



# Zootechnical Additives for Optimum Production in Livestocks in Stallfed Condition

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

This is the point of interest to use zootechnical additives in ruminants to control the accumulation of lactate in the rumen. The primary and main cause of acidosis is due to consumption of rapidly digestible carbohydrate in high amount. In normal animal husbandry (stall fed) practices generally livestock are feed with the left out or waste products rich in carbohydrates. This excessive carbohydrate consumption leads to sudden change in ruminal environment, causing sub-acute or chronic lactic acidosis. The ruminal lactic acidosis problem can be averted by either zootechnic additives such as *Saccharomyces cerevisiae* and *Megasphaera elsdenii* or adding sodium bicarbonate/enzymes in feed or ration.

**Keywords:** Acidosis; livestock; zootechnic additives.

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## 1. INTRODUCTION

“The old group of ‘microorganisms’ and the term ‘probiotics’ disappears for being too general and is now replaced by that of ‘zootechnical additives’ in which microorganisms and enzymes are included. The point of interest of using zootechnical additives in ruminant medicine is to avert the accumulation of lactate in the rumen and to stimulate the synthesis of propionate; the most used in ruminants are yeasts (*Saccharomyces cerevisiae* and *boulardii*) as well as *Aspergillus niger* and *oryzae*” [1,2,3-5].

Rumen acidosis is one of the most encountered metabolic ailments of cattle and like most metabolic diseases it is worth mentioning that for every single cow that shows clinical signs, there will be several more which are affected sub clinically [6]. Also, clinical rumen lactic acidosis remains a major cause of morbidity and mortality in modern ruminant production systems. Ruminant lactic acidosis is said to occur when the pH of the rumen falls to less than 5.5.

The primary cause of lactic acidosis is consuming a high level of rapidly digestible carbohydrate, such as wheat, barley, and other cereals. Acute lactic acidosis, is commonly seen among the stall-fed cattle. Those cattle which have obtained access to ad-lib carbohydrate rich feed/ration can suffer from severe lactic acidosis and often resulting in death. In dairy cattle, a milder form, sub-acute ruminal acidosis is also seen because of feeding increased concentrates compared to forage.

At the time of COVID 19 lockdown also, when most of (nearly all) the family members were confined at home for protection against Corona Virus as per Govt. directives, all were showering their love and care to each other along with their livestock. As a mark of affection large number of family members were feeding their livestock with whatever they got, mostly the carbohydrate rich feeds like grains especially the left-over rice, breads etc. especially in town areas where availability of roughage is a problem. This non accustomed feeding leads to sudden change in ruminal environment causing sub-acute or chronic lactic acidosis.

## 2. SYMPTOMS

Acute and chronic ruminal acidosis is prominent production ailment among ruminants fed with concentrate rich diet. Often precipitated during

adaptation to concentrate rich diets. Meanwhile, chronic acidosis may continue during the sudden change in feeding period.

With acute ruminal acidosis, ruminal acidity and osmolality increases noticeably; this can damage the ruminal as well as intestinal wall, decrease blood pH and dehydration leads to fatal outcome. Laminitis, polio encephalomalacia, and liver abscesses are often accompanying with acidosis. Even after animals recovery from a session of acidosis, nutrient absorption may be retarded and less production too. With chronic acidosis, feed intake typically is reduced and performance is depressed, probably due to hypertonicity of digesta, poor body condition and weight loss, unexplained diarrhea, pulse rate and respiratory rate may rise and leads to chronic mastitis. Management of acidosis can be achieved by incorporation of feed additives that inhibit the multiplication of microbial strains engaged in lactate production.

## 3. TREATMENT

“Animals with mild clinical signs might recover with little to no specific care. In animals with more severe clinical disease specific therapy is necessary. The use of yeast in ruminants ration is supposed to reduce subclinical acidosis” [7,8]. “The enzymes used in animal feed are considered zootechnical additives, which improve the consistency and nutritional value of the feed, increase digestibility, animal performance and reduce the effect of antinutrients” [9].

## 4. PREVENTION

Ruminal lactic acidosis can be prevented by zootechnical additives such as *Saccharomyces cerevisiae* and *Megasphaera elsdenii* (Bol. Ecotas, Bioboost, Provisac, Himalaya Batisha etc) as well as essential oils, or adding sodium bicarbonate to the ration. It is also important to consider the forage/concentrate ratio, the forage particle size, as well as the cereal's rate of degradation in the rumen.

“There is a possible benefit for using some plant extracts to improve the profile of ruminal fermentation in production systems when the ruminal pH is low (pH 5.5). *Allium sativa*, *Capsicum anuum*, *Yucca schidigera* and *Cinnamonum cassia* extracts alter the

fermentation of rumen microorganisms in favor of propionate” [10].

## 5. CONCLUSION

Zootechnic additives such as *Saccharomyces cerevisiae* and *Megasphaera elsdenii* as well as essential oils, or adding sodium bicarbonate to the ration is an important step to avert the precipitation of ruminal acidosis.

## DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declares that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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