MICROBIAL PROTEIN PRODUCTION IN CATTLE FED RYEGRASS, BUFFEL GRASS AND SPEAR GRASS HAYS

S.J. PRIOR [A], D.P. POPPI [A] and S.R. McLENNAN [B]

[A] Department of Agriculture, The University of Queensland, St Lucia, Qld 4072
[B] Qld Beef Industry Institute, DPI, Animal Research Institute, Yeerongpilly, Qld 4105

The efficiency of microbial crude protein (MCP) production in the rumen of cattle was examined using four hays, including one temperate species, ryegrass (*Lolium multiflorum*), and three tropical species: young buffel (*Cenchrus ciliaris* cv. Biloela), mature buffel grass, and spear grass (*Heteropogon contortus*). The main purpose was to provide information on tropical forages as there are few published values for these. The design was a 4 x 4 latin square using four 18-month old Brahman crossbred steers (316±20 kg). Each run included a 14 day preliminary period, during which *ad libitum* intake was established, and a seven day measurement period when intake was restricted to 95% of *ad libitum* intake, and urine and faeces were collected. Microbial crude protein production was estimated from the excretion of purine derivatives in the urine (Chen and Gomes 1995). Rumen fluid was collected using a stomach tube, three hours post-feeding, and was analysed for ammonia-nitrogen (N) concentration. The results are shown in Table 1.

Table 1. The crude protein (CP) content, dry matter (DM) intake and organic matter digestibility (OMD) of four hays, the ammonia-nitrogen (N) concentration in rumen fluid and the production and efficiency of production of microbial CP (MCP) for steers receiving these hays

	Ryegrass	Young buffel	Mature buffel	Spear grass
DM intake (g/kg $W^{0.75}$.day)	79.8±3.8 [a]	79.0±2.7 [a]	55.3±3.0 [b]	65.8±3.4 [c]
OMD (%)	62.5±1.9	56.8±1.9	55.3±3.3	60.0±2.8
CP (%)	12.7	6.4	2.8	5.3
Ammonia-N (mg/L)	112±10.8 [a]	48±9.3 [b]	24±3.1 [b]	44±8.0 [b]
MCP production				
(g/day)	651±24.6 [a]	348±45.4 [b]	176±20.9 [c]	268±19.2 [b]
(g/kg DOM)	185±11.8 [a]	117±14.3 [b]	85±12.1 [c]	95±0.8 [bc]

Within rows, values followed by a different superscript are significantly different ($P < 0.05$)

As expected, the highest intake and digestibility was recorded with ryegrass. Rumen ammonia-N concentrations reflected the differences in CP content of the hays, and were quite low for the tropical species. Whilst the efficiency of MCP production for ryegrass was consistent with the expected range indicated in the feeding standards for temperate forages (130-170 g MCP/kg digestible organic matter (DOM); SCA 1990), values for the tropical forages were well below this range, although consistent with the few observations recorded for tropical forages in SCA (1990) and with those reported by Bolam *et al.* (1998). Several factors may contribute to these low values for tropical pastures, including low rumen ammonia concentrations, low concentrations of water soluble carbohydrates, and presumably low rumen dilution rates. Thus low DOM intakes of the tropical forages, and the low efficiencies of MCP production, account for the large differences in protein supply to the intestines relative to temperate forages, as MCP is the major source of metabolisable protein to the animal. Nevertheless, if these low values are confirmed in cattle grazing tropical pastures, a strategy aimed at increasing the efficiency of MCP production to values accepted in the feeding standards has the potential to markedly enhance protein supply to the intestines, and thereby presumably increase liveweight gain.

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