

Use of selenium enriched fertilizers in the management of a suckling herd: effects over a 5 year period

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Introduction Antioxidant mechanisms, immune responses, reproduction, thyroid metabolism are processes in which the trace element selenium (Se) is involved. In beef production with suckling herds, a Se deficiency could impair animal health resulting in reduced incomes. In Belgium the Se content in locally produced feedstuffs is low and thus, in beef farms where locally produced feedstuffs are fed for the entire year, symptoms of Se deficiency are observed. The aim of the present study was to assess the effect, of Se enriched fertilizers on the Se content of feedstuffs and on the Se status of cattle.

Material and methods Se enriched fertilizers were used since 2002 on the Experimental Research Station of the Veterinary Faculty of the University of Liege. For the grazing pastures, 3 g of Se/ha was applied at each nitrogen application. For pastures used for grass silage 3g of Se/ha was applied at the beginning of the season and then after each cut. Four g Se/ha were spread at the 2nd and 3rd nitrogen applications for barley production. For maize from year 3, 8 g Se/ha was applied at sowing. There were control pastures – fields with no Se application but similar management. The Belgium Blue suckling herd was divided in 2 at the beginning of the trial with about 18 cows in each group. Cows, calves and young stock remained in their respective group throughout the experiment. During the grazing period, animals had only access to grazed pastures. During the winter period, the ration was made of grass silage, maize silage and barley produced with or without Se enriched fertilizers as appropriate to treatment group and supplemented with dehydrated lucerne, sugar beet pulp and bran.

Results The changes in plasma Se and in Se in the red blood cells along with the dietary Se content are given in Figure 1. The average dietary Se was 54, 247 and 138 µg/kg DM in the control group and in the Se groups during summer and winter respectively. At the beginning of the trial, plasma Se concentration was low for both groups. It remained low during the 5 years of the trial in the control group. By contrast, the plasma Se content was increased in the Se group by the end of the first winter period. A further increase was observed during the grazing season. The following winter was characterized by slightly lower concentrations. Similar patterns were observed during the following grazing and winter periods. The Se content in the red blood cells followed a similar pattern to that observed for plasma. The reduced concentrations during the winter periods as compared to grazing periods were due to reduced Se intake associated with the purchased feedstuffs offered during the indoors period.

Conclusion It is concluded that the use of Se enriched fertilizers can improve and maintain a high Se status in a beef herd managed over many years on locally produced feedstuffs during the succeeding outdoors and indoors seasons.

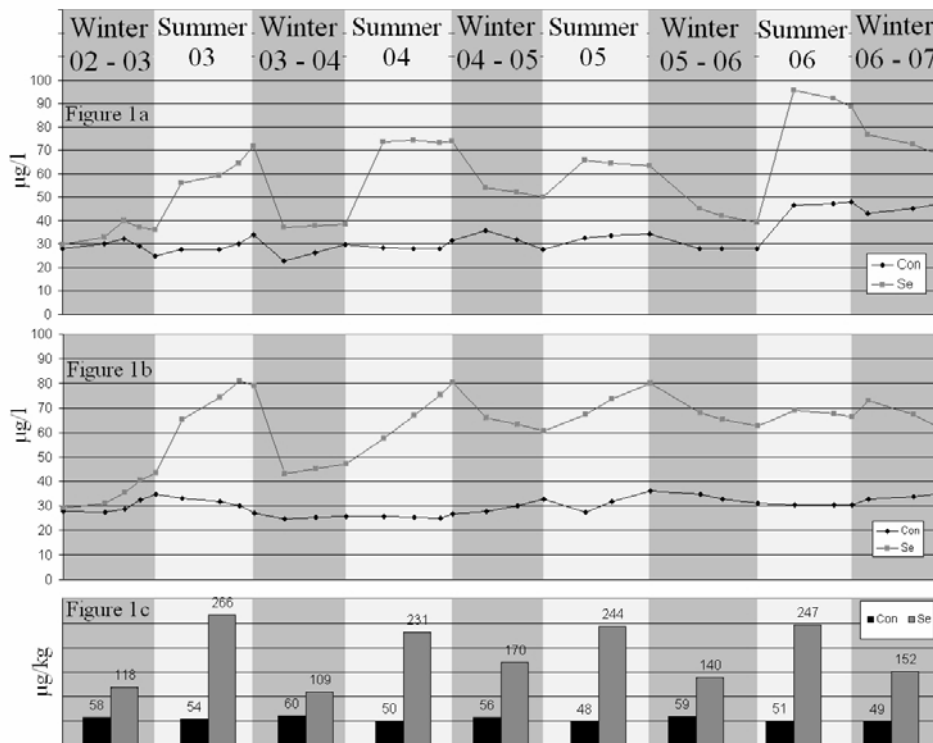


Figure 1 Changes according to the different seasons of the total plasma Se concentrations (figure 1a), of the Se content in the erythrocytes (Figure 1b) measured by the glutathione peroxidase activity and of the dietary Se contents (Figure 1c) of Belgian Blue cattle managed in a production system with (light grey) or without (dark grey) Se enriched fertilizers.