

ESTIMATION OF SUPPLEMENT OR MILK INTAKES BY INDIVIDUAL GRAZING RUMINANTS USING LITHIUM CHLORIDE AS A MARKER

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The variability in the intakes of supplements by individuals in a flock or herd inhibits the interpretation of nutritional studies of grazing ruminants. A technique using tritiated water as a marker has been used in Australia for estimating intakes of urea-molasses mixtures, bloat preventatives and grain supplements by individual grazing animals (e.g. Nolan *et al.* 1976). However, the use of radioactive water in the field poses problems, and we therefore became interested in finding suitable non-radioactive markers for use in a similar way.

Lithium salts occur in nature in extremely low concentrations, i.e. <0.01 $\mu\text{g/g}$ in plants and animal fluids. Animals can ingest considerable quantities of LiCl without ill-effects, although excessive intakes produce illness in humans and food aversion in sheep (Burritt and Provenza 1989). Preliminary experiments with sheep using about 20% of the amounts likely to cause adverse responses indicated that Li was potentially useful; it distributes through gut and extra-cellular fluids (ECF) and is eliminated from the body relatively slowly (half-life 1-2 days).

Five mature sheep in individual pens were given, daily, a basal diet of 800 g oaten chaff and protein-rich pellets at rates of, respectively, 0, 50, 100, 150 and 200 g. After adaptation, at 09.00 h on one day, Li-labelled pellets were given. These were consumed by all sheep within 15 min. Blood samples were taken during the next 30 h. Deproteinized plasma supernatant was analyzed for Li content by Atomic Absorption Spectrometry. The results (Fig.) indicate that concentrations reach maxima from 12-24 h, and are, at all times, in proportion to the amounts of Li ingested with the pellets.

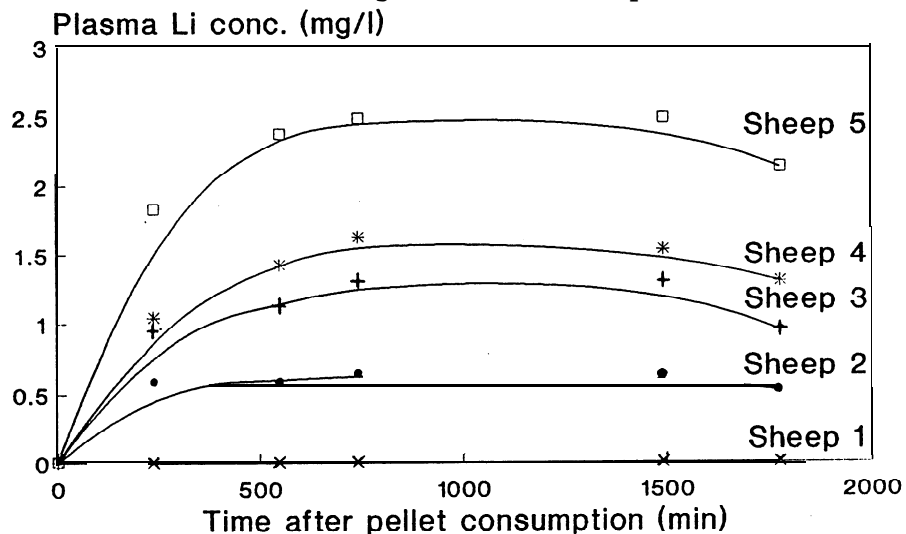


Fig. Li in plasma of sheep after ingestion of Li-labelled pellets.

From the Li content of the 24 h samples, and after adjustment for each animal's ECF volume (assumed to be 25% of liveweight), the estimated intakes of pellets were 0, 60, 92, 135, 213 g respectively. We have therefore provisionally concluded that LiCl can be used successfully for estimating intakes of supplements (and probably also milk) in grazing animals.

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