

POLYMER ENCAPSULATED DL-METHIONINE PROVIDES A PRACTICAL METHOD TO INCREASE FREE METHIONINE LEVELS IN PLASMA OF GRAZING SHEEP

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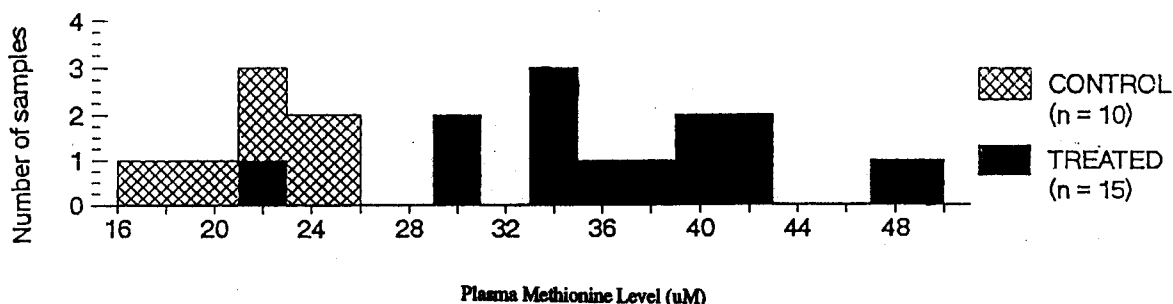
Although methionine and cysteine are the first limiting amino acids for wool growth, their rapid degradation by rumen microflora prevents use of sulphur amino acids as simple oral supplements in sheep. Experimental administration of sulphur amino acids by abomasal infusions or by various routes of parenteral injection, infusion or implantation have increased wool growth rates by around 10-40% (Reis 1979) but these techniques are unsuitable for use in unrestrained grazing animals.

Amino acid analogues such as 2-hydroxy-4-methiobutyric acid (MHA, Langlands 1972), and the salt or base forms of short chain N-acyl esters of methionine or cysteine have been used to stimulate wool growth (eg Wheeler et al. 1979; Radcliffe et al. 1985) but results have not been consistent.

A 2-vinylpyridine/styrene copolymer coated microsphere form of DL-methionine which protects the amino acid at pH > 5 but releases the amino acid at pH ≤ 4 has recently been commercially developed. This paper reports the effect of physiological doses of this protected methionine on plasma free methionine levels in grazing 18-25 kg Merino ewe lambs.

Protected methionine microspheres (1 mm diameter, 2 g/h/d, containing ≥ 65% DL-methionine w/w) were mixed with a grain supplement of oats (107 g/h/d) and lupins (21.4 g/h/d) and bound to the grain using 3% (w/w) molasses. Feeding was given as 3/7 of the weekly dose on Monday, Wednesday and Friday of each week. All supplement was eaten within an hour of trailing each medicated feed along the ground. Jugular venous blood samples were taken at 1450 - 1600 hrs following a Friday feed from 15 lambs. These were selected at random from a larger mob of 162 lambs which had been under treatment for 28 days. Ten lambs from an adjacent untreated control flock on otherwise identical nutrition were also sampled. Free methionine was measured by HPLC (Beckman 6300 Auto analyser) in supernatant after deproteinisation of 500 µl of plasma with 50 µl of 35% aqueous solution of sulfosalicylic acid dihydrate.

Treatment increased ($p < 0.0001$) plasma free methionine levels (mean ± SEM) from control values of $21.3 \pm 0.9 \mu\text{M}$ range (15.4 - 25.5 µM; median 21.3 µM) to $36.0 \pm 1.7 \mu\text{M}$ in treated ewe lambs (range 22.6 - 48.5 µM; median 34.7 µM).



Frequency distribution of plasma methionine level at 14.5-16h Post feeding

There was almost no overlap in distribution indicating that most animals were effectively treated (see figure). Variation between animals within groups was not related to liveweight.

The data indicates that the microencapsulated amino acid provides an effective way to supplement grazing sheep with physiological doses of methionine under group feeding situations on farms.

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