

Selenium supplementation in pasture-based primiparous cows and its effect on somatic cell count around calving

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A significant proportion of cattle might receive inadequate dietary selenium (Se) because of low Se content in soils and pastures. A suboptimal intake of Se has been associated to several economically important diseases in cattle, such as mastitis, which remains the most costly disease in dairy cattle. The relationship between Se status and mastitis has received considerable attention in the past two decades; however, there is little information available regarding to the effect of long-acting and organic forms of supplementation on udder health. The objective of this study was to investigate the effects of two commercial Se supplements on the SCC around calving in pasture-based primiparous cows.

One hundred and forty heifers in four dairy herds were fed suboptimal Se pasture (i.e. $Se < 0.05$ ppm). In each herd, two groups of animals were supplemented using either inorganic or organic Se sources starting 30 days prior to calving. Group 1 (n=46) received a single injection of barium selenate (1 mL/50 kg BW, Deposel[®], Novartis, New Zealand). Group 2 (n=45) received *per os* 3 mg/d of supplemental Se as Se yeast (Sel-Plex[®], Alltech, Nicholasville, KY, USA). Group 3 (n=49) remained unsupplemented. Quarter foremilk samples were collected at calving, 1 day after, and on a weekly basis until 28 DIM to evaluate SCC. Se status was established by the determination of blood glutathione peroxidase (GPx1) activity in samples collected at the beginning of trial, and 14 and 28 days after calving. Data were analyzed using multilevel mixed-effects models for GPx1, SCC at calving (day 0 and 1), and post-calving (weeks 1 to 4).

Supplemented cows had a higher activity of GPx1, reflecting an enhanced Se status, compared to unsupplemented cows ($P < 0.05$). The geometric mean of SCC decreased from 615,110 at calving to 393,820 cells/mL 1 day after calving ($P < 0.05$). The geometric mean decreased from 84,820 to 34,150 cells/mL between 1 and 4 weeks post-calving ($P < 0.05$). The treatment caused a close to significant ($P = 0.11$) reduction in SCC at calving, while did not cause any significant variation post-calving ($P > 0.05$).

Selenium supplementation increases milk Se concentration, being Se status in mammary gland an important regulator of seleno-protein (i.e. antioxidants) activity, leading to an improvement of udder immune responsiveness (Aitken et al. 2009). These results indicated that Se supplementation of dairy cows grazing on pastures having a sub-optimal Se content resulted in higher blood activity of GPx1. Nevertheless, the difference in Se status measured by blood GPx1 activity was not associated with statistically significant changes in the pattern of SCC around calving.