

# Metabolic issues in dairy cattle

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Thesis Statement: The instance of metabolic issues in dairy cattle can be lowered by the management of nutrition

## **The Prevention of Metabolic Issues in Dairy Cattle**

With the price of milk hovering around the majority of farmers breakeven price, anything that can be done to maximize profits and decrease costs must be done. Common metabolic issues in dairy cattle can rob producers of profits by decreasing production and adding to treatment costs. The combination of these two factors can decide whether a farmer is making or losing money. Metabolic problems at the time of transitioning can be prevented by being proactive in the management of nutrition and the cattle. With a few practices any dairy farmer can help improve their herd health and bottom line.

Metabolic issues in dairy cattle come from nutritional imbalances or deficiencies and can create various health problems. A dairy cow has constantly changing nutritional needs as she goes from lactating to the dry period. These issues can be compounded as nutritional needs change in conjunction with the possibility of changes in the available forage's quantity or quality. Most commonly, metabolic troubles are brought on by the large gap in a cow's nutrient intake and nutrient demand as the lactation begins. Because the cow must adjust to the change in diet, increase in dry matter intake, and the start of milk production, the first weeks of lactation can make a cow susceptible to problems due to the stress of transitioning. The diseases that are related to nutritional issues are ketosis, displaced abomasum, metritis, retained placenta, and milk fever. Each of these diseases affect the cow differently but all of them equate to lost production.

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Metabolic issues can affect a cow in several different ways, depending the type and severity of the problem. The root of the issues stem from some sort of nutritional imbalance. Due to the high level of production, a dairy cow can easily be affected by even a small change in diet. Ketosis is caused by a drop in energy intake and body condition loss when a cow has a negative energy balance. Cows with ketosis will typically stop eating and drop in milk production, when a cow goes off feed this can lead to a displaced abomasum. A displaced abomasum can have a few causes, one is a change in diet from low concentrate levels to high concentrate levels. The second one is because during pregnancy the uterus shifts the abomasum, so after calving when the uterus shifts back to a normal state it can increase the change of the abomasum becoming displaced.

The third is a lack of muscle tone of the abomasum, when the abomasum lacks enough muscle tone it stops functioning properly and causes the stomach to build up with gas. A displaced abomasum is not something that is life threatening as soon as it happens but leads to a cow going off feed and feeling ill, so it should be treated as soon as possible. Hypocalcemia, known as milk fever, is a calcium deficiency in the blood around the time of calving. Cows that consume too much calcium during the dry period become far less efficient in the uptake of dietary calcium. This translates to a higher instance of milk fever because of the cow's inability to utilize calcium. Another reason for milk fever can be a diet too high in potassium which can put the cow in a state of having a blood ph that is too high, this makes the cow more susceptible to milk fever. If not treated right away this can be fatal. Retained placenta and metritis are both related, when a cow retains the placenta, she

has a higher chance of contracting metritis. Retained placenta can be prevented by ensuring the diet has adequate levels of trace minerals and enough protein to maintain adequate muscle tone during the dry period.

While each of the problems are related to diet, there are different parts of the diet and different solutions to the individual problem. The first school of thought with milk fever was that a problem with the udder was causing the illness, but it was later discovered that milk it is caused by a lack of calcium in the bloodstream. The early attempts of treatment were focused on treating the udder to clear a virus that was thought to have been causing the illness. The focus was then shifted to calcium levels in the blood. The two modern solutions to preventing milk fever are balancing the ration to maintain low calcium and phosphorus levels and the other is feeding a diet that is more acidic to keep the blood ph at a more acidic level. Balancing the ration to maintain a lower level of calcium and phosphorus combats the onset of milk fever by not feeding calcium and phosphorus in excess (Philips) . When calcium and phosphorus are fed in greater amounts than what is needed by the cow, it reduces the cow's ability to utilize sources of calcium such as bone calcium. This can help reduce the chance of milk fever by allowing the cows body to easily utilize sources calcium when it is in high demand at the start of milk production. The newer solution of feeding a more acidic diet to keep blood ph lower allows the cow to utilize more calcium from the bones and increase the calcium absorption from the intestines (Ondarza 2018) . Some may say that feeding to maintain the blood ph level is too complicated and requires blood checks to make sure of effectiveness. Of the two methods my opinion is that the second option is more practical.

While the first option is effective it can be difficult to get calcium and phosphorus levels low enough while maintaining a balance ration. While it is still important to manage calcium levels in the dry cow ration, the second option can better improve the success of preventing milk fever.

Metritis and retained placenta are both side effects of mineral and nutritional deficiencies. At the time of calving, a cow's immune system is weakened due to colostrum production and the stress of calving. This leaves the cow in a more susceptible state to metritis. Retained placenta can be prevented by having sufficient levels of vitamin A and D as well as selenium in the dry cow ration (Warren 2018). The energy levels in the dry cow ration should also be high enough so that the cow is more likely to spend less time in a negative energy balance. Cows that are too fat at the time of calving are more likely to have difficulty calving, this puts them at a higher risk of retained placenta. In order to be healthy dry cows, need to be under a body condition score of 3.5 out of 5. To maintain a low body condition score, the dry cow ration should have the proper amount of energy to provide enough energy to allow a smooth transition without adding excess body fat. Some suggest an approach to preventing metritis and retained that is aimed at keeping calving areas low stress to put as little strain as possible on the cow. While this does help and all cattle areas should be low stress, I think it may be harder to control due to daily functions of the farm. Even with strict management of the freshening areas a cow can still be disturbed or have trouble while calving. That is why I think a well-balanced ration with proper mineral levels gives a cow the best chance at a trouble-free transition.

Ketosis and displaced abomasum are both problems that affect the cow after freshening and are associated with feed intake problems. These two diseases result in a large loss of production and potentially the animal, so all prevention steps should be considered. Ketosis is caused by the mobilization of body fat in fat cows due to a negative energy balance. A displaced abomasum is caused by too little effective fiber in the diet or too high of a grain to forage ratio. Both ketosis and displaced abomasum can be caused by milk fever, as milk fever reduced the muscle activity in the gastrointestinal system. To prevent ketosis and displaced abomasum the dry cow's diet should be have a low level of concentrate that is increased as calving approaches. Once a cow has calved, a fresh ration with less grain and a high amount of fiber will help reduce the chance of a displaced abomasum by keeping the rumen full of fiber and keeping the rumen ph at a healthy level. Increasing the amount of dry matter intake for cows that are close to calving can also help by getting cows used to the jump in feed intake once milk production has started. A higher protein level can also help prevent both diseases by maintain body weight easier while in lactation and keeping the intestinal muscles well-toned.

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