EFFECT OF STAGE OF MATURITY ON NUTRITIVE VALUE OF SUGAR CANE

Margarita Banda and R E Valdez

Comisión de Río Pánuco, Tampico, México

Summary

Determinations were made of nutritive value according to the method of Van Soest on sugar cane harvested at 8 and 16 months of age. The range of Brix in the juice was 11.4 to 17 for the 8 months cane and 15.2 to 18.0 for 16 months cane. All indices of energetic value were higher in 16 months than in 8 months cane, the respective values for in vitro digestibility being 70.5 and 57.5%. There were negative relationships between in vitro digestibility and most cell wall fractions. The only analyses in favour of the younger cane were nitrogen and ether extract. The results suggest that, contrary to the situation with most grasses, the nutritive value of sugar cane increases with maturity.

Key words: Sugarcane, maturity. nutritive value

Introduction

There are few reported analyses for the composition of sugar cane from the point of view of animal feeding, and none of these refers to the effect of increase in age/maturity (Anon 1974).

The object of the experiment reported here was to obtain preliminary data on certain parameters of nutritive value in sugar cane stalk of different ages,

Materials and Methods

Treatments and design:

The treatments consisted of the same variety of sugar cane harvested at 8 on 16 months after planting.

Procedure:

Selections were made of sugar cane variety H 37 grown on experimental plots at Platon Sanchez, Veracruz. Five canes representing different degrees of Brix were selected for each age of maturity. After removing the tops, the cane stalks were ground in a high speed chopper and samples taken of juice and of fresh ground cane for analysis. Brix was measured on the fresh juice with a hand refractometer, while other samples were taken for dry matter estimation (drying at 60° for 48 hr). These were used subsequently for a proximal analysis (AOAC 1970), and in vitro digestibility and cell wall components according to the method outlined by Van Soest (1967).

Table 1:
Chemical analysis off sugarcane harvested at 8 and 16 months (means and SE)

	Age at harvest		Significance level
	8 mth	16 mth	(P<)
Digestibility in vitro,%	57.5±3.4	70.5±4.73	.07
Brix of juice, o	14.5± .77	16.3± .87	.21
% in dry matter			
Acid detergent fibre	37.7±1.02	33.4±1.48	.05
Lignin	6.24± .13	5.43± .13	.01
Cellulose	28.6± :91	26.2± .91	.21
Cell wall	61.1±1.70	54.1±2.65	.06
Silica	2.04±.28	1.06± .28.	.06

Table 2:
Proximal of sugarcane harvested at 8 and 16 months of age (mean values and SE)

	Age at harvest		Significance level
	8 mth	16 mth	(P<)
Dry matter, %	20.5±.67	22.2±1.76	.28
% in dry matter			
N x 6.25	4.19 ±.28	2.89±.35	.02
Ether extract	1.10± .08	.81±.22	.14
Fibre	27.7±1.12	25.0±1.66	.21
Nitrogen free extract	61.4±1.56	67.8±1.40	.03

Results and Discussion

The data for in vitro digestibility, Brix in juice and some cell wall components are set out in table 1. The conventional proximal analysis is given in table 2 and relationships between in vitro digestibility and cell wall parameters in table 3.

The most important findings are the higher in vitro digestibility and lower content of structural cell wall components in 16 months cane as compared with the younger 8 months cane. The only criteria in favour of the younger cane were protein (N X 6.25) and ether extract. However, the differences in these components in favour of the young cane were small and would not appear to compensate for the quite considerable differences in in vitro digestibility.

Table 3: Relationship between in vitro digestibility and various analytical measurements

Y	X	Equation	r^2	SE_b
Digestibility	°Brix	Y=26.8 + 2.3X	.20	±1.66
Digestibility	Acid detergent fibre	Y=137.2-2.08X	.42	±0.87
Digestibility	Lignin	Y=123.8-10.4X	.24	±6 40
Digestibility	Cellulose	Y=114.2-1.89X	.24	±1.17
Digestibility	Cell wall	Y=120.4-1.0X	.26	±0.58

As was to be expected, there were significant relationships between in vitro digestibility and most cell wall components (table 3). The positive correlation between digestibility and Brix in juice indicates that the improved nutritive value with increasing maturity in sugar cane is a function of the storage of sugar. As the cane matures the increase in sugar content has the effect of diluting the structural cell wall components, thus leading to an increase on overall feeding value . These analytical data support the results of feeding trials (Alvarez and Preston 1976) in which cattle growth rate and feed conversion were significantly better on mature than on young sugar cane.

Sugar cane therefore possesses a distinct advantage over most other tropical grasses in that its feeding value increases with maturity . Since maturity of sugar cane coincides generally with the dry season, when most conventional grasses present both qualitative and quantitative deficiencies, one obvious role of sugarcane is as a dry season feed supplement.

References

Anon 1974 Latin American Tables of Feed Composition Univ Florida

AOAC 1970 Association of Official Agricultural Chemist, Official Methods of Analysis, 11th ed, Washington, D C 1970

Van Soest P J 1967 Development of a comprehensive system of feed analyses and its application to forages, J Anim Sci 26:119-28

Received 12 March 1976