



Grass Silage Trial: Ecosyl treated vs Untreated

Dr Mark Leggett | Microbiologist

Trial Summary

Wilted grass at 32 % DM was treated with Ecosyl or left untreated and ensiled for 90 days.

Treating with Ecosyl resulted in a rapid lactic acid fermentation, lowering the silage pH and effectively controlling the activity of enterobacteria and clostridia.

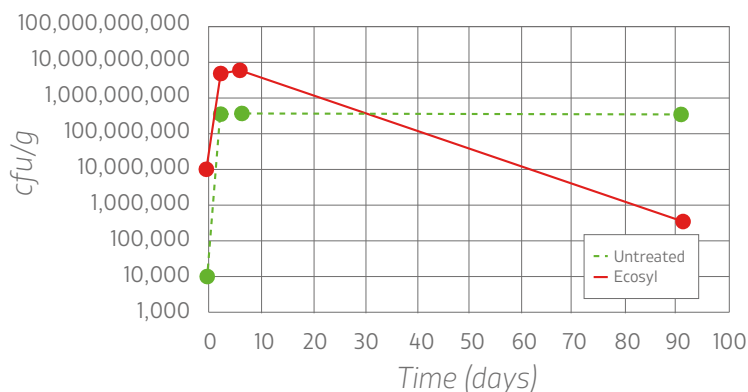
Untreated silage fermented poorly, resulting in a high pH. The higher pH allowed enterobacteria and clostridia to thrive within the fermentation resulting in production of butyric acid and high DM losses, relative to the Ecosyl treated silage.



ECOSYL™

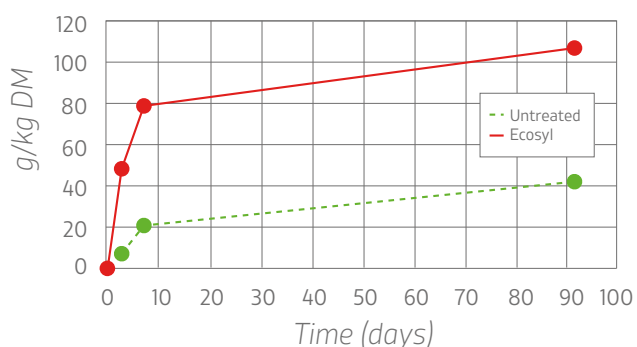
For consistently better silage

Lactic Acid Bacteria



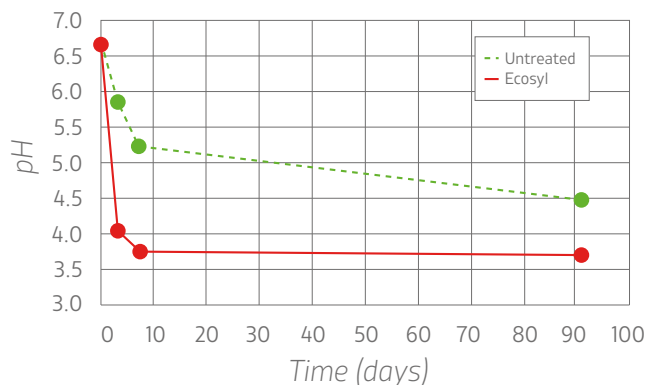
- Lactic acid bacteria increase in number during the early stages of fermentation
 - Ecosyl treated silage had higher lactic acid bacteria counts than the untreated silage and was dominated by the beneficial MTD/1 bacteria

Lactic Acid



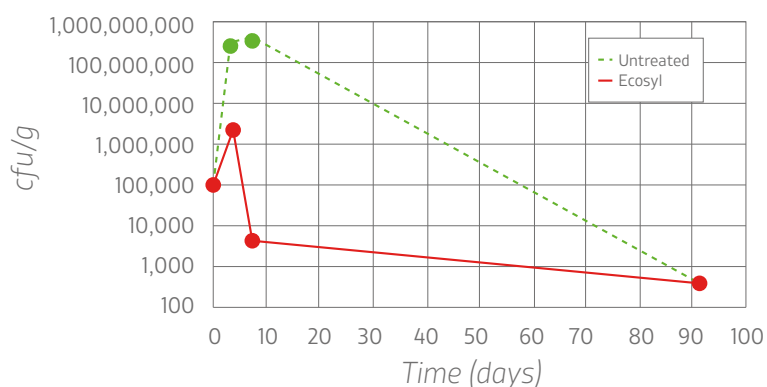
- As lactic acid bacteria numbers increase, they generate lactic acid – the most important fermentation acid
- Other fermentation end products represent less efficient uses of plant nutrients
 - The MTD/1 bacteria in Ecosyl treated silage consistently produced more lactic acid than the untreated silage

pH



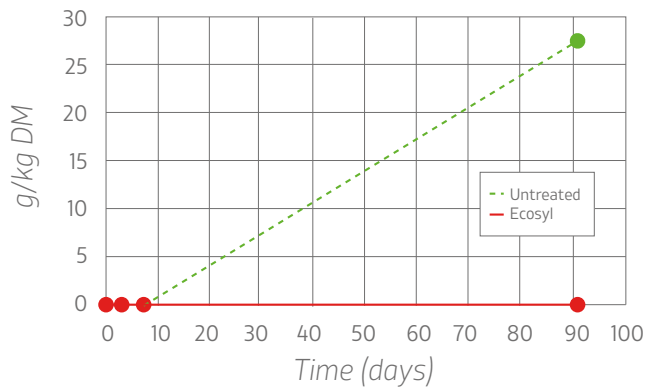
- Lactic acid generated by lactic acid bacteria lowers the silage pH
- Rapid reduction of pH is vital for stabilising the silage
 - Ecosyl treated silage was acidified more rapidly and more extensively than the untreated silage

Enterobacteria



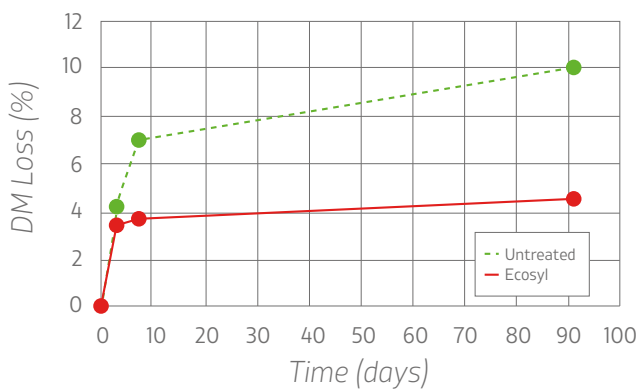
- A low pH allows effective control of enterobacteria (commonly found in slurry)
- Enterobacteria in silage can produce acetic acid and ethanol resulting in DM and energy losses
 - The rapid fermentation in Ecosyl silage resulted in more effective control of enterobacteria

Butyric Acid



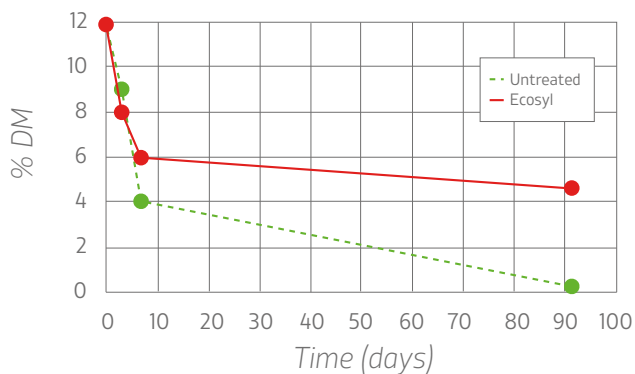
- Low pH also effectively controls the activity of clostridia
- Clostridial activity, generally resulting from soil contamination, generates butyric acid
- Butyric acid fermentations result in high DM and energy losses
 - No clostridial activity (butyric acid) was seen in Ecosyl silage

DM Loss



- The activity of clostridia and enterobacteria in silage results in large DM losses
 - Ecosyl controlled the fermentation process, effectively reducing DM losses

Sugars



- **Rapid fermentation results in greater sugar preservation.**
 - As well as preserving more of the silage DM, the rapid homofermentative fermentation from the MTD/1 bacteria in Ecosyl also preserved more sugar
 - The activity of undesirable bacteria in the untreated silage significantly reduced silage sugar content

Conclusion:

Treating with Ecosyl (MTD/1) rapidly dropped the pH and controlled spoilage organisms, resulting in reduced DM & sugar losses. This resulted in more of a higher quality silage to feed.



Using the data from our trial, we can estimate some of the benefits of using Ecosyl:

	Untreated	Treated
Fresh matter clamped (T)	1000	1000
DM	32%	32%
DM in the clamp (T)	320	320
DM losses during ensilage	10.1%	4.6%
DM remaining in clamp after losses (T)	288	305
Extra DM from Ecosyl silage (T)	18	

Lower DM losses means more silage to feed

- A clamp containing 1000 T fresh matter at 32% DM will contain 320 T DM.
- Given the DM losses seen in this trial, there would be 18 T more silage to feed in the Ecosyl clamp, compared with the untreated clamp.

	Untreated	Treated
Silage ME (MJ/kgDM)	11.27	11.48
Intake (kgDM/cow/day)	12	12
ME intake/cow/day (MJ)	135	138
ME available for milk (MJ) ¹	60.3	62.8
Milk production (L/cow/day) ²	11.6	12.1
Extra Milk from Ecosyl silage (L/cow/day)	0.5	

Using Ecosyl resulted in a higher energy silage yielding more milk

- Ecosyl silage had a higher ME than the untreated silage.
- Assuming equal intakes of both silages, Ecosyl silage could support production of 0.5 L additional milk per cow per day, compared with the untreated silage.

	Untreated	Treated
ME in the clamp (MJ)	3,242,829	3,506,689
Total milk potential (L/whole clamp)	277,852	307,248
Extra milk from Ecosyl Silage (L/whole clamp)	29,396	
Value of extra milk (£)	£8,231	
Profit (£)	£6,951	
Return on investment	5.4	

Return on investment

- Considering the energy present on a whole clamp basis, we can calculate potential milk yield from all the silage present.
- Given the improved DM retention and the higher ME, the Ecosyl treated silage holds the potential to support more than 29,000 L of additional milk compared to the untreated silage.
- At a milk price of 28 p and excluding the price of the inoculant (£1.28 / T treated), this would equate to a profit of £6,951, a return on investment of 5.4 to 1.

¹Typical Holstein/Friesian cows require 10% of their bodyweight plus 10 MJ of ME each day for maintenance. This means a 650kg cow requires $(650 \times 10 \div 100) + 10 = 75$ MJ of ME/day for maintenance.

²Typical Holstein/Friesian cows producing milk at 3.8% fat, 3.2% protein require around 5.2 MJ of ME for every litre.

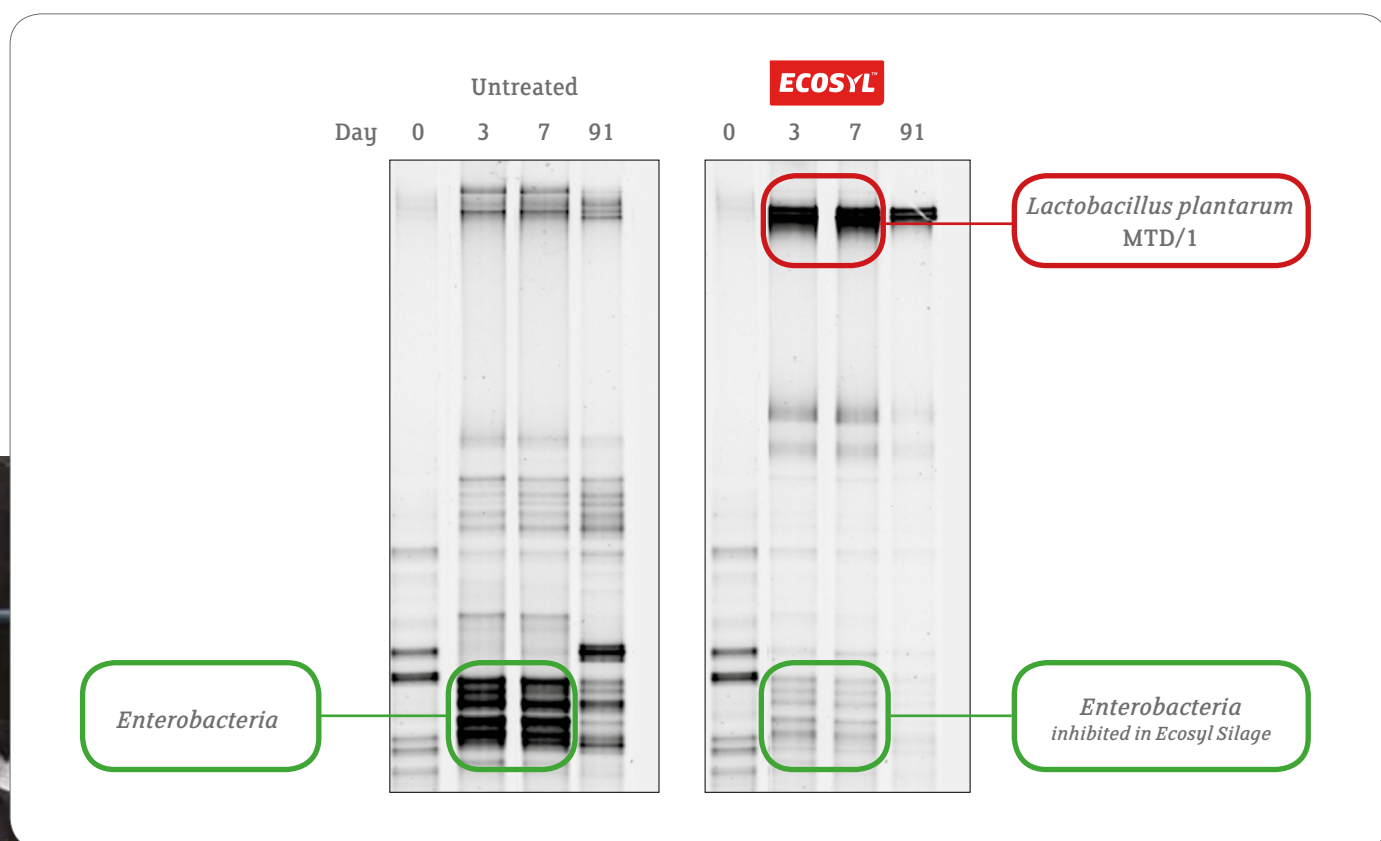


Bacterial DNA Profile



The image below shows a snap-shot of all bacteria present in the untreated or Ecosyl silage after 0, 3, 7 and 91 days ensiling. Each band represents the DNA of a different type of bacteria. **Darker bands** indicate more numerous bacteria, whereas *fainter bands* represent less numerous bacteria.

The fermentation in the Ecosyl silage was dominated by the beneficial bacteria *Lactobacillus plantarum* MTD/1 (**dark bands** shown in the red box below) which prevented the growth of bad bacteria (enterobacteria, commonly from slurry) (*faint bands* green box below), preserving the silage sugars and DM.

Untreated silage did not contain the MTD/1 bacteria, meaning that the early stages of this fermentation were dominated by enterobacteria (**dark bands** shown in the green box below), resulting in high DM losses and lower sugar levels.



For consistently better silage

  Follow us @ecosyl and @ecosyl_

For further information:

Freephone | 0800 919808 Visit | www.ecosyl.com

Copyright © 2019 Volac International Ltd. All rights reserved.



For consistently better silage