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## REVIEW ARTICLE

# Review Paper on Therapeutic Management of Ketosis (Acetonaemia) in Cross Bred Animals

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**ABSTRACT**
*Ketosis is a metabolic disease which usually occurs in cows in early lactation due to an imbalance between the nutritive intake and the nutritive requirements of the animal. It is associated with an inadequate supply of the nutrients necessary for the normal carbohydrate and fat metabolism that is seen mainly in times of high milk production in early lactation. Ketosis is a common disease of adult cattle and typically occurs in dairy cows in early lactation and is most consistently characterized by partial anorexia and depression. Symptoms in cattle, nervous dysfunction, including pica, abnormal licking, in coordination and abnormal gait, bellowing, and aggression, are occasionally seen. In this review papers, we described that about ketosis and related symptoms and their management through various aspects.*
*Keywords: Ketosis, Metabolic disorders*

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## INTRODUCTION

Ketosis in dairy cattle is not a specific disease but a metabolic disorder. It is an imbalance between the nutritive intake and the nutritive requirements of the animal. It is associated with an inadequate supply of the nutrients necessary for the normal carbohydrate and fat metabolism that is seen mainly in times of high milk production in early lactation. Ketosis in cattle occurs in practically every country in which dairying is practiced. Only a few cases occur in some regions, but in others its incidence may be 15 percent or more. It develops primarily in high-producing dairy cows and seldom in low producing cows, steers, or bulls, except those suffering prolonged starvation and protracted diseases. In many areas the number of recognized cases of ketosis has increased greatly since 1940. The first described case of ketosis in cattle in the United States is reported to have been in 1929.It may develop from poor diet or periods of stress such as cold, wet weather. It may also affect apparently well-fed cows producing very large volumes of milk. In pasture-fed cows the condition is usually seen when the grass is drying off and green feed is scarce. Ketosis can be either clinical or subclinical; therefore, the incidence of ketosis and resulting financial losses are difficult to quantitative. Lactation ketosis is a worldwide problem in cows producing greatest amounts of milk. Ketosis is a metabolic disorder that occurs in dairy cattle when energy demands for milk production exceed energy intake. The cow starts to use body fat as an energy source, but if the fat is broken down faster than the liver can process it, then excessive amounts of ketones accumulate in the blood and the symptoms of ketosis occur. Ketosis is a common disease of adult cattle. It typically occurs in dairy cows in early lactation and is most consistently characterized by partial anorexia and depression. Rarely, it occurs in cattle in late gestation, at which time it resembles pregnancy toxemia of ewes. In addition to in appetence, signs of nervous dysfunction, including pica, abnormal licking, in coordination and abnormal gait, bellowing, and aggression, are occasionally seen. The condition is worldwide in distribution but is most common where dairy cows are bred and managed for high production [1].

## VARIOUS CLASSIFICATIONS OF BOVINE KETOSIS

The disease is relatively common in lactating cows in Australia but often goes unnoticed in its mild forms. The mortality rate in affected cattle is low and spontaneous recoveries occur in many cases. The disease is usually seen in early lactation (within the first 2 months after calving) and may cause significant production losses Five types of ketosis are described according to the origin of the causes favoring the development of this disease [1-4]:

- Primary underfeeding or starvation ketosis - feed quality inadequate.
- Secondary underfeeding ketosis - inadequate feed intake due to another disease or condition.
- Ketogenic or alimentary ketosis - from feeds high in ketogenic material.
- Ketosis due to a specific nutritional deficiency - cobalt and possibly phosphorus deficiency has been suspected as causes.
- Spontaneous ketosis - where causes are not able to be established.

## PREDISPOSING FACTORS OF KETOSIS

1) Age - cows of any age may be affected but the disease appears more common in later lactations peaking at about the fourth lactation.
2) Body condition at calving - over fatness at calving has been associated with increased levels of ketosis.
3) Other diseases - secondary ketosis results frequently when conditions such as mastitis, retained placenta and milk fever have previously occurred.

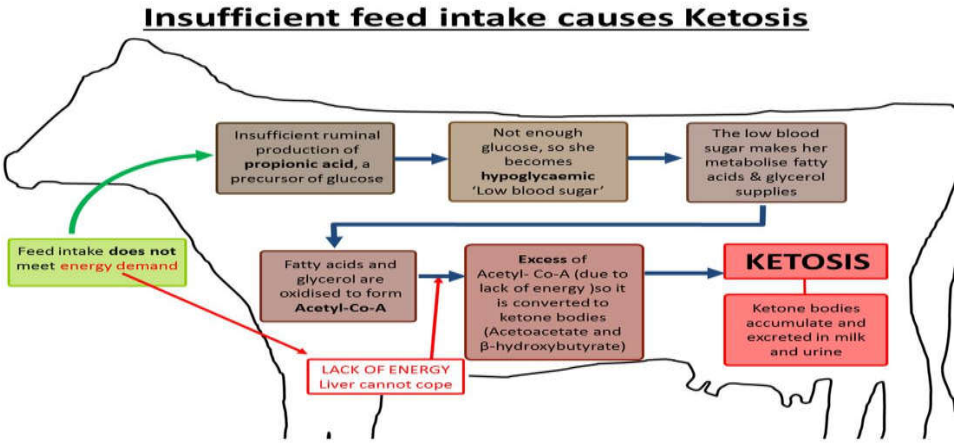


**Figure No. 1** Insufficient feed intake causes Ketosis.
[Source: https://www.farmhealthonline.com/disease-management/cattle-diseases/ketosis/]

## CLINICAL FINDING OF KETOSIS

In the more common wasting form, there is a decrease in appetite and milk yield. There is an associated loss of weight, firm faces and the cow becomes depressed. With recovery there is a gradual return to normal milk production [1].

- Body condition and weight loss
- Reduced milk yield
- Reduced appetite particularly for non for age feeds
- Dull, starry coat and firm, shiny dung
- Acetone (pear drop) smell on breath or milk
- Some individuals develop nervous signs including excessive licking, salivation and staggering ("Nervous Acetonaemia")
- Walking in circle.
- Straddling or crossing of legs
- Head pushing or leaning in to stanchion
- Apparent blindness.
- Aimless movements and wondering
- Chewing movements with salivation.
- Vigorous licking of the skin and an in animate object.

Cow with Ketosis, 6 weeks post calving. Note the poor body condition.

Ketosis affected Cows

**Figure No. 2** Ketosis affects the cow in poor body condition

**DIAGNOSIS**

A veterinary examination may be necessary to confirm the presence of the disease. Ketosis is characterised by a high blood ketone level and a low blood glucose level. A test is available which will detect the presence of ketones in the urine and this is a good guide as to the existence of the disease. Cow-side tests for the presence of ketone bodies in urine or milk are critical for diagnosis. Most commercially available test kits are based on the presence of acetoacetate or acetone in milk or urine. Dipstick tests are convenient, but those designed to detect acetoacetate or acetone in urine is not suitable for milk testing. All of these tests are read by observation for a particular color change. Care should be taken to allow the appropriate time for color development as specified by the test manufacturer. Handheld instruments designed to monitor ketone bodies in the blood of human diabetic patients are available [3]. These instruments quantitatively measure the concentration of BHB in blood, urine, or milk and may be used for the clinical diagnosis of ketosis.

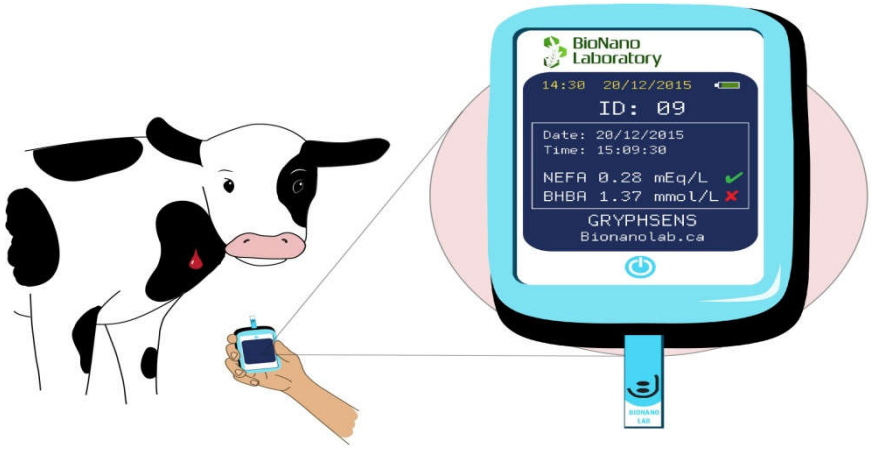


**Figure No. 3** To identify the value of BHBA and NEFA with the help of Bio Nano Laboratory

**TREATMENT OF KETOSIS**

**Corticosteroids -** these break down protein in muscle to produce glucose and help restore blood glucose levels back to normal. Steroids need to be used alongside a glucose precursor.

**Glucose Precursors –** The only rational treatment in ketosis to relieve the need for glucose formation from tissue and allow ketone body utilization to continue normally. The intravenous injection of a 500ml. Solution of glucose results in transient hyperglycemia, increased insulin, decreased glucagon and reduced plasma concentration of none esterifies fatty acids. A significant proportion of the administered glucose is lost to urinary excretion [3, 5].

**Miscellaneous therapy-** Vit B12 and cobalt is recommended to promote propionate production. Nicotinic acid 12 g daily to promote gluconeogenesis, Chloral hydrate at an initial oral dose of 30 gm followed by 7 gm doses twice daily are also recommended.

**PREVENTION AND CONTROL MEASURE**

Ketosis causes financial loss through lost production and treatment. It may be prevented by management strategies that maintain a good appetite and supply adequate feed to meet this appetite during the late dry period and immediately after calving. These strategies include [2].

1) Avoid over fat cows at calving-fat cows have poorer appetites both before and after calving and mobilise more fat.
2) Reduce disease around calving-Calving difficulties, retained cleansings, milk fever, mastitis, lameness, will all increase the risk of Ketosis.
3) Feeding management - Good quality diets and forages, maximise feeding times and trough space
4) Reduce stress - house fresh calved cows separately for the first few weeks of lactation ideally in straw yards.

**CONCLUSION**

Ketosis is an important metabolic disorder of high producing dairy cattle that result from inadequate nutrient intake by the dairy cow in early lactation. Adequate and balanced nutrients in high producing dairy cattle to fulfill their metabolic demands are to be provided so that output of the animal does not exceed input. Clinical and subclinical ketosis is a major cause of economic loss to the dairy farm. Diagnosis of the ketosis is performed on the basis of history, Characteristic clinical findings and laboratory finding such as estimation of blood glucose, estimation of ketone bodies in the serum and detection of ketone bodies in the urine and milk. Management of the dairy cow near or at calving time plays an important role in the control of metabolic disorders like ketosis.

## REFERENCES

1. Source: Queensland Department of Agriculture, Fisheries and Forestry; 2009.
2. Source: The Glenthorne veterinary group Excellent in animal care news; May 2011.
3. Source: Ketosis in Cattle Joseph A. Dye and Robert W. Dougherty, Yearbook of Agriculture 1956.
4. E. T. Littledike and J. W. Young and D. C. Beitz (1980), "Metabolic Diseases of Cattle: Ketosis, Milk Fever, Grass Tetany, and Downer Cow Complex", J Dairy Sci 64:1465—1482.
5. Ramakant, S.V Singh and J.P. Singh (2015), "Ketosis in dairy cattle and its management", the blue cross book, January 2015, vol. 31:10-16.