Intake and ruminal kinetics of sugarcane as affected by fiber digestibility and conservation methods

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Introduction Sugarcane has low fiber digestibility, one of the main factors limiting beef cattle performance. Sugarcane attains maturity and is available for daily harvest during the dry season; however, ensiling is an effective option for reducing labor costs. Effects of sugarcane fiber digestibility (NDFD) and method of conservation on intake and rumen kinetics were evaluated.

Materials and Methods Eight ruminally cannulated Nellore steers were used in a duplicated 4x4 Latin square design. Two sugarcane genotypes with differing stalk NDFD were used: IAC2480 with higher NDFD, and SP1049 with lower NDFD. Treatment diets contained 40% sugarcane as roughage source given as freshly-chopped or as silage. Animals were housed individually with free access to water and fed *ad libitum*. Periods lasted for 14d, being 10d for adaptation and 4d for sample collection. Dry matter intake was determined on days 10, 11 and 12, and ruminal contents were evacuated manually at 1100 h (2 h after feeding) on d 12 and at 0700 h (2 h before feeding) on d 13 of each period. Total ruminal content mass and volume were determined. Aliquots were squeezed through a nylon screen to separate into solid and liquid phases. Samples were taken from both phases for determination of nutrient pool size. Main effects of sugarcane genotype (CANE), method of conservation (CONS), and their interaction were tested by ANOVA.

Results and Discussion Dry matter and NDF intake were greater for steers consuming diets with higher sugarcane NDFD, however the interaction CANE x CONS was significant. The effect of greater NDFD on intake was only significant when feeding sugarcane as silage, having no effect on intake when sugarcane was offered as freshly-cut. Ruminal NDF passage rate was faster for steers fed silage, but only for the genotype with greater in vitro NDF digestibility. Ruminal NDF digestion rate was also faster for steers fed silage, and for steers consuming IAC2480, with no significant interaction. Total ruminal NDF digestibility was greater for steers receiving sugarcane as silage, with no effect of genotype.

Conclusions Increased in vitro NDFD improved intake and passage rate, but only when given as silage. Feeding sugarcane as silage increased intake and fiber passage and digestion rates.

Table 1 Intake and ruminal kinetics of steers fed with sugarcane fresh or ensiled and with higher or lower fiber digestibility.

Item	Treatments[1]				SEM	P-values		
	Fresh		Ensiled					
	IAC2480	IAC1049	IAC2480	IAC1049		Cane	Cons	Cane×Cons
DMI (kg/d)	5,27	5,22	5,89^{A}	4,68^{B}	0,50	<0,01	0,86	0,02
NDFI (kg/d)	1,07^{b}	1,13^{b}	1,40^{A,a}	1,16^{B,a}	0,12	0,02	<0,01	0,02
DMI (%BW)	1,84	1,82	2,07^{A}	1,65^{B}	0,09	<0,01	0,99	0,02
NDFI (%BW)	0,38^{b}	0,40	0,49^{A,a}	0,40^{B}	0,02	0,01	<0,01	0,02
NDF pool (kg)	1,42	1,60	1,33	1,50	0,18	0,05	0,36	0,91
NDF Turnover (%/h)	3,16^{b}	3,04^{b}	4,39^{A,a}	3,36^{B,a}	0,21	<0,01	<0,01	0,01
NDF, k_p	2,88^{b}	3,01	3,92^{A,a}	3,05^{B}	0,22	<0,01	<0,01	<0,01
NDF, k_d	0,77	0,11	1,20	0,97	0,43	0,03	<0,01	0,17
DNDF, %	42	42	57	55	11	0,77	<0,01	0,66

[1]Treatments: Sugarcane fresh or ensiled and with higher (IAC2480) or lower (SP1049) NDFD.
Means within a row with different superscripts differ (P<0.05).
^{A,B} effect of genotype within conservation method.
^{a,b} effect of conservation method within genotype.