

EFFECTS OF SELENIUM SUPPLEMENTATION ON CATTLE ANTI-RABIES HUMORAL IMMUNE RESPONSE AND LEVELS OF SERUM SELENIUM AND CORTISOL

Thesis: L. S. L. S. Reis submitted this dissertation for his Doctorate at the Veterinary Medicine and Animal Husbandry School, São Paulo State University, UNESP, Botucatu, São Paulo State, Brazil, 2008.

Advisor: Professor Simone Biagio Chiacchio

ABSTRACT: This study evaluated the effect of different concentrations of selenium (Se) supplementation on cattle anti-rabies humoral immune response, serum Se concentrations and cortisol levels. Sixty uncastrated male Nelore calves from 10 to 12 months grazing on *Brachiaria decumbens* forage were studied. The animals were assigned to one of four groups (n = 15 each), which received non-supplemented diets (Gc) or supplemented with daily and individual Selenium (Se) concentrations of 3.6 mg (G_{3.6}), 5.4 mg (G_{5.4}) or 6.4 mg (G_{6.4}). The calves were immunized on day 0 with one dose of commercial liquid inactivated rabies vaccination. On days 15, 30, 60, 90 and 120, the cattle underwent the same stressing procedures used for vaccination in the corral. Cattle blood samples were collected after vaccination and stressing procedures to determine serum Se levels, rabies antibody titers and serum cortisol. Se levels were also determined in forage samples collected from the paddocks in which the cattle were held. Se concentration in *B. decumbens* was 0.04 mg of Se/kg dry matter. Baseline Se levels obtained on day 0 were higher in Gc than in G_{5.4} and G_{6.4} (P = 0.005). Serum Se levels decreased in Gc throughout the experiment (P < 0.004), increased in G_{3.6} (P < 0.000) and G_{5.4} (P < 0.000) and were kept high from day 60 on in group G_{6.4} (P < 0.002). Rabies antibody titers did not differ among control and supplemented groups. However, 120 days after vaccination rabies antibody titers were kept above protective levels (≥ 0.5 UI/mL) only in group G_{3.6} (P < 0.00002), whereas they dropped in the other groups (P < 0.05). Serum cortisol levels did not differ among the experimental groups (P = 0.79), reached peak levels on day 90 and returned close to baseline levels on day 120. Se and cortisol levels were not markedly correlated. Serum cortisol and rabies antibody titers were correlated only in group G_{6.4}, on day 60 (R = 0.513; P = 0.05) and 120 (R = 0.644; P = 0.009). Serum Se and rabies antibody titers were correlated only in group G_{6.4}, on day 60 (R = -0.580; P = 0.023). In conclusion: a) the profile of Se variation is different among groups receiving different concentrations of this element; b) the supplementation dosage of 3.6 mg Se/animal/day is efficient to treat/prevent marginal Se deficiency; c) individual supplementation with daily concentrations of 3.6 mg Se enhances the maintenance of rabies antibody titers in cattle; d) individual supplementation with daily concentrations of 3.6; 5.4 and 6.4 mg Se are ineffective in reducing serum cortisol; e) repeated cattle handling in corrals stress animals that adapt to these procedures, although serum cortisol does not return to baseline levels by 120 days; and f) the stress generated by repeated management in cattle in the corral does not diminish antibody titers after vaccination against rabies.

KEY WORDS: selenium, rabies antibodies, cortisol, mineral supplement, bovine.

CORRESPONDENCE TO:

LUIS SOUZA LIMA DE SOUZA REIS, rua Osvaldo Cruz, 2027, Assis, SP, 19.800-081, Brasil. Email: reis.lsls@gmail.com.