Nutritional Quality of *Digitaria eriantha Steudel.* Subsp. *Eriantha* cv. *Irene*

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Abstract

Digitaria eriantha is a South African perennial grass, C4 type, that grows during spring and summer with rainfalls higher than 400mm. The aim of this paper was to evaluate its nutritional quality profile: Crude Protein (%CP), True Protein (%TP), Soluble Protein (%SP), Non-Protein Nitrogen (%NPN), Neutral Detergent Fiber (%NDF) and Acid Detergent Fiber (%ADF) in cumulative production cuttings during a species cycle. In-sacco technique was applied to estimate the degradability of dry matter (DM). A simple regression statistics method was applied to relate different nutritional parameters. ***Digitaria eriantha*** presents low percentage of CP from flowering and of NPN during its whole cycle. TP represents more than 40% of CP. The estimated effective degradability is lower than the determined with in-sacco technique and it is related to the increase of NDF and ADF and with decrease of the TP as cycle progresses.

Keywords: *Digitaria eriantha*; nutritional quality.

Introduction

Digitaria eriantha is a South African perennial grass, C4 type, that grows during spring and summer with rainfalls higher than 400mm. In San Luis, Argentina, it integrates,

alone or with weeping lovegrass and winter pasture, the forage base of calf cows operations, but it needs to be supplemented with energy and protein in winter (Frasinelli et al., 1998). It is characterized by an excellent adaptation to the environment, rusticity and adaptation to grazing.

To better evaluate the characteristics that define species as appropriate forage for cattle production, it is important to know its available nutritional profile. Degradability of different forage components is of a great importance in the handling of feeding and contributes to improve its efficient use.

The aim of this paper was to evaluate nutritional quality of *Digitaria eriantha* in cumulative production cuttings through different nutritional parameters during the species cycle.

Material end Methods

Plant material was obtained from a plot implanted three year ago on a soil cultivation with low organic matter and nitrogen content (1.04 and 0.05% respectively) in INTA-EEA San Luis (Argentina). Hand cuttings of total aerial biomass were carried out monthly from October/98 to August/99.

Forage samples taken were weighed and aliquot was separated to determine Dry Matter (%DM), %CP (Crude Protein) (Kjeldhal), True Protein (%TP), Soluble Protein (%SP), %NPN, %NDF and %ADF (Goering and Van Soest, 1970). In this study, CP, TP, SP, were informed as % DM basis and % NPN is referred to Total Nitrogen (TN).

In-sacco technique was used to evaluate the kinetic of DM ruminal degradation (Bhargava and Orskov, 1987). The cut herbage at each defoliation date was oven dried at 60º C up to constant weight. It was grinded and sifted using a 1mm sieve. In-sacco techniques involves the incubation of this material in nylon bags (like Ankom) in the rumen of

cannulated animals. Incubation times were 2, 4, 6, 9, 12, 24, 48, 72 and 96 hours. Three British yearling steers fitted with ruminal cannula were fed with good quality alfalfa hay and watter ad-libitum. Once the bags were extracted at the corresponding time, they were subjected to manual washing during 10 minutes with running tap water. The residue was dried at 60º C up to constant weight.

Dry matter degradability was evaluated through the exponential model **P = a + b [1-exp(-c t)]**, proposed by Orskov and McDonald (1979). The Naway software was also used (Bhargava and Orskov, 1987). In this equation, **P** is degradation at time (**t**), **a**, **b** and **c** are constants and **e** is the basis of the natural logarithm. This model allowed the calculation of DM digestion speed (**c**).

The effective degradability (ED) was calculated combining degradability, digestion speed (**c**) and rate of passage (**k**). The applied model is **ED = A+B.C/(C+K)** (Orskov and McDonald, 1979). An average **K**: 4%/hour was used in this study, considering **K**: 5%/hour for big animals with low requirements and **K**: 3% for summer grasses according to Lindberg (1985) (cited by Stritzler et al., 1997).

The statistics method used was the simple regression method.

Results and Discussion

Table 1 details values of nutricional profile in different cutting moments of *Digitaria eriantha cv. Irene.*

Percentage of DM increased from October to August. CP decreases from December (flowering) and stayed close to 4% +/- 0.44, this is similar to the value found for March by Veneciano and Terenti (1997). TN reached a minimum in February-March (fructification-dissemiation:0.55%). TP represented more than 40% of CP and showed a minimum in February. SP (30 to 60% of CP), decreased from October. Its minimal values were observed

in March (dissemination: 1.13%) and then increased till June (senescence: 2.55%). NPN fluctuated from October (0.35%) to August (0.08%), representing the 13.7% and the 11.4 % of TN respectively.

NDF and ADF had the tendency to increase with phenological stages.

DM degradability adjusted to Orskov and McDonald model, from sprouting (October) to fructification (January) ranked between 83.29% to 69.05%, at 96 hours of digestion. It kept the average value of 64.4% +/-1.86% from February and to August. Throughout the cycle, the greater percentages of degradability were at 96 hours of digestion. Polynomial adjusted models explained the variation of degradability with cutting moments (R2: higher than 0.63). TP coincided in its variation with DM degradability.

The adjusted degradability shows higher values to the ones found by Estelrich and Cano (1996) in *Digitaria californica* and *Pappophorum caespitosum* and lower to *Boutelowa gracilis*; with similar digestion rates in the first two cases but higher in the third.

Direct DM degradability (in-sacco) fluctuated from 81.56% (October) to 65.57% (August) and was lower than the adjusted. Veneciano and Terenti (1997) determined an average value of 46.5% of in-vitro digestibility in cumulative production cuttings after the first frost (March).

ED was under 44% from November (vegetative stage). DM digestion speed varied between 0.08% (October) and 0.02 (July). This decreased affected ED values. A polinomial model explained the variation (R^2: 0,84) according to cuttings times. Simple lineal models explained the relation between ED and CP; ED and TP; ED and SP (R^2: higher than 0.80). ED also showed direct linear relationship with NPN (R^2: 0.87). The ED relationship with NDF and ADF resulted in a second grade polinomial models (R^2 : 0.87).

Under these conditions of soil and cutting strategy, *Digitaria eriantha* has low levels of TP, NPN and ED but it is an important fiber source during the whole growing cycle.

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Table 1 - Nutritional profile of *Digitaria Eriantha* Cv. *Irene* in different cutting moments

Cutting Date	Phenological Stage	DM (%)	CP	TN	TP	SP	ADF	NDF	NPN (%TN)
			----------%DM----------						
10-21-98	Vegetative	22	16	2.56	10.67	5.46	34.4	59.6	0.35
02-23-99	Fructification Dissemination	36	3.4	0.54	1.46	1.70	44.1	70.6	0.11
08-23-99	Senescence	94	4.4	0.70	2.80	1.68	47.7	69.2	0.08