

***In Vitro* Digestibility of Sugarcane Top Treated with Exogenous Enzyme or Sodium Hydroxide**

T. Mohammadabadi, and M. Chaji

Department of Animal Science, Ramin Agriculture and Natural Resource University, Molasani, Ahvaz, Iran (Khuzestan)

Sugarcane tops (SCT) are a by-product obtained after the harvesting of the sugarcane plant. Approximately 1.4 million tons of SCT are produced annually in the southern part of Iran (Khuzestan Province) and it is an important feed resource for ruminants. However, the low digestibility and high lignin are considered as the main reasons for unsatisfactory performance of animals fed these roughages. Exogenous enzymes (Euna and Beauchemin 2007) and NaOH (Chen *et al* 2006) increase digestibility. The main objective of this work was using NaOH and enzyme to increase the nutritive value of sugarcane top (SCT).

Experimental treatments were: untreated SCT (USCT), SCT treated with 4 g/kg DM exogenous enzyme for 24 h (ESCT); SCT treated with 40 g/kg DM NaOH for 24 h (NSCT) and SCT treated with 4 g/kg DM exogenous enzyme+40 g/kg DM NaOH for 24 h (ENSCT). The enzyme mixture composition was Cellulase, Xylanase, Betaglucanase, Alpha amylase, Pectinase, Phytase, Protease and Lipase as 0.03, 6.6, 10, 0.7, 0.7, 0.07, 0.5 and 3 MU/kg, respectively (Bioproton Pty. Ltd. Co.). Chemical composition of samples (DM, CP, Ash and NDF) was determined using standard procedures (AOAC, 1990). Digestibility of dry matter, crude protein, NDF and organic matter (IVDMD, IVCPD, IVNDFD and IVOMD, respectively) of the samples (4 replicates) were determined using the *in vitro* procedure of Tilley and Terry (1963). Data of IVDMD, IVCPD, IVNDFD and IVOMD were analyzed using GLM procedure in SAS for a completely randomized design ($p < 0.05$).

Results from the present experiment indicated enzyme and NaOH increased *in vitro* digestibility of DM, NDF and OM and the highest was for ENSCT ($P < 0.01$) (Table 1). *In vitro* digestibility of CP increased by enzyme and decreased by NaOH treatment ($P < 0.01$), because NaOH denatures protein and decreased digestibility (Cozzi *et al* 1995). The effect of NSCT on *in vitro* digestibility of DM, NDF and OM was more than ESCT. Morgavi *et al.* (2000) reported exogenous enzymes work in synergy with rumen microbial enzymes, which increases their hydrolytic potential within the rumen and increase digestibility of plant cell wall. It has been proposed that sodium hydroxide may hydrolyze the ester bonds between lignin and hemicellulose, and make carbohydrates more accessible to the action of rumen micro-organisms and improve organic matter digestibility (Goto *et al* 1993). It was concluded from this experiment that the *in vitro* digestibility of sugarcane top was affected by the NaOH and enzyme.

Table 1. *In vitro* digestibility (%) of sugar cane top treated with exogenous enzyme and sodium hydroxide

Item	Treatments				s.e.m	p
	USCT	ESCT	NSCT	ENSCT		
IVDMD	24.6d	28.5c	34.9b	35.2a	0.02	0.01
IVCPD	35.2b	37.3a	32.5d	34.3c	0.02	0.01
IVNDFD	74.1d	75.1c	77.5b	78.1a	0.01	0.01
IVOMD	56.5d	67.6c	76.1b	77.2a	0.03	0.01

Untreated SCT (USCT), SCT treated with 4 g/kg DM exogenous enzyme (ESCT); SCT treated with 40 g/kg DM NaOH (NSCT) and SCT treated with 4 g/kg DM exogenous enzyme+40 g/kg DM NaOH (ENSCT), s.e.m: standard error of mean, means within each row with different letters are significantly different ($p < 0.05$).

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Email: t.mohammadabadi@gmail.com