Effects of cellulase and lactic acid bacteria inoculants on *in vitro* digestibility of alfalfa silage

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Abstract : Alfalfa is an important legume forage. But it's difficult to make high quality silage by 2nd and 3rd cutting period of alfalfa in the huang-huai-hai region of China. To investigate the *in vitro* degradation of *Medicago sativa* silage, cell-wall degradation enzyme(X100) and lactic acid bacteria(Z,R) were applied as additives in this study. The results showed that both enzymes and lactic acid bacteria increased IVDMD compared with the control ($P < 0.01$; Table 1), and the *in vitro* dry matter digestibility (IVDMD) of all treatments（CTR,X100,R,Z,R+X100,Z+X100）except Z treatment have increased ($P < 0.01$; Table 1), only the cumulative gas production at 72 h (GP_{72h}) of the X100 treatment have increased($P < 0.05$; Table 1;Fig 1). X100 treatment had higher c than other treatments ($P < 0.01$; Table 1). Among all the treatments, no significant difference was observed on A ($P > 0.05$; Table 1). The X100 treatment had higher AGPR compared with other treatments ($P < 0.01$; Table 1).These results indicated that the application of LAB combine with cellulase could be an efficient strategy to improve the *in vitro* digestibility of silage of *Medicago sativa*.

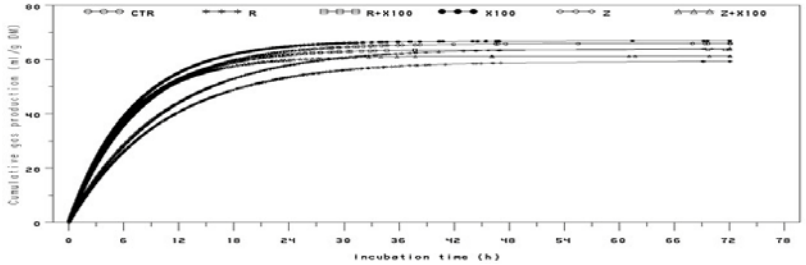

Figure.1 The Gas production for alfalfa with additives at 72h

Table1.Effects of cellulase on IVDMD, gas production and fermentation kinetic parameters of alfalfa silage after fermented for 72h

Items	Control	Cellulase (X100)	LAB		SEM	*P* value		
			Z	R		Enzyme	LAB	Enzyme×LAB
IVDMD/%	56.94	60.42	55.52	58.32	0.01	**	**	NS
GP_{72h}/(ml/g)	62.13	63.03	59.64	62.51	5.38	NS	NS	NS
Fermentation kinetic parameters								
c/(ml/h)	0.11	0.15	0.13	0.13	0.01	**	NS	NS
A/(ml)	63.01	63.95	60.32	63.88	5.20	NS	NS	NS
Lag/(h)	2.92	2.60	2.79	2.79	0.09	**	NS	NS
AGPR/(ml/h)	9.99	13.63	11.00	11.53	0.69	**	*	*

* Diluted buffered rumen fluids (75 ml) were incubated for 72 h with 500-mg ground diet, and the number of observations used in the statistical analysis for each dose per diet was n=3.

† Contrast, contrast effect between the zero control and addition; Linear, linear effect of melamine addition; Quadratic, quadratic effect of addition; NS, not significant (P>0·10).

‡ GP72, cumulative gas production at 72 h; A, the asymptotic gas production; c, the fractional rate for the gas production of 'A'; Lag, the initial delay time in the onset of gas production; AGPR, the average gas production rate.