Using the n-alkane technique to estimate the herbage intake and diet composition of cattle grazing a *Miscanthus sinensis* grassland

Y. Zhang[1], Y. Togamura[2] and K. Otsuki[2]

[1]*Animal Science and Technology College, China Agricultural University, West Road 2 Yuan Ming Yuan, Beijing, P.R. China 100094, Email: zhangyj@cau.edu.cn,* [2]*National Institute of Livestock and Grassland Science, Senbenmatsu, Nishinasuno, Tochigi, Japan 329-2793*

Keywords: n-alkane technique, intake, diet composition, *Miscanthus sinensis*

Introduction Plant wax alkanes are now widely used as marker substances (Dove & Mayes 1991) for the estimation of forage intake and diet composition of grazing herbivores. The objective of this study was to evaluate this method with cattle grazing a *M. sinensis* grassland in Japan.

Materials and methods Four cattle were continuously stocked on the grassland from 28 July to 24 August. The sward consisted of 85% *M. sinensis*, 5% *Pleiablastus chino* and 10% *Aralia elata* and *Lespedeza bicolour*. Animals were dosed with a controlled release device capsule (Captec[TM], New Zealand).. Faecal samples of individual animals were taken once daily by hand, immediately after faecal excretion on the ground. Meanwhile, herbage samples of each species were hand plucked. Alkane concentrations were determined in the samples as described by Zhang *et al.* (2002). The proportion of each species consumed were calculated using the software package 'Eatwhat' (Dove & Moore, 1995). The alkane concentrations in the diet were corrected using the proportions of the pasture species and the alkane concentrations in each species. Herbage intake was calculated on the basis of the C_{33}/C_{32} ratio using the equation described by Dove & Mayes (1991).

Results The animals had consumed 10 - 40% *P. chino* and 3 - 12% *L. bicolour* each day. Average DM intakes ranged from 1.6 - 2.3% of live weight (MBW) and were significantly. ($P < 0.05$) related to the change in body weight (Table 1).

Table 1 Daily herbage intake on *M. sinensis* grassland

Animal	MBW (kg)	Daily herbage intake (kg) Mean ±SD	DMI as % of body weight	Change in body weight (kg/day)
1	388.5	6.17±1.02	1.59	0.04
2	523.5	11.74±0.55	2.24	0.78
3	385	8.69±0.71	2.26	0.22
4	418.5	6.98±1.04	1.67	-0.19

MBW: mean body weight over a 27 days period; SD: standard deviation.

Conclusions The relative proportions of the different species in the diet was successfully estimated using the alkane technique. Using the diet composition correction, herbage intake of *M. sinensis* grassland can be successfully determined.

References

Dove, H. & R.W. Mayes (1991). The use of plant wax alkanes as marker substances in studies of the nutrition of herbivores: a review. *Australian Journal of Agricultural Research* 42, 913-925.
Dove, H. & A.D. Moore (1995). Using a least-squares optimization procedure to estimate diet composition based on the alkanes of plant cuticular wax. *Australian Journal of Agricultural Research* 46, 1535-1544.
Zhang, Y. J., Y. Togamura & K. Otsuki (2002). Differences in the n-alkane concentration of four wild plants species in Japan. *Grassland Science* 48, 50-52.