The Effect of Applying Lactic Acid Bacteria to *Elymus excelsus* and *Elymus sibiricus* Gramineous Mixed Grass on Fermentation Characteristics

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The XXI International Grassland Congress / VIII International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

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Key words : lactic acid bacteria ,mixed grass ,silage ,fermentation characteristics

Introduction In recent years , much more attention has been focused on the conservation of grass as silage . Traditionally , the objective of making silage was to preserve surplus grass through fermentation for use in winter and early spring to feed confined livestock (Wilkinson et al . 1992) .

Materials and methods Applied *Lactobacillus plantarum* and *Enterococcus mundtii* isolated from Inner Mongolian grasses , to detected the effect on the fermentation characteristics of mixed gramineous grasses *Elymus excelsus* and *Elymus sibiricus* . In this study four treatments were used with eight replicates : the control (no additives) (Con) , addition of *E .Mundtii* (EM) ; or *L .Plantarum* (LP) ; or *E . Mundtii* and *L . Plantarum* (EL) . All the inoculants were diluted with distilled water , and then sprayed on the grass at 1×10^5 cfu/g fresh matter (FM) . About 530 g of inoculated grass was packed into a plastic bottle and sealed . The bottle silos were kept at room temperature for a total of 60 days .

Results The results showed : All lactic acid bacteria (LAB) inoculants could significantly ($p<0.05$) reduce silage pH (Table 1) compared with the control . All LAB inoculants significantly ($p<0.05$) increased the content of lactic acid and the ratio of lactic acid to acetic acid in silage . In addition , treatments with EL significantly ($p<0.05$) decreased propionic acid and butyric acid concentrations compared with Con . Silage inoculated with EL had reduced ($p<0.05$) concentrations of ammonia-N (Figure 1) . All LAB inoculants showed a trend of reducing dry matter loss . Therefore , inoculation with LAB can indeed improve silage fermentation quality of *E . excelsus* and *E . sibiricus ;* the combination of *E . mundtii* and *L . plantarum* treatment produced the best results .

Table 1 *Fermentative quality of silage following* 60 *days* .

Groups	Dry matter%	Crude protein%	pH value	Ammonia-N	Lactic acid	Acetic acid	Propionic acid	Butyric acid	Dry matter loss g/1kgFM
				μmol/gFM					
Con	34 .87* ±0 .70	8 .07** ±0 .12	4 .85* ±0 .14	28 .66* ±2 .20	148 .98*** ±6 .49	40 .24* ±2 .95	79 .19* ±5 .69	23 .21* ±2 .27	25 .63* 0 .86
EM	8 .04* ±0 .45	8 .04** ±0 .08	3 .60** ±0 .11	27 .87* ±0 .11	360 .74* ±9 .74	57 .13* ±5 .22	57 .35** ±3 .65	2 .29** ±0 .43	15 .78** ±0 .96
LP	36 .50* ±0 .17	8 .32** ±0 .04	3 .60** ±0 .04	24 .52* ±0 .61	361 .41* ±9 .51	69 .99* ±6 .60	59 .68** ±6 .02	-	14 .41* ±0 .98
EL	35 .84^{8} ±0 .44	8 .72* ±0 .16	3 .60** ±0 .18	20 .85** ±0 .58	407 .38** ±8 .97	44 .71** ±3 .17	54 .97** ±3 .85	-	19 .63* ±0 .98

Note :The value with different superscript * are significantly different($P<0.05$) .-represents the value could not be detected .

Conclusions The two selected LAB inoculants improved silage fermentation quality . However , applying *E . mundtii* alone was the least effective additive , whereas the combination of *E . mundtii* and *L . plantarum* treatment producing the best results .

References

Wilkinson , J . M . , Stark , B . A .1992 . Silage in Western Europe , A survey of 17 countries . Marlow , Bucks ,UK : *Chalcombe Publications* .