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DETERMINATION OF n-ALKANES AT DIFFERENT STRATUM HEIGHTS IN A PASTURE OF *PANICUM MAXIMUM* CV.MOMBAÇA

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Abstract

The aim of this experiment was to determine n-alkane levels in the stem + leaf sheath and leaf blade components of a pasture of *Panicum maximum* cv. Mombaça, harvested in 20 cm stratified layers. This pasture was under rotational grazing for intensive beef production throughout the year. The grazing system was based on the use of 16 paddocks with a 2-day grazing period followed by a 30-day resting period. Profiles of n-alkanes were determined in samples harvested in three separate periods: in the middle of the dry season (August 97; PERIOD 1), at the beginning of the wet season (November 97; PERIOD 2) and at the end of the wet season (April 98; PERIOD 3). Chain length was measured in the range from C_{27} to C_{35}. Within the three sampling periods, C_{33} and C_{31} were the most abundant alkanes, both in the stem + leaf sheath and leaf blade. The effect of sampling periods and pasture heights on n-alkane profiles were observed for the leaf blade component only.

Keywords: Grazing, n-alkanes, pasture heights, tropical grasses.

Introduction

The double alkane procedure proposed by Mayes et al. (1986) can provide accurate estimates of forage intake by grazing ruminants (Dove and Mayes, 1991; 1996). Besides that, with this method it may be possible to estimate intake of individual plant species (Dove and Moore, 1996) or anatomical components of the plant (Dove et al., 1996). Although n-alkane concentrations in a number of pastures have been reported (Dove and Mayes, 1996), little has been found in terms of concentration in the spatial distribution of plant biomass. This aspect is of particular interest for tropical grasses of cespitose growing types such as *Pennisetuns* and *Panicuns.*

The influence of age and forage height on n-alkane profiles in hay of *Pennisetum purpureum* cv. Napier was analyzed by Oliveira et al. (1997). Maturity stages were identified by the heights of 1.2; 1.5 and 1.8 m. They observed differences in n-alkane profiles due to maturity stage and, consequently, to the height of the plant. The aim of this work was to study the effect of height on n-alkane profiles of *Panicum maximum* cv.Mombaça.

Material and Methods

This experiment was carried out at EMBRAPA/CNPGC, in Campo Grande, MS. Samples were collected from an experiment established to determine intensive beef production based on tropical grasses under rotational grazing throughout the year. Grazing system included 16 paddocks, 2-day grazing period followed by a 30-day resting period.

Samples of stem + leaf sheath and leaf blade were collected in 20 cm stratified layers of a pasture of *Panicum maximum* cv.Mombaça during three different times of the year: in the middle of the dry season (August 97; PERIOD 1), at the beginning of the wet season (November 97; PERIOD 2) and at the end of the wet season (April 98; PERIOD 3). Before

grazing, three representative areas of the paddock were selected for sampling collection.

Sampling was carried out using squared steel frames of 1m² assembled at intervals of 20-cm height up to the top layer of the forage. From the top down to ground level the forage layers were cut accordingly. Each cut stratum was separated by hand into two components: stem + leaf sheath and leaf blade. Following that, the material was oven dried at a temperature of 60°C and ground using a 40 mesh sieve. N-alkanes concentrations were then determined within the range of carbonated chain between C_{27} and C_{35}, following the technique developed by Mayes et al. (1986).

Results and Discussion

The average concentrations of n-alkanes in the forage components stem + leaf sheath and leaf blade within the different strata of cv.Mombaça, at the three sampling periods, are shown on Table 1. Odd n-alkane concentrations (C_{35}, C_{33} and C_{31}) were higher in the leaf blades as compared to the stem + leaf sheath components for the first sampling period.

At the beginning of the wet season (Period 2), the contribution of leaf blade at the 0-20 cm layer was too small (<0.3 g DM) to carry out any alkane analysis but values found at the strata 20-40 cm and > 40 cm showed a reduction in the C_{33} concentrations as compared to the previous period. Stem + leaf sheath component also showed a decay in alkane concentrations for the length chain C_{31}, C_{33} and C_{35} at 0-20 cm strata, as compared to the previous period, but the inverse occurred at strata >20 cm.

In period 3 (end of the wet season), the values for the C_{33} at the various layers of leaf blade were similar to those of period 2. The concentrations of C_{31}, however, were smaller than those registered for the previous period. Along the three periods, the C_{33} and C_{31} length chains were the alkanes which most contributed to the n-alkane profiles to both plant components studied although alkane concentrations in leaf blade, was the most affected by evaluation time

and plant height.

The differences found in n-alkanes in the present experiment are in agreement with results of Laredo et al. (1991). These authors also observed that n-alkane concentrations in the stem + leaf sheath were lower than leaf blade for all species studied. Therefore, the differences found between plant components (stem + leaf sheath and leaf blade) and height may affect the use of the double alkane technique due to animal preference during grazing (Dove e Mayes, 1991). That is why Vulich et al. (1993) emphasized that the technique employed for sampling should be sensitive to the grazing behavior so that a representative sample of animal diet may be collected. The presence of even alkanes was very low in all situations of plant components and height.

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Table 1 – N-alkane contents (mg/kg of DM) in stem + leaf sheath (stem) and leaf blade (leaf) components of a pasture of *Panicum maximum* cv Mombaça harvested at different strata and times of the year (in the middle of the dry season, August 97, PERIOD 1; at the beginning of the wet season, November 97, PERIOD 2; and at the end of the wet season, April 98, PERIOD 3).

	n-alkane (mg/kg MS)							
Period 1								
Stem	C_{27}	C_{28}	C_{29}	C_{30}	C_{31}	C_{32}	C_{33}	C_{35}
0-20 cm	4.42	2.99	8.35	3.49	27.41	4.94	32.48	8.16
> 20 cm	4.78	3.26	9.28	3.74	25.96	5.20	29.48	6.74
Leaf								
0-20 cm	6.33	6.40	25.63	17.42	143.14	17.01	146.57	27.56
20-40 cm	7.72	8.14	29.52	19.21	144.53	13.55	130.91	23.80
> 40 cm	10.12	10.94	44.12	25.63	187.41	17.41	120.19	19.81
Period 2								
Stem								
0-20 cm	4.88	2.83	8.46	2.596	23.02	3.65	25.46	6.93
> 20 cm	4.88	3.05	13.26	3.91	55.51	4.88	44.20	8.63
Leaf								
0-20 cm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20-40 cm	8.01	7.55	30.16	18.28	146.54	13.97	115.55	21.23
40-60 cm	10.48	10.99	39.79	24.72	165.04	14.40	101.72	17.85
> 60 cm	8.80	10.79	38.14	26.22	162.15	15.61	100.49	17.37
Period 3								
Stem								
0-20 cm	4.55	0.00	8.29	0.00	18.00	0.00	19.79	5.96
> 20 cm	3.72	0.00	7.81	2.66	26.60	3.16	26.31	6.79
Leaf								
0-20 cm	4.70	4.41	19.14	14.53	108.51	13.81	115.53	22.62
20-40 cm	5.23	4.92	21.29	14.32	115.37	13.39	114.04	22.29
40-60 cm	7.03	7.84	30.19	22.58	147.13	15.32	114.05	21.36
> 60cm	8.22	9.97	35.49	26.92	156.56	15.52	104.15	18.96