PROMOSIE-ARTIKEL

# Excential Selenium 4000 to improve animal health and meat quality in beef cattle

Jolien van Soest (soest@orffa.com), Brecht Bruneel, Orffa Additives BV, Breda, the Netherlands

## Selenium is an important trace element to support the health and performance of animals

An important parameter in feed rations is the inclusion of minerals. One of the essential trace elements is selenium (Se), which is involved in reducing oxidative stress, improving immune status, reproduction and growth. Adequate selenium status in beef cattle is known to support the animal during times of stress (e.g. transport and heat). Adding selenium to feed is a good way to enhance the selenium status of animals. Besides positive effects on animal health and production, selenium can also be used during the finisher period to improve meat quality.

Both inorganic and organic sources of selenium are readily available. Inorganic selenium is often used in the form of sodium selenite. A part will be used to produce selenoproteins, the rest will be excreted via breath or urine. Absorption of inorganic selenium is low, especially in ruminants, with a value between 10–16%. In the rumen, inorganic selenium is converted into non-absorbable elemental selenium due to the effect of the microbiota. This renders inorganic selenium ineffective at meeting the nutritional requirements.

Organic selenium, in the form of L-selenomethionine, will also be used for selenoprotein synthesis, but also allows for selenium storage in general body protein and animal products (e.g. meat and milk). Organic selenium ensures a safe deposit of selenium inside the animal, which is used during times of stress or low selenium intake. L-selenomethionine is therefore considered the most effective form of selenium. Orffa provides synthetically produced, dust free L-selenomethionine (Excential Selenium 4000).

## Excential Selenium 4000 – effects on meat quality

The different effects of sodium selenite and L-selenomethionine (Excential Selenium 4000, Orffa Additives BV) on the production, blood parameters and meat quality of Bonsmara bull calves were recently investigated in a South African trial. The study included 24 calves (seven months of age) that were transported to the experimental trial facility Rumen-8 (Bethlehem, South Africa) after finishing a grower period of 60 days at a commercial feedlot. Upon arrival at the research station, the animals completed an adaptation period of ten days, after which they were divided into two groups, subdivided into three subgroups per treatment based on body weight. Both groups were fed total mixed ration (TMR) supplemented with 5,25 mg Se/head/day. The diets only differed in the type of selenium, which was either sodium selenite or Excential Selenium 4000, for the control and treatment group respectively. In order to ensure similar selenium intake between animals, feed intake was limited to 10 kg dry matter per day. The trial lasted for 47 days, after which the animals were slaughtered and meat quality was measured.

"Excential Selenium 4000 improves meat quality and reduces stress"

After slaughter, some important parameters of meat quality were determined; i.e., instrumental tenderness, purge and final pH. Instrumental tenderness was determined using Warner Bratzler Shear Force (WBSF) at 3 and 14 days after slaughter. Lower WBSF values indicate a higher tenderness. Tenderness was shown to be significantly higher for

**Figure 1: Variation in WBSF for both control and treatment groups.**

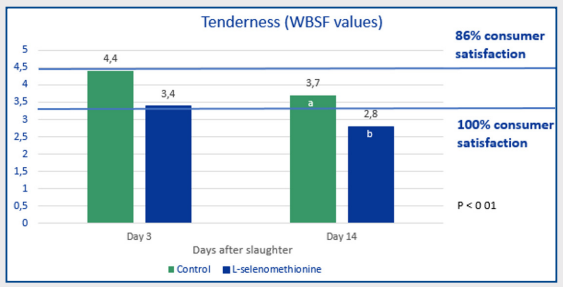
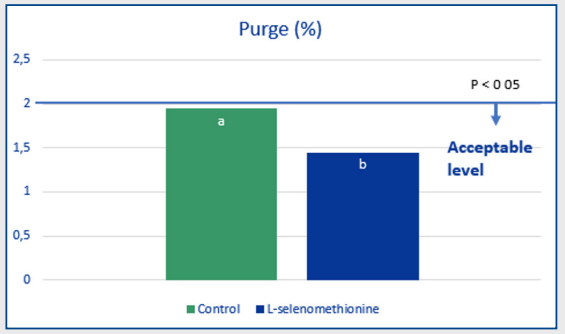



**Figure 2: Level of purge for both control and treatment group. An acceptable level of purge is below 2.0%.**




the group receiving Excential Selenium 4000 compared to the control group at day 14 after slaughter, WBSF values were 2,8 and 3,7 respectively (P = 0,01). This indicates less tough meat and highest consumer satisfaction.

Acceptable levels of purge for consumers are below 2,0%. Both groups showed acceptable levels of purge, however the control group showed a level of purge just under 2,0%, while the treatment group showed 0,5% less purge (Figure 2). This indicates juicier steaks and higher consumer satisfaction. Lower levels of purge result in more sellable meat and therefore allows for higher profits.

"Excential Selenium 4000 shows ROI of 1:3.37"

Final pH was shown to be lower in the animals that received Excential Selenium 4000. This could indicate higher glycogen reserves in the muscle, which, in turn, could reduce the risk of dark, firm, and dry carcasses.

## Advantages of Excential Selenium 4000

Overall, Excential Selenium 4000 improves meat quality compared to sodium selenite. The increased tenderness improves eating satisfaction and the decrease in purge will make the product more desirable and increase consumer satisfaction. Return on investment of adding Excential Selenium 4000 to TMR is ZAR 1:3,37. On the day of slaughter, it allowed for a profit of ZAR 83,13 more per animal, making it very interesting from an economic perspective.

Besides positive effects on meat quality, Excential Selenium 4000 also showed beneficial effects on stress levels. Cortisol is known as a stress hormone with increased levels under stressful conditions. Here, the treatment group showed a higher number of animals with cortisol levels below the detection limit which is beneficial for animal health and welfare.