Formulating for ruminant health and excellent farm performance

Calving is the most difficult and challenging phase in the life of the cow. Her body will prepare to start the next lactation and without adequate nutrition and management, her health will begin to deteriorate, and profit will decrease. Managing ruminant health most often relies on treating health issues once they occur.

by Deepak Dubey,
Senior Product Manager,
Kemin Europa NV, Belgium.
www.kemin.com/emena

However, we must focus more on the prevention of these health issues by taking care of daily nutrition – especially during the pre- and post-calving phases.

Formulating the cow's diet for optimal health will prepare her for a smoother calving and improved lactation after calving. By formulating the diet for ruminant health, you will also be able to achieve a good daily farm performance.

At Kemin, we will work together with you to formulate for ruminant health, based on our expertise and scientifically proven nutritional solutions.

For us, good animal health is the cornerstone of profitable dairy farming. In formulating a ruminant health programme, we focus on both the pre- and post-calving phase in dairy cows

This article will give you a clearer overview

of the importance and pitfalls of the pre-calving phase in the cow's life.

Pre-calving phase

A critical time in the dry period is the last three weeks before calving, also known as the 'close-up' period.

During this time, the cow is preparing to start her next lactation. Without adequate nutrition and management, cows can fade quickly and lose potential income for you.

The close-up dry phase needs to be considered a high attention area that sets the stage for how well the cow will perform after calving. We all know that dry cows should be moved to the close-up pen before their due date, but where does this recommendation come from?

For a lactating cow to be successful, she needs to be able to mobilise calcium from her bones. This process can take 10-15 days. Without adequate time to prepare for lactation, milk fever can be a major issue.

By changing the diets provided during the close-up period, not only are we allowing time for the cow to begin to mobilise calcium, but we are also allowing time for her rumen to adapt to the forages and higher energy diets which are essential to absorb nutrients and prevent problems after calving.

Today's biggest concern with the pre-calving phase

Today's concern is not actually clinical disease and its treatment cost, but instead focuses on 'subclinical metabolic disorders' which can affect you very badly.

Metabolic disorder i.e. subclinical hypocalcaemia (SCH) is considered a 'gateway disease' because it is associated with an increased risk of periparturient problems that have long-term consequences to production, reproduction, and survival. Research findings clearly

Continued on page 9

Fig. 1. Association of hypocalcaemia with the lactation number (Reinhardt et al., 2011).

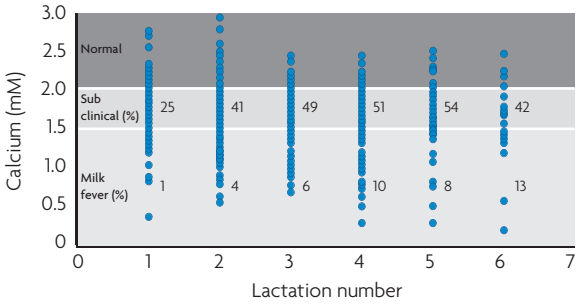
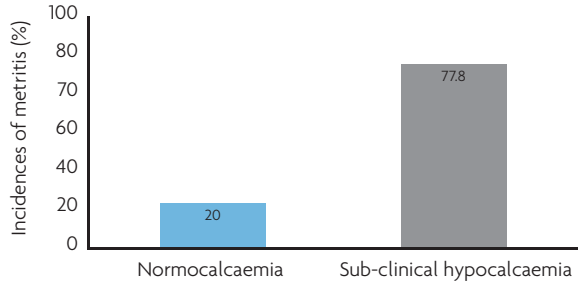


Fig. 2. Association of subclinical hypocalcaemia with metritis in a high-risk situation.



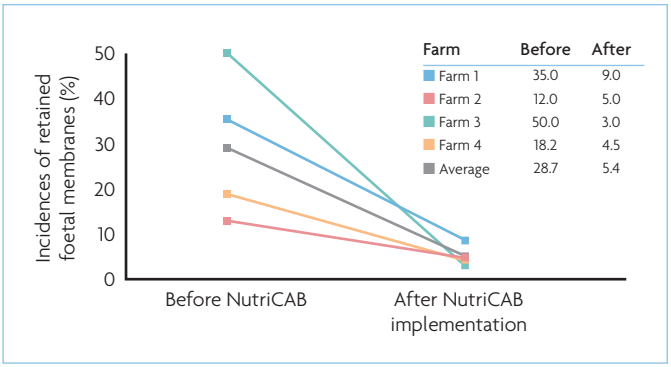


Fig. 3. Changes in the incidences of retained foetal membranes after the introduction of NutriCAB.

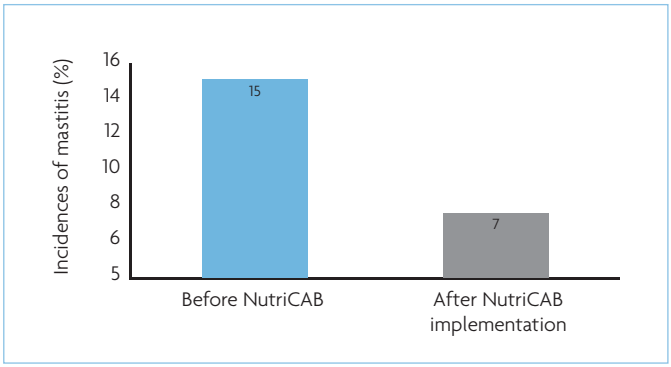


Fig. 4. Changes in the incidences of mastitis after the introduction of NutriCAB.

Continued from page 7
indicate that cows are more susceptible to hypocalcaemia as the lactation number increases.

Effects of subclinical hypocalcaemia beyond milk fever

In 2014, Martinez and coworkers studied the impact of subclinical hypocalcaemia beyond milk fever. They induced SCH through 5% ethylene glycol tetra acetic acid (intravenous infusion) treatment for 24 hours. They reported that SCH significantly (*P<0.01) reduced dry matter intake, increased non-esterified fatty acids (NEFA) concentration, reduced rumen contractions and decreased neutrophil functions compared to normocalcaemic cows.

Martinez et. al. (2012) also studied the effect of normocalcaemia/SCH and its effects on metritis incidences when a cow is in a high-risk situation.

A high-risk situation was described as a cow being diagnosed with dystocia, twins, still born or retained foetal membranes.

Normocalcaemic cows in a high-risk situation showed 20% incidences of metritis, whereas subclinical hypocalcemic cows showed 77.8% incidences of metritis in a similar high-risk situation (Fig. 2).

Formulating diets for pre-calving cow health

A meta-analysis consisting of 42 randomised trials suggested that cows with cationic diets (diets having a positive charge due to higher concentration of sodium, potassium, calcium and magnesium) are more likely to suffer increased incidences of milk fever or hypocalcaemia.

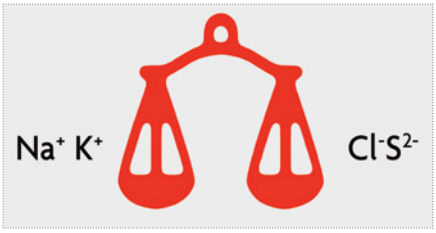
Cationic diets are one of the strong triggers of subclinical hypocalcaemia during the close-up dry cow phase.

Anionic diets (diets having a negative charge due to a higher concentration of chloride, sulphur and phosphorus) promote a more acidic metabolic state (lower blood pH) that is associated with a reduced incidence of milk fever.

Is your cow's diet cationic or anionic?

It is likely that most diets are cationic in nature, based on the dietary ingredients used in the diet of close-up cows. One of the main reasons for this is that these ingredients are fundamentally cationic.

Turning your cow's diet from cationic to anionic can create optimal acidification in the cow's blood.



These acidogenic diets work to minimise hypocalcemia by:

- Changing the cow's blood pH towards a slightly acidic condition by increasing the concentration of chloride ions.
- Mobilising more calcium from the bones to buffer the acid in her bloodstream.
- Achieving maximum calcium supply at the time of calving.
- Reducing incidences of hypocalcaemia which occur due to calcium deficiency.

Kemin offers an on-site pH measurement kit for monitoring urinary pH in cows, which is critical for analysing pitfalls after calving, as well as diet testing facilities in their laboratory to check cation status.

In this way they propose the most refined application of hypocalcaemia control solutions and technologies.

Kemin's solution for the health of pre-calving cows is NutriCAB. NutriCAB comes with the highest concentration (>80%) of calcium chloride in an encapsulated form to mask the bitterness of anionic salt during intake; control hygroscopicity during application and storage; ensure skin safety while handling; and improve metabolic health for improved cow performance.

Performance under field condition

Compromised immunity and decreased muscle tone due to calcium deficiency can be associated with an increased incidence of retained foetal membranes and mastitis in dairy cows. When formulating a ruminant health programme for pre-calving cows (last 21 days before calving) the diets were made acidogenic with NutriCAB and the incidence of retained foetal membranes reduced from 28.7% to 5.4% (average of four farms, Fig. 3).

Following NutriCAB supplementation, one of the trial farms reported a decrease of 53.3% in incidences of mastitis (Fig. 4).

Conclusion

The pre-calving cow phase is an area of great importance that sets the stage for how well the cow manages after calving.

Hypocalcaemia is known to be the main problem affecting calving. Studies indicate that to combat this, pre-calving cow diets should be acidogenic. Kemin's experience and strategies will help you resolve the challenges of the pre-calving process and optimise your dairy farm's profits. ■

References are available from the author on request

Benefits of NutriCAB

- Provides a palatable source of anionic salt
- Controls hygroscopicity; easy handling, storage and application at farm and factory level
- Reduces urinary pH in five days post supplementation
- Helps in smoother calving
- Reduces incidences of milk fever, retained placenta and displaced abomasum
- Helps in attaining optimum peak milk yield after calving and maintains better lactation persistency