DO EXCESSIVE INTAKES OF UREA CAUSE CONDITIONED FOOD AVERSIONS?

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Diet selection in a ruminant can be modified by trial-and-error learning which involves an animal cautiously ingesting a novel food and associating the resulting sensory stimuli (i.e., taste and odour) with the food's metabolic consequences (Provenza and Balph 1990). If a negative feedback occurs the animal will decrease intake of the food commensurate with the degree of internal malaise. The same thing can happen when animals eat a food and are given a drench of lithium chloride, a known toxin. Less is known about the potential to create feed aversions by more common metabolites that change in concentration as a consequence of normal food ingestion, e.g., ammonia, VFA, amino acids. We determined the effects of intra-ruminal administration of NaCl, LiCl and urea on the subsequent daily patterns of poplar ingestion in sheep.

Six sheep were randomly allocated to each of 3 groups, i.e., NaCl, LiCl and urea. The sheep grazed each day, and were trained in yards to eat freshly cut poplar branches after an overnight fast. The number of bites by each sheep was recorded during a 5-minute test for 3 days before, and each day after drenching.

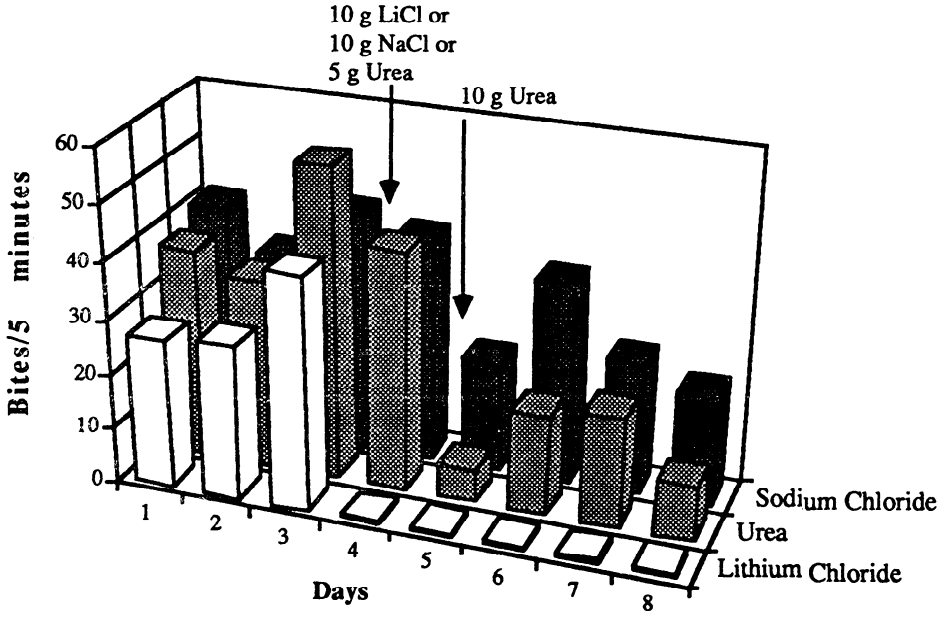

Figure 1

When sheep were given LiCl (10g) after having eaten poplar, they subsequently decreased intake of poplar (Figure 1). Sheep given NaCl showed no change in intake of poplar. The poplar intake of sheep drenched with 5 g of urea on day 3 tended to be lower than the intake measured on the previous day. When 10 g urea was given to these sheep on day 4, intake of poplar was subsequently much lower than for those sheep which were drenched with NaCl.

The decrease in intake of poplar by sheep given LiCl was expected (du Toit et *al.* 1991) but whether urea would be aversive and, if so, at what dosage was unknown. In this study 10g of urea depressed poplar intake perhaps through the sudden arrival in the liver of a large amount of ammonia which may have overwhelmed the urea cycle, allowing ammonia to escape into the peripheral circulation where it is toxic. Subclinical ammonia intoxication may have occurred in this case producing metabolic ill-effects together with aversive conditioning which led to a decrease in intake of poplar. It is possible that mild conditioned aversion could occur in sheep grazing high quality pasture. In this case large amounts of ammonia are produced in the rumen and could have the subsequent effect of causing the animal to moderate its intake or change the diet it selects.

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