L-SELENOMETHIONINE FOR BEEF CATTLE:

A major driver of immunity and meat quality

Although the trace element selenium occurs only in low concentrations in soils, plants, and raw feeding materials, it is of great importance for optimal animal health and performance.

Mineral supplementation is a hot topic in beef rations. It is one with extensive commercial implications. Critical phases require special attention, also regarding macro- and micronutrients. Stressful periods, such as weaning, changing environments, and transportation require mineral supplementation to reinforce the immune system. The impact of different stressors is especially high in young animals and depends on the characteristics of the individual. In addition, feed intake is depressed during these periods and the absorption of many trace minerals is reduced in periods of stress, compromising immune function.

Rapid recovery or prevention of these stressors is important, but how do we improve absorption of trace minerals when uptake is limited? A safe deposit inside the animal would, in this case, be very helpful. Looking at the essential trace element selenium, which plays a huge role in immunity, it is possible to increase the concentration inside the animal to help them overcome stressful periods without having a limited supply of this specific trace mineral via the feed.

L-SELENOMETHIONINE, A HIGH-ADDED-VALUE SELENIUM COMPOUND

Since the early 70s, diets have been supplemented with inorganic selenium (for example, sodium selenite or sodium selenate). Unfortunately, the absorption is low in all animals, including ruminants (±10%). Microorganisms in the rumen also transform this form of selenium partly into non-absorbable elemental selenium, which is then excreted in the faeces (see figure 1). Recent reviews of the role of selenium in ruminants concluded that inorganic selenium sources were not effective to fulfil nutritional requirements. Based on these shortcomings, organic

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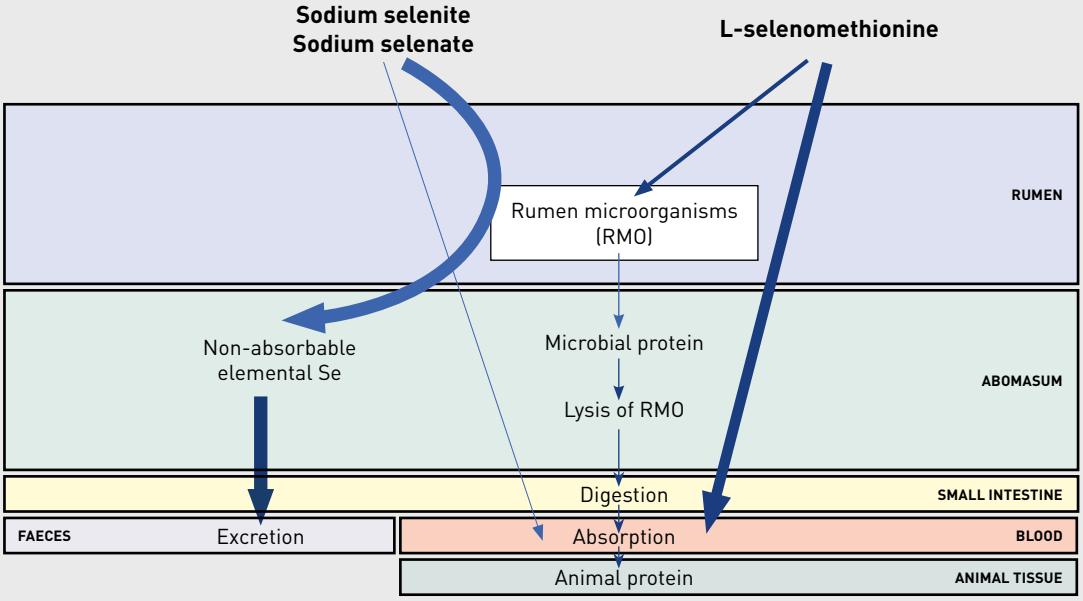
First-generation organic selenium sources comprise selenised yeasts. Yeasts are able to incorporate inorganic selenium as organic selenium (L-selenomethionine) in their protein fraction. Unfortunately, due to biological limitations, these organisms are not able to accumulate all inorganic selenium in the form of L-selenomethionine, and huge variability is seen in the quality of these products. L-selenomethionine is the desired selenium molecule as it is able, as a methionine source, to be incorporated in animal proteins and accumulate in the body to a high extent, thereby providing a safe deposit of selenium for future usage. The quality of selenised yeast is expressed, by consequence, in the percentage of selenium in the form of L-selenomethionine.

Recently, a new-generation organic selenium source was introduced to the South-African market. This source contains pure synthetically made L-selenomethionine, present as a single amino acid. All selenium is in the desired form with no variation in concentration. L-selenomethionine is the desired molecule for ruminants as it will not be converted to unavailable selenium (see figure 1). A small part will be incorporated into the proteins of the microorganisms present in the rumen. Free L-selenomethionine, and L-selenomethionine incorporated in the rumen microorganisms, is readily available for absorption in the small intestine. The absorbed L-selenomethionine is then deposited, as a methionine source, in animal protein and acts as a safe storage. In times of stress, L-selenomethionine is released from the proteins, due to protein turnover, into the amino acid pool and selenium can be utilised for selenoprotein production. Many of these selenoproteins function as an antioxidant to prevent reactive oxygen species (ROS) from damaging lipids, proteins, and DNA on a cellular level.

BENEFITS FOR BEEF

The trace element selenium has a direct influence on the functioning of the immune system. The improvement of immune cell functioning is

Figure 1: Absorption of different selenium sources in ruminants



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linked to an enhanced antioxidant status that, in turn, is based on the availability of selenium. A deficiency in selenium and compromised immunity is associated in calves with muscular dystrophy, stillbirths, and weakness, and in cows with mastitis, metritis, and retained placenta. In finishing cattle, inadequate selenium negatively affects meat quality, meat colour, drip loss, and shelf life. Providing a highly bioavailable source of selenium (that is, L-selenomethionine) to beef cattle is, therefore, associated with a positive effect on growth performance, immune function, and antioxidant status. Supplementing highly bioavailable selenium increases antibody titers and reduces the incidence of bovine respiratory disease, morbidity, and mortality. Providing a highly bioavailable source of selenium during the finishing period is an interesting method to improve meat tenderness, shelf life, colour stability, and muscle selenium content. Increased selenium content in the meat is also valuable in providing more nutritional value to consumers.

L-selenomethionine (Excential Selenium 4000, by Orffa) is the trace mineral source of selenium of choice for best feeding practices. Moreover, it is metabolically the most bioavailable source of selenium for beef. As a result, in various animal trials, both under practical and controlled conditions, the molecule plays a crucial role in maintaining an optimal health status. Excential Selenium 4000 is a high-quality, trace mineral source of selenium that provides your animals with essential selenium in the optimal way.