

# 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 <sub>1</sub>	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

<sup>1</sup>In 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)  
 $\alpha$ -amylase,  $\beta$ -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 <sup>a</sup>	4.27 <sup>b</sup>	0.02
N-NH <sub>3</sub> , g/kg N	62.7 <sup>a</sup>	51.2 <sup>b</sup>	1.9
Lactic acid, g/kg DM	37.1 <sup>a</sup>	55.7 <sup>b</sup>	1.7
Acetic acid, g/kg DM	15.8 <sup>a</sup>	21.7 <sup>b</sup>	0.8
Ethanol, g/kg DM	12.8 <sup>a</sup>	8.9 <sup>b</sup>	0.6
DM losses, g/kg DM	48.8 <sup>a</sup>	42.9 <sup>b</sup>	4.4

<sup>a b</sup> Means within row with different superscripts differ ( $P < 0.05$ )

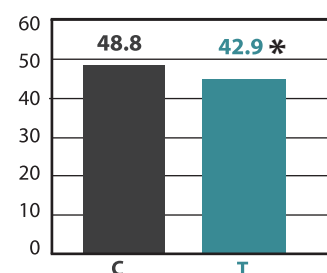
SEM=Standard Error of Means

### C. DRY MATER LOSSES (Figure 1)

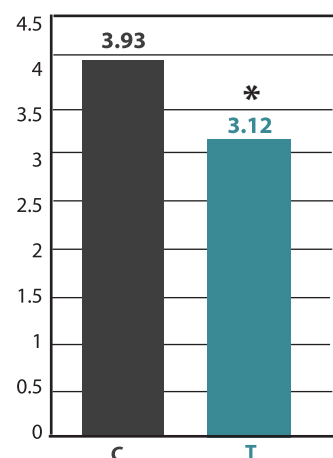
- Significantly lower dry matter losses for the T group compared to C ( $P < 0.05$ )

### 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.