

Effect of Selenium Source on Meat Quality of Bonsmara Bull Calves

Authors : J. van Soest, B. Bruneel, J. Smit, N. Williams, P. Swiegers

Abstract : Selenium (Se) is an essential trace mineral involved in reducing oxidative stress, enhancing immune status, improving reproduction, and regulating growth. During finishing period, selenium supplementation can be applied to improve meat quality. Dietary selenium can be provided in inorganic or organic forms. Specifically, L-selenomethionine (organic selenium) allows for selenium storage in animal protein which supports the animal during periods of high oxidative stress. The objective of this study was to investigate the effects of synthetically produced, single amino acid, L-selenomethionine (Excellent Selenium 4000, Orffa Additives BV) on production parameters, health status, and meat quality of Bonsmara bull calves. 24 calves, 7 months of age, completed a 60-day initial growing period at a commercial feedlot, after which they were transported to research station Rumen-8 (Bethlehem, South-Africa). After a ten-day adaptation period, the bulls were allocated to a control (n=12) or treatment (n=12) group. Each group was divided over 3 pens based on weight. Both groups received Total Mixed Ration supplemented with 5.25 mg Se/head per day. The control group was supplemented with sodium selenite as Se source, whilst the treatment group was supplemented with L-selenomethionine (Excellent Selenium 4000, Orffa Additives BV). Animals were limited to 10 kg feed intake per head per day to ensure similar Se intake. Treatment period lasted 1.5 months. A beta-adrenergic agonist was included in the feed for the last 30 days. During the treatment period, average daily gain, average daily feed intake, and feed conversion ratio were recorded. Blood parameters were measured at day 1, day 25, and before slaughter (day 47). After slaughter, carcass weight, dressing percentage, grading, and meat quality (pH, tenderness, colour, odour, purge, proximate analyses, acid detergent fibre, and neutral detergent fibre) were determined. No differences between groups were found in performance. A higher number of animals with cortisol levels below detection limit (27.6 nmol/l) was recorded for the treatment group. Other blood parameters showed no differences. No differences were found regarding carcass weight and dressing percentage. Important parameters of meat quality were significantly improved in the treatment group: instrumental tenderness at 14 days ageing was 2.8 and 3.4 for treatment and control respectively (P=0.010), and a 0.5% decrease in purge (of fresh samples) was shown, 1.5% and 2.0% for treatment group and control respectively (p=0.029). Besides, pH was shown to be numerically reduced in the treatment group. In summary, supplementation with L-selenomethionine as selenium source improved meat quality compared to sodium selenite. Lower instrumental tenderness (Warner Bratzler Shear Force, WBSF) was recorded for the treatment group. This indicates less tough meat and highest consumer satisfaction. Regarding purge, control was just below 2.0%, an important threshold for consumer acceptance. Treatment group scored 0.5% lower for purge than control, indicating higher consumer satisfaction. The lower pH in the treatment group could be an indication of higher glycogen reserves in muscle which could contribute to a reduced risk of Dark Firm Dry carcasses. More animals showed cortisol levels below detection limit in the treatment group, indicating lower levels of stress when animals receive L-selenomethionine.

Keywords : calves, meat quality, nutrition, selenium

Conference Title : ICLN 2022 : International Conference on Livestock Nutrition

Conference Location : Cape Town, South Africa

Conference Dates : November 03-04, 2022