

THE NUTRITIVE VALUE OF PROTEIN-EXTRACTED PASTURE FOR LACTATING DAIRY COWS

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Pastures in the dairying areas of Victoria are generally high in protein and this may not all be required by lactating dairy cows. By extracting part of the protein for use by non-ruminant animals and feeding the fibrous residue to ruminants, more efficient use of the pasture might be expected. The aim of this experiment was to determine the comparative nutritive value, at equivalent dry matter intakes, of fresh pasture containing predominantly white clover (*Trifolium repens*), with some ryegrass (*Lolium perenne*) and cocksfoot (*Dactylis glomerata*), and the fibrous residue remaining after the partial extraction of protein.

Six lactating Jersey-Friesian cows were stall-fed in four trials which coincided with the fourth, fifth, sixth and seventh months of lactation. Three cows were fed fresh pasture and three were fed fibrous residue. Each trial consisted of an initial data collection period for covariate correction of treatment responses and a treatment period of 13 days on average. The fibrous residue required each day was processed early in the morning. The *in vitro* digestibilities and nitrogen contents of both herbage were determined and daily milk yields (MY), milk fat and protein contents, and live weights were measured. Treatment differences were assessed by analysis of variance and stepwise regression was used to relate MY to the amount of protein extracted (EP).

The fibrous material remaining after the extraction of an average of 4.2% protein was a major product of the process; 85% of the pasture was returned as fibrous residue. The residue was lower in digestibility and nitrogen, and the cows that ate it produced 5% less milk (Table 1). Neither milk constituents nor live weight were affected by protein extraction.

TABLE 1 Average dry matter digestibility (DMD; %), herbage nitrogen content (N; %), milk yield (MY; kg/cow/day), milk fat content (MF; %), milk protein content (MP; %), and live weight (LW; kg) for fresh pasture and fibrous residue after the partial extraction of protein

	DMD	N	MY	MF	MP	LW
Fresh pasture	69.0	3.07	17.2	4.13	3.14	404
Fibrous residue	65.3	2.84	16.3	4.09	3.06	403
LSD (P = 0.05)	2.0	0.08	0.5	0.17	0.13	4

MY was inversely related to the amount of protein extracted as given by the following regression:

$$MY \text{ (kg/cow/day)} = 17.6 - 0.24(\pm 0.04)EP(\%) \quad R^2 = 0.67(P < 0.01); \text{RSD} = 1.0$$

The extraction process resulted in fibrous residue which was of lower nutritive value than the original pasture. It is probable that the lower animal production was largely due to reduced digestibility although the removal of specific fractions of protein, or of some of the minerals, may also be important. Whether the reduction in yield is tolerable will depend on the cost of extracting the protein and the price of the protein concentrate as a stock supplement.

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