

THE EFFECT OF A MULTI STRAIN AND ENZYME SILAGE INOCULANT ON FERMENTATION CHARACTERISTICS AND AEROBIC STABILITY OF LEGUME SILAGE



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INTRODUCTION

Dual purpose inoculants containing homofermentative and heterofermentative bacteria were developed to overcome the limitations of inoculants containing either type of bacteria alone.

OBJECTIVE

Determine the effect of a commercial multi strain silage inoculant on the DM loss, fermentation characteristics and aerobic stability (AS) of wilted lucerne silage.

MATERIAL & METHODS

Forage	: Wilted lucerne (3rd cut) (Table 1)
Set up	: 12 L mini silos (4 silos/treatment)
Opening Times	: 90 days
Treatments	: ■ Control (C) : no additive ■ Treatment (T) : Sil-All4x4+WS *
Measurements	: ■ Nutritional value ■ Fermentation characteristics ■ DM losses ■ Aerobic stability

Table 1 Chemical composition of wilted lucerne

DM	Ash	CP	NDF	ADF	WSC*	Soluble-N	dDM ₁	LAB	Yeast	Molds
g/kg					g/kg DM				log10 CFU/g FM	
354.1	108.5	207.4	402.3	363.8	63.2	12.8	828.5	5.34	7.11	0.00

¹In vitro dry matter digestibility

*WSC= Water Soluble Carbohydrates

*Sil-All4x4+WS

Lactobacillus plantarum CNCM I-3235 (500 000 CFU/g fresh forage)
Pediococcus pentosaceus NCIMB 12455 (200 000 CFU/g fresh forage)
Propionibacterium acidipropionici CNCM MA/26 4U (200 000 CFU/g fresh forage)
Pediococcus acidilactici CNCM I-3237 (100 000 CFU/g fresh forage)
α-amylase, β-glucanase, cellulase and glucanase
(enzymes included at EU 1831/2003 efficacy application rate)

RESULTS & DISCUSSION

A. NUTRITIONAL VALUE

■ T silage had significantly more WSC compared to C silage (P<0.05)

B. FERMENTATION CHARACTERISTICS (Table 2)

- T silages had a significantly lower pH compared to the C (P< 0.05)
- Significant higher lactic acid and acetic acid content in T silages compared to C (P<0.05)
- Ethanol content 30% lower in T silage compared to C (P<0.05)

Table 2. Fermentation characteristics of silage after 90 d of ensiling

Item	C	T	SEM
pH	4.42 ^a	4.27 ^b	0.02
N-NH ₃ , g/kg N	62.7 ^a	51.2 ^b	1.9
Lactic acid, g/kg DM	37.1 ^a	55.7 ^b	1.7
Acetic acid, g/kg DM	15.8 ^a	21.7 ^b	0.8
Ethanol, g/kg DM	12.8 ^a	8.9 ^b	0.6
DM losses, g/kg DM	48.8 ^a	42.9 ^b	4.4

a b Means within row with different superscripts differ (P < 0.05)

SEM=Standard Error of Means

C. DRY MATER LOSSES (Figure 1)

■ Significantly lower dry matter losses for the T group compared to C (P<0.05)

D. AEROBIC STABILITY

- All silages were aerobically stable
- After the AS-test, yeast counts were significantly lower in T silage (P<0.05) (**Figure 2**)

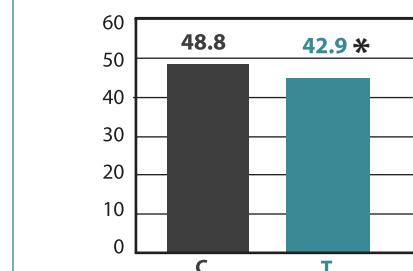


Figure 1. DM losses during ensiling (g/kg DM)

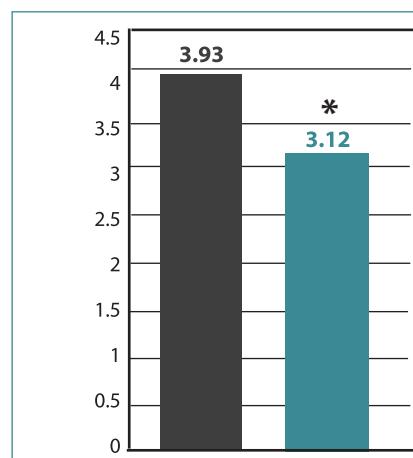


Figure 2. Yeast counts after AS test (Log CFU/g silage) * P < 0.05

CONCLUSION

The multi strain silage and enzyme additive improved fermentation characteristics (P<0.05) and reduced DM losses (P<0.05) during ensiling of lucerne.