop of fresh rumen fluid was placed on a clean glass slide and was covered with a cover glass. The live and dead protozoal proportion (live: dead) examined under low power field microscope based on viability of protozoa. An air-dried smear of ruminal fluid was stained by Gram's Method and observed under oil immersion microscope. The statistical values were represented as Mean  $\pm$  Standard Error. Blood samples were collected from affected goats for estimation of haematological parameters viz. haemoglobin (Hb), packed cell volume (PCV), total erythrocyte count (TEC) and total leucocyte count (TLC) by using automated haematology cell counter model MS4e. Serum was separated for estimation of total protein, blood glucose, Aspartate Aminotransferase (AST), Alanine Aminotransferase (ALT), Blood Urea Nitrogen (BUN), Creatinine and blood lactic acid concentration by using Semi Automated Biochemistry Analyzer.

Affected goats were therapeutically treated with sodium bicarbonate (7.5% w/v) solution intravenously @ 1 ml/kg body weight mixed with normal saline solution, Pheneramine maleate @ 0.5 mg/kg body weight intramuscularly, Vitamin B-Complex injection intramuscularly and rumenotonic bolus (Rumentus), powder Bufzone 50 g once a day orally until complete recovery.

## Result and discussion

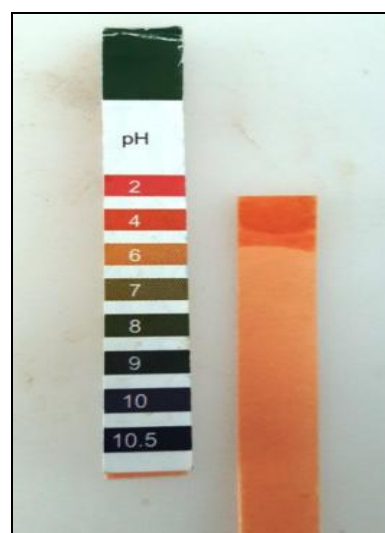
The present study revealed accidental ingestion of large amount of immature leaf, grains paddy, Cabbage, leafy vegetables, boiled rice, ceremonial wastes were responsible for the development of ruminal acidosis. The clinical examination of affected goats revealed increase pulse rate, respiration rate, bloat, diarrhoea, fluid flashing sounds on percussion, gurgling sounds on auscultation of rumen, nasal discharge, shrunken eyes, dehydration, sluggish rumen motility, full and doughy rumen<sup>[11]</sup>.

The colour, odour, consistency, protozoal motility of rumen liquor and ruminal microflora were found different from apparently healthy goats<sup>[12]</sup> (Table 1). Ruminal pH of diseased goats was found lower (Plate 1), which might be due to excess accumulation of lactic acid in rumen<sup>[11, 12, 13, 14]</sup>. Rumen liquor smear of acidotic goats revealed predominant of gram positive flora<sup>[15]</sup>. Haematological parameters indicated increased in Hb, PCV and TLC values (Table 2), which could be attributed to haemocentration due to loss of intra vascular water in rumen<sup>[14,16,17,18]</sup>. There was increase in mean value of total protein, ALT and AST might be due to hepatocellular damage as a result of toxic products like alcohol, histamine, thiaminase and other endotoxins produced in rumen epithelium<sup>[12,19]</sup>. The mean value of blood glucose level also found higher which might be due to decreased utilization of glucose by the peripheral tissues<sup>[20,21]</sup>. The mean value of serum lactic acid was elevated might be due to excess accumulation of lactic acid in rumen which

subsequently absorbed into blood<sup>[11]</sup>. The BUN value was increased might be due to dehydration, haemoconcentration, anuria, catabolism with body toxemia<sup>[22, 23, 24]</sup>. The increase creatinine level in acidosis goats might be due to state of dehydration and haemo-concentration as occurred in acidosis and activation of compensatory mechanism in the body<sup>[23, 24]</sup>. Clinical signs of acidosis goats were gradually disappeared after treatment. Administration of sodium bicarbonate lessened the effect of metabolic acidosis. Antihistaminic drug Pheneramine maleate has reduced the rumen and blood histamine level. Rumenotonic bolus was given to restore rumen motility and appetite. Vitamin B Complex injection (Tribivet) administered intramuscularly to prevent deficiency by abnormal growth of thiaminase enzyme producing bacteria inside the rumen.

**Table 1:** Rumen liquor physical parameters in rumen acidosis affected goats.

Parameters	Diseased Goats
Colour	Milky gray
Odour	Sweetish sour
Consistency	More Watery
Ruminal pH	4.67 $\pm$ 0.065
Protozoal motility	+/0
Microflora	Predominant G +ve



**Plate 1:** Ruminal acidotic goat rumen pH showing acidic pH.

**Table 2:** Serum Hematological and biochemical parameters in rumen acidosis affected goats.

Parameters	Diseased Goats
Hb (gm/dl)	14.58 $\pm$ 0.156
PCV (per cent)	43.42 $\pm$ 0.479
TEC (Millions/cumm)	14.34 $\pm$ 0.091
TLC (Thousands/cumm)	20880.77 $\pm$ 409.827
Total Protein (gm/dl)	6.15 $\pm$ 0.041
AST	130.83 $\pm$ 1.099
ALT	68.12 $\pm$ 4.210
Blood lactic acid (mg/dl)	52.58 $\pm$ 1.27
BUN	31.37 $\pm$ 0.196
Creatinine	1.96 $\pm$ 0.034
Blood Glucose	101.18 $\pm$ 0.500

## Acknowledgement

The necessary support extended by the Directorate of Research (Veterinary), Assam Agricultural University,

Khanapara, Guwahati-22, under Tribal sub plan project is gratefully acknowledged. The author also thankful to all Scientist of Live Stock Research Station, Mandira for their technical and physical cooperation and sincere advice during the study.

### Conclusion

Acidosis is caused by improper feeding practices. It is suggested that animals should rear under intensive farming for proper care and management and avoid unnecessary or accidental feeding of immature leaf, grains paddy, Cabbage, leafy vegetables, boiled rice, ceremonial wastes. Moreover, the respective treatment employed for ruminal acidosis in goats is very much effective.

### References

1. Thomas JD. *Rebhun's diseases of dairy cattle*, 8th ed, Elsevier inc., st. louis. Missouri. Library of congress, China, 2008, 687p.
2. Randhawa SS, Gupta PP, Roy KS, Ahuja AK, Rathore S. Biochemical, pathological and histoenzymological studies on experimental acute lactic acidosis in buffalo calves (*Bubalus bubalis*). *Indian Buffalo Journal*. 1989; 5(1):12-24.
3. Lal SB, Swamp D, Dwivedi SK, Sharma MC. Biochemical alteration in serum and cerebrospinal fluid in experimental acidosis in goats. *Research in Veterinary Science*. 1991; 56:208-210.
4. Garry FB. Indigestion in ruminants. In: *Large animal internal medicine*. Smith B.P., ed. Mosby- Year Book, Mosby, St Louis, Missouri, USA, 2002, 722-747.
5. Brown MS, Krehbiel CR, Galyean, ML, Remmenga Peters JP, Hibbard B, Robinson J *et al*. Evaluation of models of acute and subacute acidosis on dry matter intake, ruminal fermentation, blood chemistry, and endocrine profiles of beef steers. *Journal of Animal Science*. 2000; 78:3155-3168.
6. Jorg MD, Enemark. The monitoring, prevention and treatment of sub acute ruminal acidosis (SARA): A review. *The Veterinary Journal*. 2008; 176:32-43.
7. Patra RC, Lal SB, Swarup D. Biochemical profile of rumen liquor, blood and urine in experimental acidosis in sheep. *Small Ruminant Research*, 1996, 177-180.
8. Rosenberger G. Digestive system. In: *Clinical examination of cattle*. 2nd Edn. Verlagpaul parey, Berlin and Hamburg, 1979, 211p.
9. Nichols RE, Penn KE. Simple methods for the detection of unfavorable changes in ruminal ingesta. *Journal of the American Veterinary Medical Association*. 1958; 133:275-277.
10. Misra SK, Singh U. Studies on the clinico-pathological and therapeutic aspects of indigestion in cattle. *Indian veterinary journal*. 1974; 51:698-704.
11. Hajikolaie MR, Nouri M, Saberi AJ. Effect of experimentally induced ruminal lactic acidosis on blood pH, bicarbonate and pCo<sub>2</sub> in the sheep. *Pakistan Journal of Biological Sciences*. 2006; 9(10):2003-2005.
12. Radostitis OM, Mayhew IG, Houston DM. *Veterinary clinical examination and diagnosis*. 9th ed. London. Edinburgh, NewYork, Oxford. Philadelphia st. Louis. Sydney, Toronto, 2007, 989p.
13. Smith BP. *Large Animal Internal Medicine*. 3rd ed. C.V. Missouri, 2002, 747-764,782-791
14. Ceroni V, Turmalaj L, Lika E, Duro S. Haematological Indicators affected by the subacute Ruminal Acidosis in Dairy Cows. *Journal of Animal and Veterinary Advances*. 2012; 11(7):927-930.
15. Dirksen G. In *Proceedings, 3rd International Symposium on the Physiology of Digestion and Metabolism in ruminants*. Phillipson, A.I. (Ed.) Otel Press. 1970, 612p.
16. Morgante M, Stelletta C, Tacchio G, Letting I, Berzaghi, P. Subclinical rumen acidosis in Italian dairy herds. *Proceeding of the 23rd World Buiatrics Congress, Canada, 2004*, 11-16.
17. Gozho GN, Krause DO, Plaizier JC. Ruminal lipopolysaccharide concentration and inflammatory response during grain-induced subacute ruminal acidosis in dairy cows. *Journal of Dairy Science*. 2007; 90:856-866.
18. Morgante M, Stelletta C, Berzaghi P, Ganesella M, Andrighetto I. Subacute rumen acidosis in lactating cows: An investigation in intensive Italian dairy herds. *Journal of Animal Physiology and Animal Nutrition*. 2007; 91:226-234.
19. Cakala S, Borkowski T, Albrycht A. Rumen acidosis in sheep induced with different doses of saccharose. *Pol Arch Weter*. 1974; 17:117-130.
20. Kaneko JJ, Harvey JW, Bruss ML. *Clinical Biochemistry of Domestic Animals*. Harcourt Brace and Company Asia Pvt. Ltd. Singapore, 1999.
21. Basak DN, Sarkar S, Charkrabharti A. A note on haematological changes in experimentally induced indigestion in goats. *Indian Journal of Veterinary Medicine*. 1993; 13(1):32p.
22. Coles EH. *Veterinary Clinical Pathology*. 2nd edition, W.B. Saunder Company, Philadelphia, 1974, 192-271.
23. Karale AD. Evaluation of different therapeutic regimen in ruminal acidosis of goats. M. V. Sc. thesis submitted to M.A.F.S.U. Nagpur, 2012.
24. Rahima A, Nambi AP, Vijaykumar G, Vairamuthu S. Efficacy of Haemodialysis in goats affected with Acute Ruminal Lactoacidosis, *Indian Veterinary Journal*. 2012; 89(6):128-130.