Alkane Profiles in Tropical Forages

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The role of n-alkanes in animal nutrition research has recently been reviewed by Dove and Mayes (1996). The measurement of voluntary intake (VI) using the naturally occurring odd chain length alkanes C_{31} or C_{33} in conjunction with administered even chain length alkanes such as C_{32} and C_{36} provides several advantages over the more conventional methods. Much of the development work involving this technology has been carried out with sheep or dairy cattle fed predominantly temperate pasture. Laredo *et al.*, (1991) have published alkane profiles for a number of introduced tropical pasture grasses but no alkane profiles have been published for native tropical pasture grasses. When using the ratio method to estimate VI,

The data summarised in Table 1 show that animals eating mostly forest bluegrass green leaf for example would be consuming a significant quantity of even chain length alkanes. Thus, the high concentrations of C_{32} and C_{34} in these grasses demand an alternative protocol when using alkanes to estimate VI and FO. the odd chain length concentration should exceed 50mg/kg DM. It is equally important that the concentration of naturally occurring even chain length alkanes is low (<10mg/kg DM). This generally has been the case with temperate pasture grass and legume species such as ryegrass and white clover (Dove and Mayes 1996). Generally C_{34} is used as the internal standard to calculate sample recovery during analysis. Considering the relatively high concentrations of C_{34} in our samples, we repeated the analysis using C_{36} as the internal standard and found this to be superior to C_{34}. Here we report the alkane profiles in the leaf and stem components of five important native sub-tropical pasture grasses

Dove, H. and R. W. Mayes. 1996. Plant Wax Components: A new approach to estimating intake and diet composition in herbivores. J. Nutr. 126:13.

Laredo, M. A., G. D. Simpson, D. J. Minson and C. G. Orpin. 1991. The potential for using n-alkanes in tropical forages as a marker for the determination of dry matter by grazing ruminants J. Agric. Sci. Camb. 117: 355.

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Table 1. Concentrations of n-alkanes (mg/kg DM) in the cuticular wax of live and dead leaf and stem of five native pasture grasses.

Native pasture grass species		Alkane Concentration mg/kg DM									
		C_{27}	C_{28}	C_{29}	C_{30}	C_{31}	C_{32}	C_{33}	C_{34}	C_{35}	C_{36}
Forest bluegrass	green leaf	79	60	166	52	426	109	344	78	70	7
(*Bothriochloa bladhii*)	dead leaf	70	52	100	154	292	67	268	22	60	8
	green stem	35	7	63	16	130	15	177	19	42	7
	dead stem	27	2	23	6	54	6	104	16	27	6
Black speargrass	green leaf	53	23	112	53	253	27	159	34	20	9
(*Heteropogon contortus*)	dead leaf	74	54	157	99	488	27	177	15	28	7
	green stem	77	38	165	59	235	29	163	13	14	6
	dead stem	67	53	95	55	193	27	76	14	9	7
Golden beard grass	green leaf	80	57	59	50	303	31	251	31	98	7
(*Chrysopogon fallax*)	dead leaf	96	51	52	50	243	41	191	27	60	8
	green stem	99	54	93	94	399	51	184	36	33	6
	dead stem	118	53	50	86	362	57	176	24	31	8
Slender chloris	green leaf	28	20	82	32	367	37	704	33	159	7
(*Chloris divaricata*)	dead leaf	34	12	69	42	326	38	523	24	113	7
	green stem	16	2	54	6	123	11	299	21	87	6
	dead stem	27	2	18	1	50	7	172	28	79	6
Woodland lovegrass	green leaf	33	15	84	55	293	18	153	17	30	8
(*Eragrostis sororia*)	dead leaf	12	7	49	34	208	19	139	19	35	8
	green stem	22	6	89	22	266	13	141	16	20	6
	dead stem	52	33	79	22	256	14	147	17	29	7