

Short Communication

Lithium Carbonate as a Potential Aversive Agent

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Lithium chloride, an emetic widely used in animal behavioral studies and in clinical applications in humans (Ralphs and Provenza 1999), has been rated as the most effective agent to induce aversion in cattle, sheep, and horses (Ralphs et al. 2001). Lithium chloride causes nausea without dangerous side effects (Provenza et al. 1994). Owing to its caustic nature and the relatively large amount required to induce aversion in livestock, it must be administered into the rumen either in solution by stomach tube or in gelatin capsules or boluses, allowing dilution in the digestive fluid (Ralphs et al. 2001). The boluses, however, may break during insertion into the esophagus, resulting in acute tracheitis when coughed up and aspirated, leaving dosing by stomach tube as the safer option (Ralphs et al. 2001). Administering lithium chloride orally via a stomach tube, however, is a time-consuming, labor-intensive process that must be performed by a skilled person. This renders it impractical to apply when large numbers of cattle have to be treated.

Lithium carbonate (Merck, Pty Ltd), a lithium salt with low solubility in water and rather tasteless, was easily drenched orally without harmful effects or unwillingness by the animal to swallow. The efficacy of lithium carbonate as aversive agent was demonstrated by the following observations:

- (1) Four naïve steers were placed individually in pens to induce aversion to high-quality feed pellets by oral drenching with 200 mg lithium carbonate/kg body weight (BW). All the steers refused to eat the feed pellets that were presented for an hour a day for 3 consecutive days following aversion treatment. Aversion to the feed pellets

seemed to be induced quite rapidly, as all the steers refused to eat the feed pellets when offered 30 minutes after aversion treatment. When retested in the same pens after spending 3 months on pasture, they continued to refuse to eat the feed pellets (L.D. Snyman and R.A. Schultz, 2006, unpublished data).

- (2) Six naïve steers, individually penned and subjected to aversion treatment to high-quality feed pellets by oral drenching with 75, 100, 125, 150, 175, and 200 mg lithium carbonate/kg BW, refused 0%, 87%, 66%, 98%, 97%, and 100%, respectively, of 500 g feed pellets offered for a period of 3 days, commencing the day after aversion treatment (Snyman et al. 2011).
- (3) Inducing aversion in cattle to yellow tulp (*Moraea pallida*) on yellow tulp-infested grass pasture by administering lithium carbonate (80 mg/kg BW, drenched per os) in combination with epoxyscillirosidin (0.005 mg/kg BW, administered intramuscularly) resulted in effective aversion of all six animals, compared to three of six untreated control animals that were poisoned. The trial was performed over 2 days (L.D. Snyman and R.A. Schultz, 2007, unpublished data).
- (4) Lithium carbonate was also successfully used to induce aversion in 15 sheep to *Geigeria ornativa* (Snyman et al. 2011). This was achieved by oral drenching with

lithium carbonate (160 mg /kg BW), followed by continuous access to an aversive mixture that resulted in consumption of 20 mg lithium carbonate/kg BW/day. The treated sheep, unlike 7 of the untreated controls, remained unaffected while grazing on a *G. ornativa*-infested pasture for the duration of the 62-day trial.

The results suggest that lithium carbonate might be an effective agent for inducing aversion to poisonous plants in livestock. The more practical means of administration renders lithium carbonate an attractive option for inducing aversion in large numbers of stock in the field. Since lithium carbonate can be used as the unprocessed raw material as mined, it might also be a cheaper alternative to lithium chloride.

References

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