ACCURACY OF A MODIFIED TOH TRACER TECHNIQUE FOR DETERMINING SUPPLEMENT INTAKE

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The cost benefit of providing grazing stock with supplements containing nitrogen, energy and/or minerals, can only be determined by careful scrutiny of intake versus production response for individual animals. Nolan et.al (1975) measured individual intakes of liquid (molasses) based licks by adding tritiated water (TOH) for a 7 d period and then relating residual whole body label to supplement intake. A key element in this process is the estimation of body water turnover by bleeding individual animals at 1, 3 and 7 days after removal of the tracer. The technique has now been modified for use with free ranging cattle (typically Tuen et al 1982). Because of the intrinsic problems associated with f requent mustering under extensive conditions, a single blood sample on d8 and an average $t_{\frac{1}{2}}$ for TOH of 3.5 d are used to calculate the amount of tracer ingested (R.M. Murray pers. comm.). We believe these modifications can lead to serious errors in estimating intake given the variability of body water turnover rates.

In two experiments Hereford cattle of mean (±SD) live weight 365 ± 12.5 kg were drenched with graded levels of TOH (14 - 48 µCi) once daily for 7d. Blood samples to determine biological $t_{\frac{1}{2}}$ values were taken on days 8, 10 and 14. Two estimates of residual whole body label, designated theoretical and observed, were calculated according to Nolan et al (1975) but using an average $t_{\frac{1}{2}}$ of 3.5 d for TOH and a body water content of 60%. The theoretical values calculated from the doses given and the observed values estimated from the blood sample taken on d 8 are compared below.

		Dose µCi d^{-1}	Residual Whole Body Label (µCi) Theoretical*	Observed**	Relative Error in Estimated Intake (%)
Trial 1	A	14.3	49	69,72,86	42,46,75
(n=3/gp)	B	34.4	118	186,180,188	58,53,60
	C	48.0	164	310,265,261	89,61,59
Trial 2	A	17.6	60	50,68,94,64	-18,13,56,6
(n=4/gp)	B	35.3	121	124,102,94,101	3,-16,-22,-16

* Calculated from TOH given, using $t_{\frac{1}{2}}$ of 3.5 d
** Calculated from d8 bleeding using $t_{\frac{1}{2}}$ of 3.5 d, body water 60%.

Trial 1 was conducted during late winter (max. ambient 18°C) and the second during mid summer (max. ambient >$30^{\vee}$C). Average $t_{\frac{1}{2}}$ values exceeded 6.3 d in the first experiment but were less than 4.5 d in the second. These changes are consistent with the known seasonal effects on water turnover rates. We conclude that reliance on a single blood sample and an assumed half life for TOH can result in substantial errors in estimating supplement intake of free ranging cattle.

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