USE OF MONENSIN CONTROLLED RELEASE CAPSULES AND SELENIUM PELLETS IN FEEDLOT CATTLE

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The carboxylic polyether ionophores, monensin and narasin, increase the apparent whole-body retention of selenium (Se), primarily by increasing the absorption of selenium from the gastrointestinal tract in cattle (Costa *et al.* 1985; Hood and Costa 1992). The aim of this study was to determine the effect of monensin on the concentration of selenium in the plasma (as an indicator of absorption), storage tissues (primarily liver) and the principal site of selenium pathology (muscle) in feedlot steers.

Forty eight yearling steers were purchased at market, and allocated evenly to 1 of 4 treatment groups: control, monensin, selenium, or monensin plus selenium, according to ranked liveweight. The monensin and the monensin plus selenium groups received controlled release capsules (CRCs, Elanco Animal Health) containing 32 g monensin in a hexaglycerol distrearate matrix core, while the control and the selenium groups received CRCs containing only the core material. In addition, steers in the selenium and the monensin plus selenium groups received 2 selenium pellets for cattle (Permasel, Coopers). All of the steers were fed hay (60%) and lupins (40%) at a rate of 2.8% of mean liveweight for the group/day for 70 days and then 3% for a further 30 days. This ration contained less than 0.25 μmol selenium/kg dry matter. Blood samples were collected from 6 steers in each group 50 days into the trial. All steers were slaughtered at a commercial abattoir, and samples of liver and diaphragm muscle were obtained. Plasma and tissue samples were assayed for selenium by the automated fluorometric method.

Selenium supplementation significantly increased the concentrations of selenium in the plasma, liver and muscle from steers in the selenium and monensin plus selenium groups (Table 1). There was no significant interaction between monensin and selenium.

Table 1. Selenium concentrations in plasma, liver and muscle from steers treated with monensin, selenium, or monensin plus selenium

Treatment	Plasma selenium[A] (μmol/L)	Liver selenium[A] (μmol/kg wet wt.)	Muscle selenium[A] (μmol/kg wet wt.)
Control	0.32 (0.06)^{a}	2.82 (0.20)^{a}	0.90 (0.08)^{a}
Monensin	0.45 (0.05)^{a}	3.21 (0.15)^{a}	0.96 (0.08)^{a}
Selenium	1.21 (0.12)^{ab}	3.99 (0.20)^{ab}	1.21 (0.06)^{ab}
Monensin plus selenium	1.19 (0.08)^{ab}	4.19 (0.17)^{ab}	1.31 (0.10)^{ab}

Values with different superscripts are significantly different at $P < 0.05$.
[A]Liver and muscle values are the mean (± SEM) for 12 animals/treatment. Plasma values are the mean (± SEM) for 6 animals/treatment.

Selenium pellets effectively increased plasma and tissue selenium concentrations. Although monensin treatment increased the plasma selenium concentrations from low to marginal/adequate, monensin was not an effective substitute for selenium supplementation in increasing the concentration of selenium in tissues of feedlot steers on a low selenium intake.

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