Immunity- for optimal health, fertility and production

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Introduction

With Focus For 100, Alltech aimed to identify the key areas that are most important in that first 100 days of lactation – and how you can optimise these to get the best 305 day lactation from each cow. Nutrition, Immunity and Rumen Health are the backbone to this period, and in the following article we will explore more the immune function of the early lactation dairy cow.

The immune system is the cows defence against infection. The stronger the immune system is, the more likely a cow will perform optimally and she will have a lower risk of succumbing to infection and/or disease. A reduced immune system does not often present itself with clinical symptoms but can often lead to subclinical issues. These subclinical issues can reduce performance and therefore be a hidden cost leaving the farmer unable to maximise profitability. In this article we will examine the main factors which contribute to a reduced immune system.

Stress

Stress can have a negative effect on the cows ability to fight disease. When the animal is under physiological stress such as at calving this impairs the immune system. The below graph shows that the standard cow has a reduced ability to fight infection at calving(Figure 1). This is partially due to the stress that the cow is under at this difficult time. Other good examples of stresses that can impair the immune system is overcrowding, where cows do not have sufficient cubicle space for lying down. Also feed barrier space per cow can be another stressor where cows have to fight to gain access to feed.

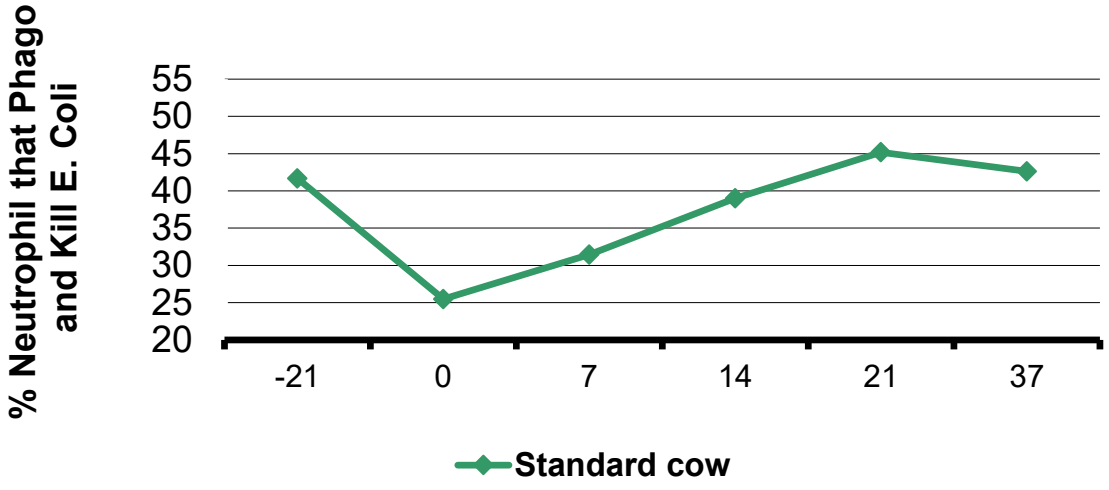


Figure 1 Effect of pre- to post-calving on killing ability of white blood cells

Immunity related issues

A number of diseases are associated with the stress of calving and the pressure the immune system is under. Retained cleanings, endometritis, milk fever, left displaced abomasum (LDA), sub acute ruminal acidosis, low milk solids constituents, mastitis amongst other issues are common post calving and can be detrimental to the future fertility of the cow and her overall production in the lactation. Supporting her immune system after calving can help minimise these conditions.

Feeding to enhance immunity

Nutrition plays an essential role in the efficient functioning of the immune system. Both deficiencies and excesses of various nutrients can result in impaired immune function. As can the overall level and quality of nutrient the cow is receiving.

Reducing energy balance

Post calving the cow has a high energy demand, she needs energy to recover from calving, to produce milk and to maintain her own health and BCS, so she is at risk of entering negative energy balance. That is that she is expending more energy than she can take in from her diet. Energy balance has a major role to play as it affects the ability of certain cells to get to the area of infection quick enough. Animals in negative energy balance will have a slower response to infection. Therefore, reducing negative energy balance in the transition period is essential. This requires a healthy functioning rumen which can be encouraged by feeding quality forage and a well balanced diet. The use of ruminal buffers, such as Yea-Sacc® from Alltech®, has been proven to increase dry matter intake, improve fibre digestion and lead to a significant increase in energy production from the diet.

Mineral deficiencies

Minerals play an essential role in immune function, fertility and production of dairy cows. Zinc deficiency for example can lead to reduced resistance to infection. Selenium inadequacy also impairs immune function - Selenium (Se) is a natural antioxidant and boosts the **immunity** of calves and **dairy cows** by playing a role in the resistance to viral and bacterial infection. Adequate selenium status has a positive effect on the animal's ability to resist infection, as well as fertility parameters (Figure 2). Increased susceptibility to infection through malnutrition has been a recognized issue in livestock for many years.

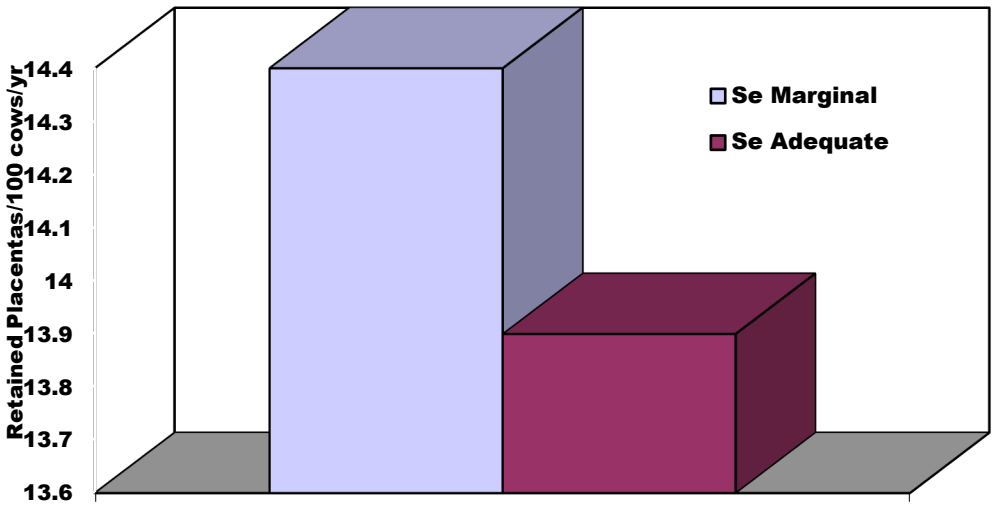
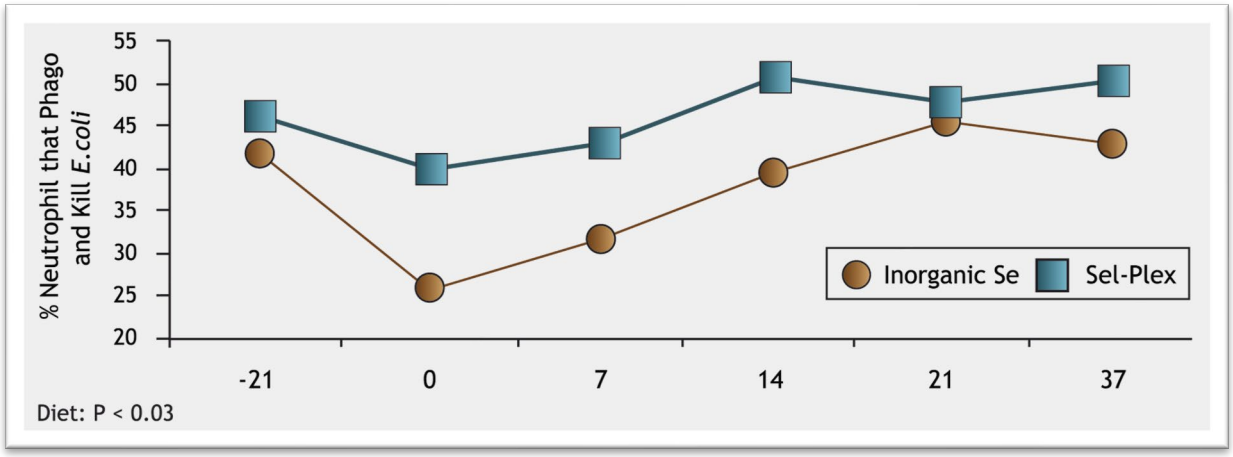


Figure 2 Effect of selenium status on incidence of retained placenta

It's not just important to supply cows with minerals, but to supply them with the right minerals in the best form for them to make use of those minerals. Supplying minerals in their more natural organic form (in comparison to inorganic minerals) leads to better bio availability and uptake by the dairy cow. Bioplex and Selplex from Alltech are organic minerals that lead to improved absorption and utilization by the cow. This leads to the maintenance of optimal health and greater resistance to disease.

The graph below shows how Selplex has a greater ability to fight infection when compared to the inorganic form of selenium supplementation, sodium selenite.



Silvestre & Thatcher (2006)

Figure 3 Ability of Selplex to fight infection versus sodium selenite

As Bioplex and Selplex are more available and therefore better absorbed by the cow she will have an improved immune response and therefore a stronger ability to fight infection.

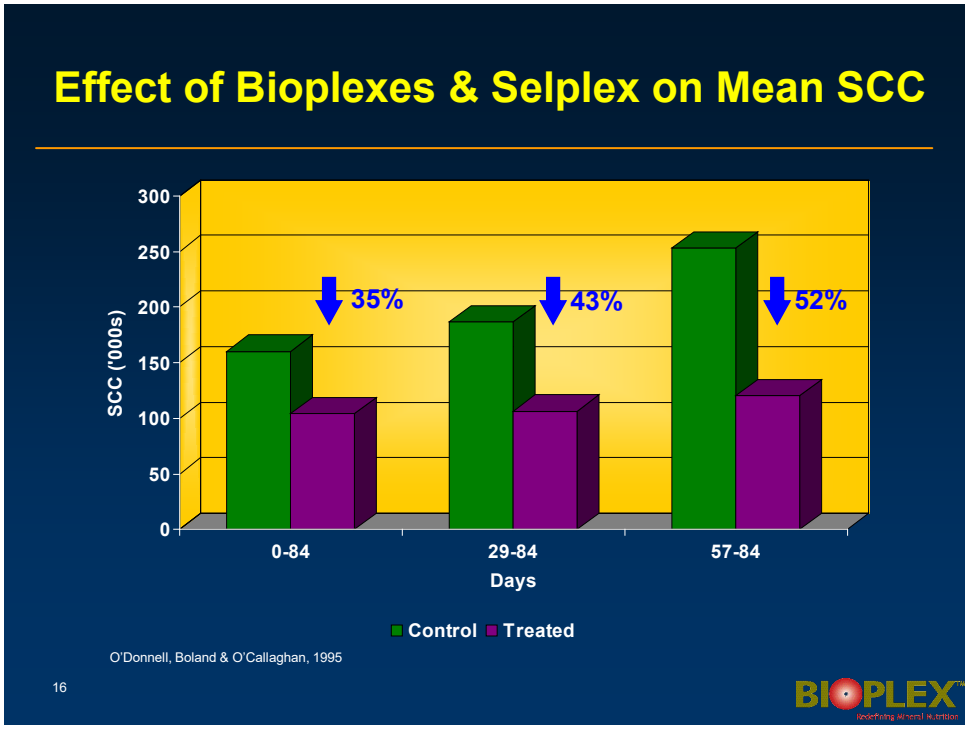


Figure 4 The effect of Selplex, Bioplex Zinc and BioPlex Copper on somatic cell count infections when compared to inorganic mineral supplementation.

Conclusion

Essentially, the immune system must be promoted at all times throughout the lactation cycle but particular attention should be paid during that crucial period of the first 100 days post calving as a time of increased physiological stress. Reducing stress and improving cow comfort will help improve immunity. Feeding to enhance immunity is vital and should focus on reducing negative energy balance, as well as building tissue reserves of key minerals, which is most effectively done by feeding them in the organic form of Bioplex and Selplex. Alltech has over 40 years of experience in animal nutrition and can help you troubleshoot early lactation issues and optimize nutrition, to set you r herd up for a successful 305+ day lactation.