

# Nutritional Remedy for prevention of Milk Fever

S. Manu Mohan

**M**ilk fever is an impaired metabolic condition related to calcium status, to previous calcium intake and to parathyroid function. This condition results when the calcium homeostatic mechanisms of the body fail to replace the calcium lost from the plasma at the onset of lactation. Low phosphorus intakes are occasionally related as a cause for milk fever. Hypomagnesaemia can also lead to milk fever due to impaired parathormone (PTH) action. Steaming up of dairy cattle also predisposes the incidence of milk fever if the ration fed to dry cow is higher in calcium.

Recent advances in the field of nutrition has opened up new vistas in the formulation of dairy cattle rations. One of the new concepts in ration formulation for dairy cattle is the 'Dietary Cation Anion Balance- DCAB'. It is also known by the following terms: Dietary Cation Anion Difference (DCAD), Dietary Electrolyte Balance (DEB), Anion Cation Balance (ACB), Strong Ion Balance (SIB), and Fixed Ion Balance (FIB). It was observed that feeding cattle with grass silage preserved with mineral acids (sulphuric acid and hydrochloric acid) prevented milk fever while feeding sugar beets high in sodium and potassium caused milk fever. Diets containing calcium, chloride, magnesium chloride and aluminium sulphate prevented milk fever. The concept of DCAB in dairy rations was based on the above observations.

## What is DCAB?

Dietary cation anion balance is the difference between the cations and anions in milliequivalents expressed per 100 grams of feed. In its most complete form, DCAD is expressed as the difference between the sum of the milli-equivalents (meq) of cations and anions ie.  $(Na^+, K^+, Ca^{++} \text{ and } Mg^{+}) - (Cl^- + So_4^- + PO_4^-)$  per 100 gram drymatter. The most commonly used expressions are:  $meq. (Na^+ + k^+) - c1/100$  gram drymatter or  $meq. (Na+K) - C1 + S$ . The milliequivalents of strong ions can be

calculated from their percentage composition and their atomic weight.

## What is the effect of DCAB in animals?

The major effect of DCAB is on the systemic acid base status of the cow. When a negative DCAB diet (more meq. of anions relative to cations) is consumed, a mild metabolic acidosis is produced. Conversely, with positive DCAB diets, the result can be metabolic alkalosis. Feeding an anionic diet during late pregnancy results in an influx of negatively charged ions ( $Cl^-$  and  $SO_4^{--}$ ) systemically. Consequently, positively charged ions ( $H^+$  or  $Ca^{++}$ ) are released to neutralize the anions. Several compensatory mechanisms take part in the maintenance of blood pH. In calcium deficiency, an increase in anions in the blood stimulates the production of parathormone (PTH) which in turn mobilizes calcium and phosphorus from the bone and increase the absorption of calcium from the intestine. the PTH activates vitamin D (cholecalciferol) to 1,25-dihydroxy-cholecalciferol which in turn produces the calcium binding protein (calbindin) for the absorption of calcium. The PTH also increases the renal reabsorption of calcium so that the excretion of calcium through the kidneys is reduced. The end result is that blood calcium concentrations are maintained near normal and the metabolic processes to increase blood calcium is functional. Feeding of cationic diets will bring about an opposite effect.

## The application of DCAB in practical feeding

The diets with negative DCAB during pre-partum period found to reduce the incidences of milk fever in cattle. The DCAB value of normal dairy ration is cationic and it ranges from +5.8 to +1 61.2. In order to make a diet anionic, it is necessary that we should add anionic salts separately. Various anions that can be added are aluminium sulphate, calcium chloride, calcium sulphate, magnesium

Dr. S. Manu Mohan,  
Asst. Professor of  
Pathology, Kerala  
Agricultural University.

## Nutritional Remedy for prevention of Milk Fever

chloride, magnesium sulphate, ammonium chloride and ammonium sulphate. A DCAB value of -15 meq/100 g DM is the most desirable in the rations of pregnant cows.

The selection of an anionic salts must be based on the availability, cost, potential toxicity, dietary deficiencies, palatability and type of feeding systems.

Anionic salts are easy to formulate. The important points to be borne in mind while using anionic diets are:

1. Anionic salts are best utilized when it is mixed with a total mixed diet or a complete diet that prevents preferential selection of feedstuffs.
2. The anionic salts are not palatable that can lead to problems with consumption. We must make sure to add some highly palatable feeds when we use anions in the diets.
3. Anionic diets must be fed for three to five weeks before parturition for better results. It takes only 10 to 14 days to produce anionic effect. Due to the inaccuracies in the prediction of calving dates, it is best to feed these special diets for atleast three weeks before calving.

The calcium and phosphorus levels in the diet of pregnant cows should be limited to match the requirements of the pregnant animal. The levels should be increased to meet the requirements of milk production, a few days before calving.

At that time the body system will be functional for the absorption of cations especially calcium from the gastro-intestinal tract. Since milk synthesis begins one or two days before parturition, it is not enough if we increase the mineral and energy contents in a ration after calving.

It is found from different experiments that the use of cationic or alkalogenic diets for lactating dairy cows increased milk production and drymatter intake. The cationic salts used to increase DCAB include sodium bicarbonate and sodium carbonate. The DCAB values ranging from +19 to +38 gave beneficial results in lactating cows.

The major reasons for the development of milk fever are over and under feeding of calcium and phosphorus during pregnancy. Over feeding of these minerals during pregnancy will have a suppressing effect of PTH and under feeding leads to reduced availability of minerals. Milk fever can be prevented by avoiding over feeding of calcium and phosphorus and making the diets anionic during the prepartum period.

Another important point is that the levels of these minerals must be increased a few days prior to parturition and during lactation so that the animals get the required minerals when they need the most. The diet also must be made cationic during lactation for maximum benefit.

*With Best Compliments From :-*

**C. K. MEDICALS**

KUTHANNUR

PALAKKAD

Tel: 0492-287245

*With Best Compliments From :-*

**SELVA MEDICALS**

SHORNUR

Tel: 0492-623507

# **Alved Pharma & Foods Pvt. Ltd.**

K.K.Nagar, Chennai - 78  
Introducing two more innovative formulation

Introducing two more innovative formulations

## **ALPHOS**

The first and the  
only injectable  
inorganic phosphorus

## **RAFOX PLUS**

India's first and the only Rafoxanide &  
Levamisole combination for mixed  
helminth infestation

*25 Years of Innovative Professional Service*



## **HIPPO.VAGS**

Pharmaceutical Distributors  
A.R. Menon Road, Thrissur - 680001

**Dealers & Suppliers of Rabies Vaccines,  
Canine distemper vaccines, mastitis kit etc.**