

EFFECTS OF DIETARY NITROGEN SUPPLEMENTS ON EFFICIENCIES OF BACTERIAL PROTEIN SYNTHESIS AND SUPPLY OF PROTEIN TO STEERS FED WHEAT STRAW

N. SRISKANDARAJAH*, R.C. KELLAWAY* and JANE LEIBHOLZ*

Intake of low quality forages may be restricted by the availability of ammonia and peptides in the rumen and by the supply of protein post-ruminally.

Four steers aged 18 months, fitted with rumen and abomasal cannulas, were fed wheat straw *ad lib.*, together with supplements supplying (g N/d) 30 urea (A), 30 urea + 30 casein (B), 30 urea + 37 HCHO-treated casein (C), during three successive collection periods, each of 17 days duration. HCHO-treated casein (15 g HCHO/kg casein) supplied 30 g N digestible in the intestines per 37 g N fed. The supplements were given as pellets fed in two equal meals at 0800 and 2000 h daily. Cr-EDTA sprayed onto the straw, and acid detergent lignin were used as markers for digesta flows, and 2,6-diaminopimelic acid was used as the bacterial marker.

TABLE 1 Intake and abomasal flows of organic matter (OM) and nitrogen (N)

	A	Diet B	C	SEM
OM intake (g/d)	3141	3560	3723	193.6
N intake (g/d)	51	80	88	0.7
OM flow at abomasum (g/d)	1878	2063	2213	165.5
N flow at abomasum (g/d)	40	44	54	3.4
Bacterial N flow at abomasum (g/d)	39	37	41	3.3
Rumen NH ₃ (mM/l)	10	18	14	0.3
Bacterial N (g/kg OM apparently digested in stomach)	31	24	26	2.5

Concentrations of NH₃ in the rumen were well in excess of levels considered to be optimal for bacterial protein synthesis (Roffler *et al.* 1976). Efficiencies of bacterial protein synthesis did not differ significantly between treatments. This indicates that the supply of peptides in the rumen from the basal diet and endogenous sources was adequate, and that supplementary N as casein did not improve efficiency of microbial protein synthesis. Abomasal flows of N were highest when HCHO-treated casein was fed, although only the difference between diets A and C was significant ($P < 0.05$). There was extensive degradation of HCHO-treated casein in the stomach.

Organic matter intakes on diets B and C were 13 and 17% higher respectively than on diet A, although these differences were not significant ($P > 0.05$). When similar diets were fed to 24 yearling steers in individual pens, OM intakes on diets B and C were 5 and 17% higher than on diet A and these differences also were not significant; however, liveweight changes did differ significantly, being -189, -108 and +42 g/day on diets A, B and C respectively ($P < 0.05$).

These results suggest that protein supplements which are digestible post-ruminally, may be useful in reducing liveweight losses in cattle eating wheat straw.

ROFFLER, R.E., SCHWAB, C.C. and SATTER, L.D. (1976). *J. Dairy Sci.* 59: 80.

* Department of Animal Husbandry, University of Sydney, Camden, N.S.W. 2570.