

RUMEN DEGRADATION RATE OF FEED PROTEIN MEASURED IN VITRO

S.A. NEUTZE and W.A. FORBES

The rate and extent of rumen degradation of dietary protein is an important determinant of feed quality and animal performance, but establishing a simple means of reliably measuring degradation has proved difficult. We have adopted an *in vitro* technique (Broderick 1987) and have extended it to a range of protein supplements.

Air-dried ground samples were hammermilled through a 1 mm screen prior to incubation in a medium of strained rumen fluid, buffer and inhibitors of microbial uptake of amino acids and ammonia (hydrazine sulphate and chloramphenicol, Broderick 1987). Rumen contents were collected from 2 to 4 wethers consuming equal quantities of lucerne chaff and oat grain, approximately 18h after feed had been offered. Samples from blank and feed incubation vessels were taken half hourly from 0 to 4 hours, and protein-N precipitated with trichloroacetic acid. Total N was determined on the supernatant. Degradation rates (kd, %/h) were calculated (Orskov and McDonald 1979) assuming a single exponential function (r^2 for fitted line). Each supplement was tested on three separate days. Means are presented for the instantly degraded fraction (a), kd, and % degraded assuming rumen fractional outflow rates (kr) of 8, 5 or 2%/h (s.e. for kd in brackets, HCHO refers to treatment with formaldehyde).

Feed	a(%)	kd(%/h)	r^2	% degraded at kr(/h)		
				8	5	2
Casein	32.8	73.0 (9.6)	0.83	93.0	95.4	98.1
HCHO-casein	2.5	0.6 (0.01)	0.15	6.9	9.3	18.1
Soyabean meal	7.4	7.0 (0.1)	0.84	44.0	56.5	78.6
Cottonseed meal(CSM)	26.7	6.5 (1.0)	0.80	53.9	63.4	81.2
CSM pellets	16.0	13.5 (0.8)	0.92	64.9	75.5	89.0
HCHO-sunflower meal	6.8	4.8 (0.5)	0.83	34.6	45.8	69.9
Lupin grain 1	17.1	7.9 (1.7)	0.75	50.9	61.7	80.6
Lupin grain 2	28.9	15.5 (1.6)	0.87	72.9	81.4	91.7
Oat grain	19.5	11.5 (0.4)	0.98	62.8	73.5	88.0

The low r^2 for HCHO-casein reflects the unsuitability of the method for feeds containing protein with low or negligible rates of degradation. No standard method exists with which to compare the above results. Nevertheless, the present method simulates well the extremes in degradation generally observed for HCHO-treated and untreated casein. The degradation rate observed for the latter is close to the value of 71.3%/h observed by Broderick (1987) for ^{14}C -casein. Although serving only as a broad comparison, the data presented in the table compare favourably with the ranking of the same feeds in *in vivo* studies. Additionally, we were able to distinguish differences in degradation between different samples of the same feed type.

BRODERICK, G.A. (1987). *Br. J. Nutr.* 58:463.

ORSKOV, E.R. and McDONALD, I. (1979). *J. agric. Sci.* 92:499.

Elizabeth Macarthur Agricultural Institute, NSW Agriculture and Fisheries, PMB 8, Camden NSW 2570.