

Rumination Disorders and Its Prevention in Dairy Cattle

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Abstract

The rumen contains physiologically controlled conditions, and when these parameters change abruptly, illnesses and problems occur. The most effective way to maintain a healthy herd and avoid many digestive problems is to prevent rumination disorders in cattle.

Introduction

Animals known as ruminants have a digestive system called the rumen. Domestic animals in this group include cattle, buffaloes, camelids (camels, dromedaries, alpacas, vicuas, llamas), goats, and sheep. The rumen, a large capacity glandular sac, performs the fermentative reactions that occur in the animal's feed. The rumen contains millions of microbial populations, including bacteria, protozoa, fungi, and archaea. This group is known as the microbiota. These microbes are responsible for digesting and processing all plant material consumed by ruminants. They subsequently produce volatile fatty acids (VFA), which are taken by ruminants and serve as their primary source of energy. Furthermore, CO₂ and methane CH₄ are emitted during this process. Changes in rumination result from an imbalance in these mechanisms. Many bacteria die as a result of these changes since the microbiota is equally prone to them. The vast majorities of ruminal bacteria cling to fibrous plant debris and produce amylase and proteolytic enzymes to degrade it.

Rumen disorders

It can be either mechanical or fermentative

I. Mechanical

1. Traumatic reticulo-peritonitis: The ingestion of a sharp foreign body causes this change in rumination. Cows are animals that do not distinguish or select their feed and may consume foreign objects. Laces, metal bits, and wires are among the most common elements. These objects become trapped in the reticulum close to the rumen and perforate the organs as a result of digestive processes. Perforation of the rumen and reticulum can lead to perforation of the peritoneum. This condition causes rumen paralysis (hypomotility) and can result in the death of the animals involved.

2. Vagal indigestion: Vagal indigestion is a rumination change caused by the involvement of the vagus nerve (cranial nerve X). It causes two forms of disorder: The first is known as Anterior Functional Stenosis Syndrome, and it makes it difficult for food to enter through the reticulo-omasal orifice. The second condition is known as posterior functional stenosis syndrome, and it prevents food bolus passage into the pylorus. Anorexia, tenesmus, acute abdominal distension due to gas accumulation and overall deterioration are all symptoms of vagal indigestion. Animals are at great risk of death as a result of this rumination change.

3. Ruminal tympanism: Animals clearly show this variation in rumination, which can be brought on by a variety of causes. Fermentation-related odors are expelled by ruminants through belching. Gas will begin to build up in the rumen if there is a blockage (in the oesophagus, for instance) or digestive issue (foamy tympanism, for instance) that hinders the discharge of eructation. The accumulation of gas causes the other organs to get squeezed and the rumen to become bloated. It may be fatal if the distension lasts for a long time or is severe enough to squeeze the animal's lungs and prevent breathing.

II. Fermentative

1. Rumen dysbiosis: The population ratio of the bacteria that inhabit the rumen changes as a result of this condition. Ruminant digestion is affected by this in a different way.

2. Simple indigestion: Occasionally, ruminants will inadvertently ingest foreign objects like plastic. Due to its shape and size, this kind of object gets stuck in the rumen and prevents animals from digesting it. Simple dyspepsia causes a change in rumination and can grow serious, risking the animal's life.

3. Ruminal acidosis: Due to its clinical significance and prevalence, ruminal acidosis is maybe the



most well-known rumination condition. This ruminal illness is the most severe of all and is complicated due to all the alterations that take place in the rumen. It is primarily brought on by abrupt dietary changes and an increase in carbs that are simple to digest. These carbohydrates are transformed into lactic acid by the microbiota, particularly the bacteria *Streptococcus* spp. and *Lactobacillus* spp. In addition to having an impact on the rumen, the production of lactic acid as a metabolic byproduct causes an acid-base imbalance in the animal. Death may happen in less than 24 hours.

Rumination disorders prevention strategies

All of the alterations previously mentioned should generally be avoided since they have an adverse effect on production and may even result in animal death.

1. **Cleaning of pastures:** Ruminant housing facilities must always be spotless. Plastic remnants, sharp objects, trash, and other items that ruminants can consume need to be handled with caution.
2. **Use of magnets to capture metallic or sharp objects,** as they are the most common cause of traumatic reticulo-peritonitis. To stop the perforation of the digestive organs and trap metallic elements, ruminants with the condition might be given an oral magnet.
3. **Avoid making drastic dietary changes;** doing so encourages the metabolic imbalance that leads to the fermentation process in the rumen. Changing your diet should be done gradually.
4. **Avoid consuming too be many carbs that are simple to digest;** ruminants should only receive the precise amount of carbohydrates that they require. To avoid consuming too many carbohydrates, foods like fruits and feed grains should be offered with prudence. These are the compounds that cause ruminal acidosis.
5. **Use of forages:** It should avoid to increase the amount of feed if pasture is scarce owing to the summer season. Instead, silage or hay should be kept on hand as forage reserves to augment the animals' diet. Sometimes it is thought to be okay to feed the animals some forage that has been chopped up finely using mowers or other equipment. Animal produces ruminal acidosis, lowers salivation, and improperly performs the rumination process in small particles.
6. **Animal health:** It is advised that ruminant farms oversee a herd health programe to ensure the best possible welfare of the animals. Rumination changes caused by diseases in other organs or systems should be avoided in some cases.
7. **Sodium bicarbonate addition:** The veterinarian can determine how much sodium bicarbonate to



give cows that are at risk of ruminal acidosis.

8. Use of probiotics: It has been demonstrated that consuming yeasts like *Saccharomyces cerevisiae* and *Megasphaera elsdenii* or include essential oils in one's diet has a protective effect against rumination disorders.

9. Rumination stimulants: Products like Alquerplus Ruminatorio accelerate the rumen microbiota's development during crucial times for the digestive system (weaning, diet change) and make it easier to digest the most vital parts of the feed. This product includes probiotics (to replenish the microbiota), pro-nutrients (to enhance digestive physiology), vitamins, amino acids, mineral salts, and probiotics. To avoid the development of metabolic disorders in ruminants, it is crucial that the rumination process is normal and that organic functions are sufficient.

Conclusion

The rumen issues are common in animals, therefore it's critical to identify and avoid them. Therefore, it is crucial to think about these rumination diseases' prevention. Clean pastures, a sufficient supply of food (forage or feed), and the use of substances as rumination stimulants to support rumen health are all related to prevention strategies.

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