Six Steps Towards Consistently Better Silage

Cut to Clamp

A **Volac** initiative

Six-step plan towards consistently better grass silage

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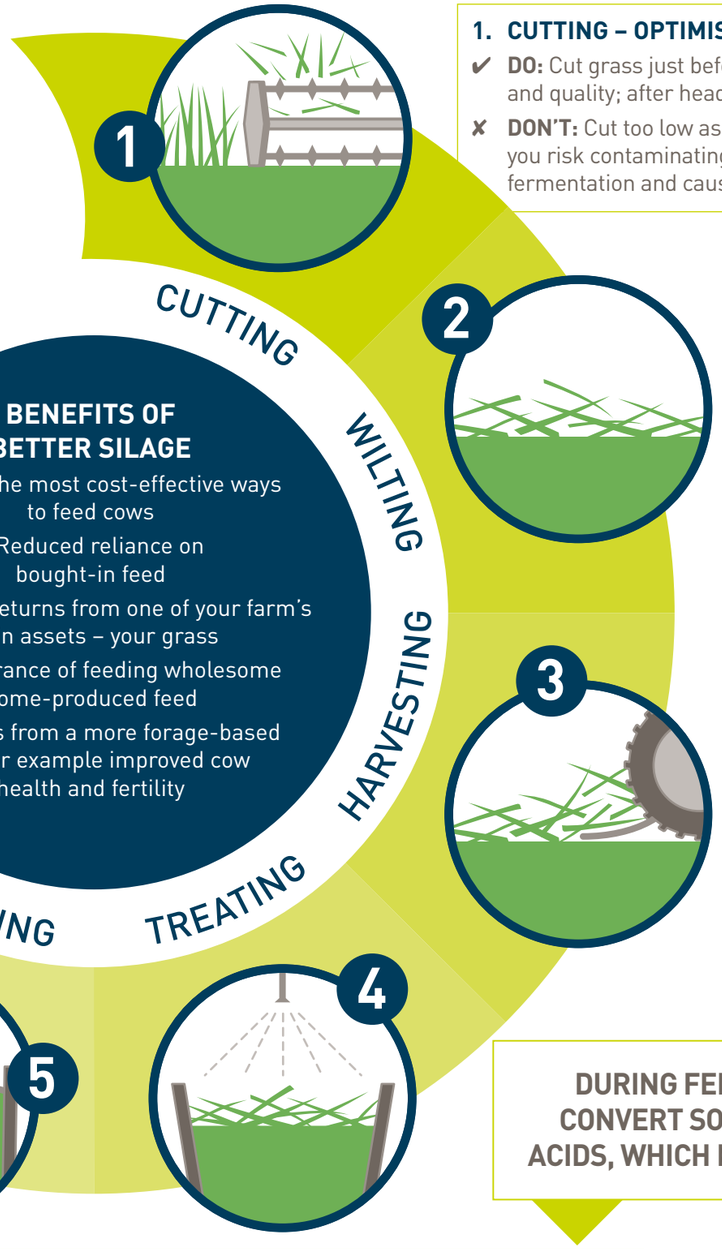
BENEFITS OF BETTER SILAGE

- One of the most cost-effective ways to feed cows
- Reduced reliance on bought-in feed
- Improved returns from one of your farm's main assets – your grass
- Reassurance of feeding wholesome home-produced feed
- Benefits from a more forage-based diet, for example improved cow health and fertility



1. CUTTING – OPTIMISE YIELD AND QUALITY

✔ **DO:** Cut grass just before heading as it gives the best balance of yield and quality; after heading, digestibility falls by about 0.5%/day

✘ **DON'T:** Cut too low as the stem base has the lowest digestibility and you risk contaminating with 'bad' microbes, which could hinder fermentation and cause aerobic spoilage (heating)

2. WILTING – QUICKLY ACHIEVE THE RIGHT DRY MATTER

✔ **DO:** Wilt to 28-32% DM to reduce effluent and optimise fermentation

✔ **DO:** Wilt as quickly as possible as it minimises loss of sugar; use mower - conditioners and tedders to speed up wilting, but check machinery is not dragging in soil

3. HARVESTING – USING THE CORRECT CHOP LENGTH

✔ **DO:** Adjust chop length to crop DM – it is vital for good consolidation and fermentation

GRASS DM%	EXAMPLE CHOP LENGTH
>30%	15-25mm*
20-30%	25-50mm
<20%	Up to 100mm

** If being fed as part of a high maize diet, this should be increased to ensure sufficient effective fibre in the diet.*

DURING FERMENTATION, 'GOOD' BACTERIA CONVERT SOME OF THE CROP'S SUGARS INTO ACIDS, WHICH EFFECTIVELY 'PICKLE' THE FORAGE

4. TREATING – MAINTAIN CONTROL OF FERMENTATION

✔ **DO:** Look at additive results; as well as reducing DM losses, a quality bacterial additive can improve ME and D value and boost milk yield (by an average of 1.2 litres/cow/day in the case of *lactobacillus plantarum* MTD/1)

✘ **DON'T:** Leave preservation to chance; you don't know if bacteria populations on grass are sufficient for an effective fermentation; used correctly, a quality additive will supply one million 'good' bacteria per gram of forage

5. CLAMPING – KEEP AIR OUT

✔ **DO:** Consolidate properly, especially the clamp edges; trapped air reduces fermentation quality and increases risk of aerobic spoilage; grass layers 150mm deep are the maximum which can be consolidated effectively

✔ **DO:** Sheet properly to exclude air, using side sheets, an oxygen barrier film and a top sheet, with generous sheet overlaps plus good weighting all over

6. FEEDING – KEEP CLAMPS CLEAN AND TIDY

✔ **DO:** Minimise air ingress at feedout by maintaining a tidy clamp face, moving across it quickly and avoiding cutting the top sheet back too far; however, don't pull the top sheet down over the open face as it encourages aerobic spoilage

✘ **DON'T:** Allow mouldy silage to contaminate the clamp with 'bad' microbes as it reduces quality and intake

Would you like to know more about how Cut to Clamp could help you?
Visit **www.cuttoclamp.com**

New initiative launched to help farmers produce better silage

With nine out of 10 dairy farmers rating better use of grass silage as extremely or very important in their goal to reduce bought-in feed costs, Volac has launched its new Cut to Clamp initiative to help. We explore its first three steps.

A recent Volac survey found about three out of four dairy farmers were extremely or very concerned about future volatility in bought-in feed costs and milk price.

Moreover, 82% were looking to reduce bought-in feed costs.

But despite 90% rating greater use of grass silage as either extremely or very important to help achieve this, the survey revealed some key shortfalls in silage-making techniques.

Volac silage microbiologist Philip Jones says: "This was something we had suspected, because, in general, silage quality does not seem to be improving. However, against a background of unpredictability in milk price and bought-in feed costs, particularly with Brexit, becoming more self-sufficient in what you feed cows makes sound business sense.

Biggest asset

"Not only is this because you are maximising your return on arguably your biggest asset – your land – but also because silage is one of the cheapest ways to feed cows. By making consistently better silage, you can potentially reduce bought-in feed costs and reduce exposure to volatility."

In line with this, Mr Jones says Cut to Clamp divides silaging into six logical steps.

"Silage is produced when beneficial bacteria ferment sugars in grass to lactic acid which 'pickles' it to preserve nutrients.

"During the process, you are looking to maximise the nutritional value of the grass you cut, but also to manage it for the best possible fermentation. This is precisely what Cut to Clamp is about."

Independent silage consultant Dr David Davies says: "Feeding a high quality silage not only increases milk from forage, it can bring other benefits."

1. CUTTING

CUTTING grass at the correct stage is crucial, agree Mr Jones and Dr Davies.

Although it is a challenge, with weather and contractor availability to wrestle with, it is essential to achieve the optimum balance of yield and quality, they point out.

Mr Jones says: "As grass approaches heading, yield increases, but leave cutting too late and protein, digestibility and metabolisable energy decline. The optimum is cutting just before heading."

Dr Davies agrees farmers often delay cutting to boost silage yield. But while this might produce a heavier crop, he says because its nutritional value will be lower, it will not have the same capability to support production of milk.

Extra energy

He says: "If you cut at 11.5 ME and you have 1,000 tonnes of silage, it is the equivalent of 300,000 MJ of energy extra compared to cutting at 10.5 ME. This is approximately equivalent to 60,000 litres of milk.

"Yes, there will be a lower yield, but where you cut later, your losses are actually higher than in a lighter crop. So the yield difference is not as great as farmers think and the quality makes up for this difference.

"Also, a lot of farmers think the lower the cutting height, the higher the yield.

"But if you cut higher, you are leaving the base of the stem in the field which is the part with the lowest digestibility. So again you will improve overall quality by cutting higher."

Mr Jones says cutting too low risks introducing soil micro-organisms, such as clostridia, into silage, increasing the risk of poor fermentation and reducing its feed value, or potentially contaminating with listeria.

2. WILTING

WILTING to increase the percentage of dry matter reduces effluent. It also means silage stabilises at a higher dry matter, so less acid, hence sugar, will be required, as well as inhibiting spoilage bacteria, such as clostridia, says Mr Jones. Wilting grass to 28-32% DM is the target, he says.

Dr Davies says: "The higher the sugar content the better. It is an indicator of good silage practice.

"As soon as you have cut, sugars start declining because they are being used by the plant, because it is still living, and by undesirable bacteria. The aim should be to wilt as quickly as possible to 28-32% DM.

"Too many people wilt for a fixed window, but in good conditions the standard 24 hours could be too long.

"If you cut in the afternoon, sugar content might start off higher because the crop has been photosynthesising for longer that day, but you probably have to wilt for 24 hours.

"Over a 24- to 36-hour period, you can lose 6% of sugar which is huge, whereas if you cut in the morning and achieve a rapid wilt, you could be harvesting by 5pm, so sugar content could turn out to be higher."

To achieve 28-32% DM quickly, Dr Davies recommends silage should be conditioned and spread.

He says: "Mower-conditioners are good at improving wilting speed of grass. However, if you have clover in the sward the conditioner should be left as wide as possible because you can over-condition those crops.

"Some farmers still refuse to spread because they think they are going to get soil contamination, but if you do not spread, you will not hit the target DM."

As a guide, Mr Jones says 1% of moisture is lost per hour of sunlight in bright conditions – greater if using mower-conditioning and tedding – however, tedders and rakes must be adjusted to avoid hitting the ground.

Dr Davies says: "I recommend you check behind the machine that it is not dragging soil in. If it is wet, look for concentric rings where the rake has scraped the soil. If it is dry, you are looking to avoid clouds of dust."

BENEFITS OF BETTER SILAGE

- ✔ One of the most cost-effective ways to feed cows
- ✔ Reduced reliance on bought-in feed
- ✔ Improved returns from one of your farm's main assets: your grass
- ✔ Reassurance of feeding wholesome, home-produced feed
- ✔ 'Hidden' benefits from a more forage-based diet – for example, improved cow health and fertility and lower vet bills

3. HARVESTING

WHEN harvesting, optimum chop length is key, both experts agree, as it has a big impact on consolidation. Mr Jones says: "Fermentation starts once the air in the clamp is used up, so the quicker you can achieve this the better.

"A longer chop makes it more difficult to squeeze air out, particularly with drier crops. However, too short a chop can also cause problems. As well as keeping knives sharp, ensure they are correctly adjusted according to the crop's percentage DM.

"Above 30% DM, chop to 15-25mm to improve consolidation, although if grass silage is being fed as part of a high maize diet, this should be increased to ensure sufficient effective fibre in the diet.

"At 20-30% DM, aim for 25-50mm; if less than 20% DM, you may need to increase up to 100mm to reduce effluent and prevent clamp slippage."

With chop length so critical for optimum clamp density, Dr Davies reckons farmers do not focus on chop length enough.

Also avoid simple mistakes like over-filling trailers, says Dr Davies.

He says: "It may only be 1-2% of grass which falls out, but the 1-2% should be in your clamp."

Six-point plan

1. CUTTING

2. WILTING

3. HARVESTING

4. TREATING

5. CLAMPING

6. FEEDING

Don't miss next month's issue for the second Cut to Clamp article examining treating, clamping and feeding. For more information, visit **www.cuttoclamp.com**

Cut to Clamp
A Volac initiative

New initiative aims for maximum silage nutrients for milk

Continuing our exploration of Volac's new Cut to Clamp initiative, which is aimed at helping producers insulate businesses against milk and feed price volatility by making consistently better silage, we examine the last three steps.

The first three steps of Cut to Clamp – cutting, wilting and harvesting – are all about capturing maximum feed value from grass and preparing it for conservation, says Volac silage microbiologist Philip Jones.

The next three steps – treating, clamping and feeding – are all about ensuring you preserve as much feed value as possible, so it is available for cows in the final ration.

Mr Jones says: "By doing this, you are ensuring you get the best possible return on the huge asset of your home-produced grass and hopefully reduce requirements for bought-in feed."

Independent silage consultant Dr David Davies agrees. He says: "By making high quality silage, more of the animal's nutrient requirements will be fulfilled from silage.

"This will reduce costs of milk production, reduce concentrate input and maintain a healthier rumen, therefore reducing metabolic disease. All in all, it makes profitable milk production far more likely."

4. TREATING

IF you are aiming for high quality silage, there is no question that using a silage additive can help significantly, says Dr Davies.

He says: "Do not think of a silage additive as solving all your management issues. It is there to improve fermentation and quality, but you still need to do your bit.

"There are lots of additives in the industry, so seek independent advice and ask for independent trial results to highlight animal performance benefits. You want to spend on an additive which will improve animal performance."

Philip Jones echoes this. He says: "By applying a proven additive at this stage, you are putting yourself in greater control of the fermentation process.

"To improve fermentation, you want to ensure maximum numbers of beneficial bacteria are present, such as Lactobacillus plantarum, which produce mainly lactic acid from the crop's sugar, so the pH drops rapidly to inhibit growth of undesirable bacteria and moulds.

"Although fresh grass will contain some beneficial bacteria, they tend to be in low numbers and are not the best types for achieving a fast, efficient fermentation.

Beneficial bacteria

"A good inoculant should provide bacterial strains specially selected to be highly efficient at fermentation and can supply as many as one million beneficial bacteria per gram of forage treated when used correctly.

"However, do not just think of a silage additive as preserving forage. While the proven silage additive strain of Lactobacillus plantarum MTD/1 has been shown to preserve dry matter, it also goes much further than that.

"There are trials which show treating with MTD/1 also improves silage metabolisable energy, digestibility, animal dry matter intake and, most importantly, leads to higher milk yield. Across a range of forages, milk yield was improved by an average 1.2 litres/cow/day."

THE IDEAL FERMENTATION PROCESS

Sugars in grass → Converted by beneficial bacteria in air-free conditions → Lactic acid

Brings about a fast, efficient fermentation with minimum dry matter losses, inhibiting undesirable bugs which could spoil the fermentation

5. CLAMPING

THERE are many actions which can improve silage quality in the clamp and at feedout, both experts agree. Mr Jones says: "Begin with a clean clamp and repair any cracks."

Additionally, Dr Davies highlights one of the biggest issues as being silage density. He says: "We are not consolidating enough because trailers are arriving at the clamp too quickly.

"If you trap too much air in the clamp when you ensile grass, you reduce fermentation quality and increase aerobic instability problems at feedout.

"You can only efficiently consolidate the top 15cm. You want to load silage into the clamp in even layers no more than 15cm deep, compact the layer and repeat. I know it is a challenge, but then rolling only once is often enough to achieve a target density of 250kg of DM/cu.metre."

For machinery, Dr Davies advocates consolidation with a compacter rather than a tractor.

He says: "With a full width compacter, you are rolling the whole width of the tractor, not just individual wheel widths.

"Another thing we often see is clamp overfill. As soon as we fill above the walls, silage density drops by 10%. If you go over the top of the walls, you should consider putting that silage into bales."

Mr Jones says farmers should pay particular attention to consolidating clamp edges, which are more difficult to compress.

Once fully consolidated, it is essential the clamp is sealed properly to prevent oxygen ingress during storage, he says.

Dr Davies adds: "For this, I view side sheets as essential. Ideally, use oxygen barrier film for the top and the walls, with a minimum overlap of preferably 1.5m. This will give you a much better seal than standard sheets, although you will still need a standard sheet over the top of the film. Finish off with plenty of weight to maximise the density of the vulnerable top area."

Dr Davies says another key area to get right is the ramp: "Too many farmers cut the silage sheet too short. We should ensure at least 500mm of extra silage sheet at the front with gravel bags all around the edge to seal carbon dioxide in.

"If we allow carbon dioxide to fall out of the clamp, we create a vacuum, which sucks oxygen in.

"Ideally, every grass silage clamp should be sealed for a minimum of two months. During those two months, you reduce the yeast population which initiates aerobic spoilage and heating at feedout."

6. FEEDING

WHEN it comes to feedout, cleanliness is everything, Mr Jones and Dr Davies say.

Dr Davies says: "I like to see a clamp you could eat your dinner off the floor in front of. In particular, mouldy silage in front leads to mould spores contaminating the exposed face, increasing the rate of aerobic spoilage.

"Spoiled silage, whether due to a poor fermentation or aerobic spoilage, will upset rumen fermentation. Do everything you can to avoid producing it. If you have it, discard it.

"Too much of it ends up getting mixed in with the good silage and has a disproportionately large negative effect."

To take silage out of the clamp, Mr Jones urges the use of a shear grab. He says: "This maintains a tidy, tight clamp face, which reduces air ingress, reducing risk of aerobic spoilage causing loss of nutrients, reduced palatability and potentially production of mycotoxins.

"For the same reasons, move across the face quickly to reduce the time silage is exposed, avoid pulling or cutting the top sheet back too far once the clamp is opened and keep the front edge of it weighted down.

"It is important to avoid pulling the sheet down over the clamp face itself during feedout. This is because it creates a microclimate, which encourages yeasts and moulds, increasing risk of spoilage and heating.

"Remember to scrutinise your silage analysis. It will tell you how good a job you did last season and help pinpoint ways this year's silage production can be improved."

Six-point plan

1. CUTTING

2. WILTING

3. HARVESTING

4. TREATING

5. CLAMPING

6. FEEDING

Would you like to know more about how Cut to Clamp could help you? Visit **www.cuttoclamp.com**

On-farm consulta tions offer a route to better silage

With interest in more milk from forage, Volac is offering free consultations to help improve silage-making under its Cut to Clamp initiative.

Aimed at helping producers get more milk from silage, animal nutrition and forage preservation company Volac is offering a number of free consultations to help farmers produce consistently better silage.

Darran Ward, one of Volac's nationwide experts conducting the consultations, says: "There is a huge amount to be gained from making better silage.

Cow health

"Benefits can include spending less on bought-in feeds, improvements in cow health from a more forage-based diet, and the satisfaction of making your business more self-sufficient by feeding more of what you grow.

"The consultations provide practical pointers to improve silage quantity or quality at various stages of the silaging process, including cutting, wilting, treating, harvesting, clamping and even feeding."

In essence, Mr Ward says consultations involve three steps.

1. Silage sample analysed and results interpreted
2. Visual inspection of the clamp
3. Detailed understanding of the silage-making process

He says: "By combining all three elements, a comprehensive picture is built up to unearth areas for improvement."

> "THE CONSULTATIONS PROVIDE PRACTICAL POINTERS FOR IMPROVING SILAGE
> **Darran Ward**

Improvements

BY conducting the consultation, Mr Ward says it is possible to pinpoint areas for improvement for making next season's silage, but it can also provide tips to get more from silage already in the clamp.

He says: "The more milk produced from silage and forage, the better."

1. SILAGE ANALYSIS INTERPRETATION

ALTHOUGH farmers are used to seeing silage analyses, the Cut to Clamp consultation goes further by simplifying results into a summary in two key areas, says Mr Ward.

- Nutrient quality: For a picture of what the animal can take from the silage nutritionally, based on factors such as digestibility, energy content, sugar and crude protein.
- Keeping quality: For a picture of the efficiency of the preservation, based on factors such as fermentation quality and ammonia production, and others.

Nutrient quality

Mr Ward says: "If the silage scored low for digestibility, we would ask about quality of grass to begin with.

"Is more regular reseeding needed? We would look at cutting date, because after heading, digestibility of grass falls by about 0.5%/day.

"Similarly, protein content of grass will decline as the season progresses, giving an indication of plant maturity when cut. Additionally, a breakdown product of protein, ammonia, gives a useful measure of keeping quality."

Keeping quality

Explaining this, Mr Ward says a high ammonia content is an indicator of a poor fermentation, because protein has not been fully preserved.

"We want a high sugar content, as low sugar can be an indicator of a poor fermentation by the wrong type of bacteria. These produce the wrong acids, as well as carbon dioxide, from sugar, which wastes energy.

"We want to produce lactic acid to 'pickle' grass into silage. This uses less sugar and is more efficient. So, as well as pH, we look at proportions of lactic acid to less desirable acids, such as acetic, propionic or butyric.

"Good silage would have five times as much lactic acid as other acids. A bad-scoring silage could have a ratio as low as 1:1."

2. CLAMP INSPECTION

AS well as silage analysis, a lot is gleaned by inspecting the clamp, Mr Ward says.

Tidiness/temperature

"We look at how uniform and tidy silage is in the clamp. An untidy silage face increases chance of air penetrating, resulting in wastage from aerobic spoilage, characterised by heating. We check the temperature at several points with a probe.

"How tidy is the floor? It should be clean right up to the edge of silage to avoid contaminating the face with old silage."

Colour, texture and smell

Visually, Mr Ward says colour will be checked, with olive green an indicator of good grass silage, while brown could mean a poor fermentation.

"We look at the amount of stem and leaf. You want mainly leaf, as stems are less digestible. Excess stem can mean cutting date was too late. You don't want it to smell like vinegar or sickly sweet, but have a nice, clean smell."

Consolidation

To assess consolidation, Mr Ward says straight horizontal lines showing in the layers of silage are a good sign. Wavy lines indicate uneven consolidation.

"The degree of difficulty pushing the temperature probe into the silage also indicates how well it has been consolidated, while the shoulders, which are harder to consolidate, will be visually checked."

Sheeting and sealing

Mr Ward says: "We check whether side sheets have been used, and check how many layers are on the top.

"Many farmers think they do not need side sheets in a concrete clamp, but porous concrete is not as good as plastic for keeping air out.

"Ideally, we would look for an oxygen barrier film on top, with side sheets overlapping as far as possible over the top, then at least one black plastic sheet on top, and the whole thing properly weighted.

"It is important sheets are rolled back from the clamp face once opened to divert rain water from the top of the clamp from penetrating into the face."

3. SILAGE PRODUCTION ASSESSMENT

THE final piece of the jigsaw is to discuss with the farmer how silage is currently produced.

Cutting

Mr Ward says: "Starting with cutting, we review cutting date and height to see if there is anything out of order, and whether a mower-conditioner has been used to help speed up wilting.

"This is because the faster you wilt to the target 28-32% dry matter, the less sugar is used up by the plant continuing to respire."

Wilting

He says: "We review the full wilting process. For example, has a tedder been used? Most moisture is lost through pores in grass leaves, the stomata, which can lose up to 100 litres of water per tonne per hour. But they only stay open for two hours after cutting. Tedding within two hours of cutting gives better quality."

Harvesting

Mr Ward says: "You need to use the right chop length for the stage of cutting and your target percentage DM, so you get the best consolidation in the clamp.

"We consider harvest machinery: was it a rapid forage harvester, or a slower trailed harvester or forage wagon? All these affect how long it takes to get the crop in the clamp."

Treating

Mr Ward says he examines whether the right type of additive has been used: "Some people using a silage additive can suffer heat and mould in silage, but have applied a fermentation-only additive with no effect on aerobic stability. Ensure you use the right product for the correct outcome.

"Often, an additive is used as a type of insurance. But think of it more as proactively managing the preservation process."

Clamping

"We check whether the clamp was filled in thin layers to aid consolidation, and was it rapidly sheeted?"

Feeding

"We look at how silage is fed. For example, are you using a shear grab? Do you roll the top sheet back, rather than leave it hanging? The latter encourages spoilage from yeast and moulds."

For more information on Volac's Cut to Clamp initiative, visit **www.cuttoclamp.com**

Making better multi-cut silage with latest stepwise plan

As grass silage cutting dates edge earlier and more cuts are taken per season, Volac is adding new guidance to its six-step Cut to Clamp silage-making plan for producers taking this approach.

The multi-cut approach of cutting grass for silage younger and taking more cuts in a season is gaining ground.

A recent survey of more than 150 UK dairy farmers by forage preservation and animal nutrition experts Volac, and forage seed experts Germinal, found 60% had already brought their first-cut date earlier in the past three years, and 44% had shortened cutting intervals.

Among those already taking more silage cuts per year, or intending to, 71% said this was to make better quality silage, 68% said it was to make more milk from grass silage, and 65% said it was to reduce bought-in feed costs.

While the system may not suit every farm, it can provide real benefits, agree independent silage consultant Dr David Davies and Volac silage microbiologist Philip Jones, but it is important to follow the correct steps to produce it.

Nutrition

Dr Davies says: "The average dairy farm could improve income by thousands of pounds by making better silage. If you make better silage, you will get better nutrition from it.

"You would not graze high-producing cows on stemmy grass, so why make silage from it? To me, multi-cut grass silage is anything more than three cuts per season."

Apart from the obvious benefit of younger cut grass being more digestible, from being more leafy and less stemmy, and therefore having the potential to provide more metabolisable energy for milk production, Dr Davies says it also offers other advantages.

For a start, protein is likely to be higher, he says, and silage which is more digestible will not spend as long in the rumen, so cows can eat more of it, allowing forage intakes to improve.

Additionally, frequent cutting can give a better total grass yield over the season, he says, while a hidden benefit for milk yield could come from grass being at a more uniform growth stage when cut earlier, resulting in less variability in the clamp and, therefore, in the daily ration.

Mr Jones agrees, saying the latest updates to Cut to Clamp are designed to help producers make the most of these type of benefits.

He says: "Cut to Clamp was launched last year to help producers make consistently better silage.

"Since then, it has become apparent more people are going down the multi-cut route, so we have developed some updates for those preferring this approach."

> "THE AVERAGE DAIRY FARM COULD IMPROVE INCOME BY THOUSANDS OF POUNDS BY MAKING BETTER SILAGE
>
> **Dr David Davies**

1. CUTTING

ONE of the first points to watch if cutting more frequently is to adjust fertiliser policy accordingly, says Dr Davies, whether using bagged fertiliser or slurry.

He says: "If cutting at four- to five-week intervals, regrowth will require less nitrogen fertiliser than if cutting every six or so weeks. Also, slurry should be injected or applied with a trailing shoe. It should not be surface spread."

Another point when it comes to earlier cutting is to ensure your contractor is available, says Mr Jones: "You may be cutting in April rather than mid-May.

"Clearly, if you are taking first-cut earlier, the weather can be wetter, so you need to bear this in mind, although the lower bulk should make wilting easier."

2. WILTING

JUST as with conventional silage, the aim with multi-cut silage should still be to wilt as quickly as possible to a target 28-32% dry matter, say Mr Jones and Dr Davies, ideally cutting in the morning and wilting rapidly so grass can be picked up in the afternoon.

However, because the yield of individual cuts is likely to be lower with more frequent cutting, wilting times can be much shorter, they say.

Dr Davies says: "Because you can wilt quicker, there is less loss in the field from continued respiration of grass. The longer you wilt, the more sugar you lose."

3. HARVESTING

ALTHOUGH high D-value grass from earlier cutting is beneficial, its lower fibre content can make it more prone to slipping in the clamp, says Dr Davies. In response, he says chop length when harvesting may need lengthening compared with more fibrous grass.

Dr Davies says: "If you have a 75 D-value silage at 30% DM, maybe look at a 5cm chop length. Firstly to help hold it in the clamp, but also to help it stay in the rumen a bit longer to get better value from it."

4. TREATING

THERE is an added argument with a multi-cut system that you need a good additive because sugar levels will be lower, says Dr Davies, since sugars accumulate during plant growth.

He says: "Protein will be higher because the plant has assimilated nitrogen into protein, but it has not grown as much, so the protein has not been diluted.

"Higher protein increases buffering, so you need to get the pH down quickly. If you do not have a good silage additive, protein breaks down and you need more acid to counteract this."

Mr Jones agrees, and says without an efficient fermentation to convert sugars into beneficial acid to 'pickle', and therefore preserve the silage, some of its higher nutrient content risks being lost.

He says: "You need a proven additive capable of delivering highly efficient homo-fermentative bacteria. This is what Ecosyl has been developed to do."

5. CLAMPING

DR Davies and Mr Jones agree that a useful practical benefit of cutting grass while it is younger and contains less stem material is easier consolidation in the clamp.

Dr Davies says: "The best equipment for moving silage into the clamp is a push-off buckrake. As you drive up the clamp, it maintains an even layer, making it easier to consistently achieve the correct 15cm layer depth for filling.

"With a consolidator, it can be a single-pass job because grass should contain less stem material. It can also speed up filling of the clamp and help you keep pace with the contractor bringing silage loads."

Multi-cut: Example watch points

- Ensure you do not over-wilt lighter cuts
- Protein could be higher
- Sugar could be lower
- Stronger case for additive to improve fermentation
- May need to feed supplementary fibre
- May need longer chop to avoid clamp slippage

6. FEEDING

ONE of the key points with multi-cut at feeding, says Dr Davies, is to be mindful of the extra protein it can deliver. Also, there is a slight risk there could be higher nitrate content in silage because it is cut sooner.

Dr Davies says: "Protein may be higher than you think. If you feed excess protein, it is shipped out of the animal in urea, which takes energy, and fertility can drop.

"High nitrates in silage and, therefore, in the cow, could be exacerbated if feeding urea-treated cereal."

In response, Dr Davies advises having a wet silage analysis conducted, so protein levels in the ration can be accurately balanced.

Also, although less stem material can help with consolidation, it can mean extra fibre has to be added to the ration with multi-cut silage, says Mr Jones, but fibre is relatively cheap.

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Cut to Clamp

A Volac initiative

Fermentation – the secrets under the covers

Achieving a good fermentation is key to making the best grass silage. But what actually goes on in your clamp?

Are you one of those farmers who sets everything up 'just so' in the clamp, leaving nothing to chance? Or do you load grass in, roll it, sheet it and hope for the best?

Either way, some sort of fermentation is going to happen, says Volac product manager Jackie Bradley.

The issue is that some fermentation types could lose much more of the silage's tonnes of dry matter and nutrient value than others, she adds.

Mrs Bradley says: "Our Cut to Clamp initiative, which was launched two years ago to help farmers, provides a blueprint for each of six key stages of silage-making and utilisation. These are: cutting, wilting, harvesting, treating, clamping and feeding.

"Several stages have an impact on fermentation. By understanding what an ideal fermentation looks like, it is easier to appreciate why certain steps are so important to get right."

Ideal fermentation

Fundamentally, Mrs Bradley says fermentation is a natural process, whereby the crop's own sugars – glucose or fructose – are converted to acid, which 'pickles' the forage to preserve it. However, in some types of fermentation, other less desirable by-products are also produced.

"In an ideal fermentation, sugar is converted only to lactic acid," she says.

"This is ideal because lactic acid is a beneficially strong acid. This means it produces a rapid 'pickling' effect, through a rapid pH fall. So the growth of undesirable micro-organisms, which would otherwise 'feed' on silage, is quickly stopped."

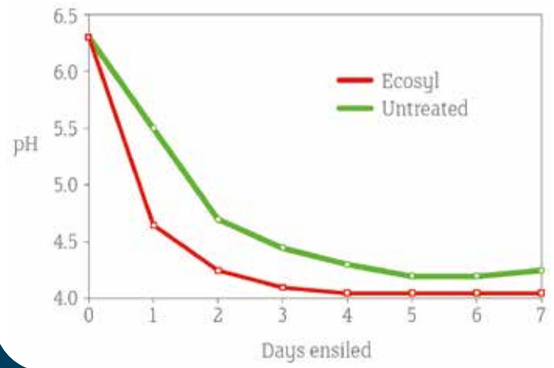
However, there is another advantage in this type of fermentation, she adds.

"Because only lactic acid is produced, with no undesirable by-products, there is very little loss of energy during this conversion process. It is only about 0.7% less than in the original sugar.

"This type of fermentation is termed 'homo-fermentative' because there is only one end product: lactic acid.

"This type of fermentation is favoured when a proven silage additive delivering high numbers of efficient lactic acid-producing bacteria is used," she says.

Graph 1: Speed of pH fall in untreated and treated silage



> "A GOOD FERMENTATION SHOULD RESULT IN A HIGH RATIO OF LACTIC ACID TO OTHER ACIDS
> **Jackie Bradley**

Poor fermentation

In contrast to this, Mrs Bradley says a poor fermentation occurs when less efficient lactic acid-producing bacteria, or other even less desirable bacteria, such as enterobacteria contained in slurry, are present and allowed to convert sugars in grass.

She says: "The problem with these bacteria is they produce a mixture of different end products, besides lactic acid. These can include acetic acid, which is vinegar, and ethanol.

"This type of fermentation is termed 'hetero-fermentative'. It is less desirable because acetic acid is a relatively weak acid, which means the pickling process is slower, so any undesirable microbes present can feed on silage for longer, using up more of its nutrients.

"In addition, ethanol is not an acid at all, so it does not help.

"To make matters worse, carbon dioxide is also produced in this process. Since carbon dioxide comes from the breakdown of sugar in grass, it wastes the energy contained in the original sugar and depletes dry matter."

A particularly poor fermentation occurs when clostridia bacteria are introduced from soil. These convert good lactic acid into less desirable butyric acid, wasting about 18% of the original energy in the process, as well as resulting in unpalatable silage, she adds.

Ideal fermentation process for producing beneficial lactic acid and preserving the energy content of the original sugar

Type of fermentation	Food source	End Product	Energy loss
Homo-fermentative	Glucose/Fructose	Lactic acid	0.7%

Other types of fermentation processes

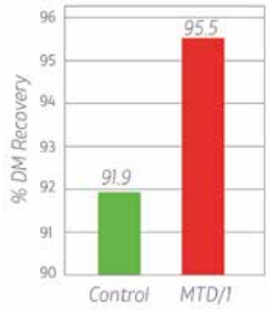
Type of fermentation	Food source	End Product	Energy loss
Hetero-fermentative	Fructose	Lactic & Acetic acid	1%
Hetero-fermentative	Glucose	Lactic acid & Ethanol	1.7%
Entero-bacterial	Glucose	Acetic acid & Ethanol	16.6%
Clostridial	Lactic acid	Butyric acid	18.4%

Good clamp management will help fermentation.

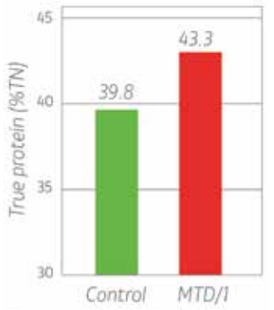
Natural vs. treated

Because fresh grass naturally contains a mixture of good and bad bacteria, if it is left to ferment naturally, it is possible for all these types of fermentation to happen, Mrs Bradley explains.

Graph 2: Improved DM recovery in treated silage



Graph 3: Increased true protein preservation



Note: MTD/1 = Lactobacillus plantarum MTD/1 (the bacterial strain in Ecosyl additive)

She says: "Although some beneficial bacteria will be present, they may be in low numbers and not necessarily the most efficient types.

"Avoiding slurry and soil contamination of grass will reduce the undesirable bacteria. Also, maximising the sugar available in grass – for example by cutting at the optimum growth stage and achieving a rapid wilt – will help fermentation quality.

"Similarly, wilting to the correct dry matter and exclusion of air from the clamp, by combining the optimum chop length with good consolidation and effective sealing, will also help.

"This is because an efficient fermentation only starts once air in the clamp has been used up."

"However, an integral part of Cut to Clamp is the use of a proven additive. This can introduce as many as a million beneficial bacteria per gram of forage treated when used correctly to dominate the fermentation in favour of maximising lactic acid production.

"Research clearly shows how much quicker the pH falls when a proven additive is used, and how much more of the silage's dry matter is retained *[see graphs 1 and 2]*.

"A good fermentation should result in a high ratio of lactic acid to other acids," she adds.

PRESERVING PROTEIN

AS soon as grass is cut, its protein starts to be broken down, explains Mrs Bradley, initially by enzymes in the plant itself, but then also by undesirable micro-organisms present.

This results in a loss of true protein, she adds.

"As well as helping in other ways, a rapid fermentation to a stable pH will also quickly inhibit the plant enzymes and micro-organisms that cause protein breakdown *[see graph 3]*.

"Another problem after cutting is that sugars are used up in the grass by the plant continuing to respire and by the respiration of micro-organisms.

"Rapid wilting, together with effective consolidation and sheeting to remove and seal out air, and a proven additive, will also reduce these respiration losses.

"Ultimately, producing and feeding better silage will benefit the cow. Compelling results from 15 trials on a range of forages showed that feeding silage treated with Lactobacillus plantarum MTD/1, which is the beneficial bacterial strain in Ecosyl, gave an average milk yield increase of 1.2 litres/cow/day."

For more information on Volac's Cut to Clamp initiative, visit **cuttoclamp.com**

Cut to Clamp

A Volac initiative

‘Growing’ more milk from silage

Want more milk from home-grown feed? Then maximising energy in your grass and ‘locking-in’ as much as possible when you turn it into silage are key steps. New research points the way.

A key foundation for milk production is the amount of metabolisable energy (ME) available to the cow, says Volac silage scientist Philip Jones.

There is a relationship which says it takes about 5.3MJ of ME for her to produce one litre of milk.

And if you want to insulate your business against volatile feed prices, providing as much of this ME as possible from home-produced forage and silage is a ‘no brainer’, Mr Jones says.

“Here in the UK we are blessed with being able to grow good grass, so it makes sense to make the most of this asset.

“An interesting way to view this is the amount of ME you can make available from your grass per hectare.

“We know that new leys are more productive than old ones, but in addition to growing nutritious grass, with silage generally fed for half the year, it is also important to ‘lock-in’ as much of this nutritional value as possible when turning it into silage.”

Improving silage

Achieving this is a multi-stage process, says Mr Jones, which is what the Cut to Clamp educational resource is all about *(see ‘Better silage’ panel).*

However, two particular steps attracting increased interest for improving silage are cutting grass at the optimum growth stage and including a proven additive as an integral part of the conservation.

Elaborating on these, Mr Jones says if cutting is delayed until after heading, the digestibility of grass, which determines its ME, falls by 0.5% per day.

Similarly, animal feeding trials have shown conserving silage with Ecosyl additive has significantly improved ME, from 10.6 to 11.2MJ/kg dry matter (DM). Indeed, further research showed feeding silage preserved with Ecosyl also led to cows producing an extra 1.2 litres of milk/cow/day.

Now, this latest Volac research has taken this a step further by focusing on the progressive technique of cutting grass younger and taking more cuts per season using a multi-cut system, as well as on conserving this potentially high quality forage.

Mr Jones says: “Theoretically, we know that multi-cut silage should offer several nutritional advantages. As well as being higher in protein, younger grass should also be more digestible, therefore naturally higher in ME.

“Accordingly, this latest two-year research project, which was conducted in a real farm situation, examined these quality parameters. By measuring yield, we were then also able to derive a figure for how much extra ME/ha the multi-cut system could potentially deliver.”

Pointing to the findings, Mr Jones says fresh grass from the five-cut, multi-cut system was clearly of higher nutritional quality than from the more conventional three-cut approach.

Average digestibility from the multi-cut was three D units higher, at 72.7 compared to 69.7, which equated to it delivering an extra 0.5MJ/kg of ME. In addition, crude protein content was also almost 3% higher, at 16.7% versus 13.9%.

Mr Jones says: “When overall yield was measured, we found five cuts also delivered an extra 0.92 tonnes/ha of DM in total, with a DM yield of 16.92t/ha.

“When this extra 0.92t/ha of DM was multiplied by its higher energy content, this was equivalent to it providing an extra 18,582MJ/ha of energy over the season *[see Figure 1].*

“If it takes 5.3MJ of energy to produce one litre of milk, this means the multi-cut had the potential to deliver an additional 3,506 litres/ha.

“Even after subtracting the extra contractor costs, if you take milk at 25ppl, this would still leave you about £333/ha better off.”

As well as demonstrating extra energy potential of the fresh multi-cut grass, new research also shed light on improving its preservation, says Mr Jones.

Buffering fermentation

While the higher protein content of multi-cut is a benefit, nutritionally it can also contribute to buffering of the fermentation. In addition, shorter intervals between cuts means less time for slurry to dissipate before the next cut is taken, which increases the risk of slurry bacteria in the silage.

The combination of high buffering and the action of slurry bacteria can lead to DM losses.

Mr Jones says: “With these challenges in mind, a further part of the research examined how these might be mitigated, by comparing how the fermentation proceeded in multi-cut samples without an additive, compared to where Ecosyl was used.

“Results showed that not only was the fermentation slow without the additive, with pH levels never reaching those achieved in the treated silage even 90 days after ensiling *[Figure 2]*, there was also a big increase in enterobacteria numbers, the bad bacteria often associated with slurry, where no additive was used *[see Figure 3].*

“Ultimately, nearly 10% of the DM was lost across all cuts of the untreated silage, and there was evidence of protein being broken down *[see Figure 4].*

“Where Ecosyl was used, not only was fermentation faster, with the pH falling rapidly *[see Figure 2],* which is key for inhibiting bad bacteria, but enterobacteria numbers were between 100 and 100,000 times lower *[see Figure 3],* and the average DM loss was almost halved *[see Figure 4].* There was also evidence of better preservation of protein.

Summary

“In summary, it was clear multi-cut grass offers the potential to ‘grow more milk’ by providing a higher output of ME/ha, but it does need conserving properly, and treating with Ecosyl certainly helped to achieve that.”

> “MULTI-CUT GRASS OFFERS THE POTENTIAL TO ‘GROW MORE MILK’
> **Philip Jones**

For more information on Volac’s Cut to Clamp initiative, visit **cuttoclamp.com**

BETTER SILAGE

Cut to Clamp: a SIX-stage blueprint for better silage:

- Cutting
- Wilting
- Harvesting
- Treating
- Clamping
- Feeding

Figure 1: Higher energy yield per hectare in multi-cut compared to conventionally cut grass *(Source: Volac two-year research project)*

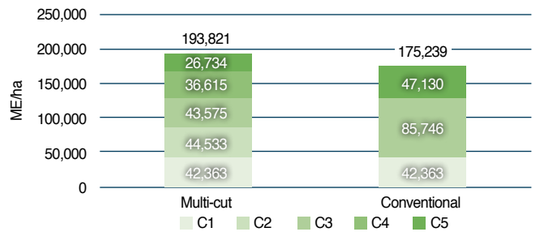


Figure 2: Faster pH fall in multi-cut silage treated with Ecosyl compared with untreated *(Source: Volac two-year research project, second of four cuts as an example)*

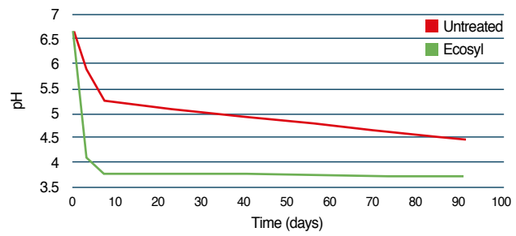


Figure 3: Lower numbers of enterobacteria in multi-cut silage treated with Ecosyl compared with untreated *(Source: Volac two-year research project, second of four cuts as an example)*

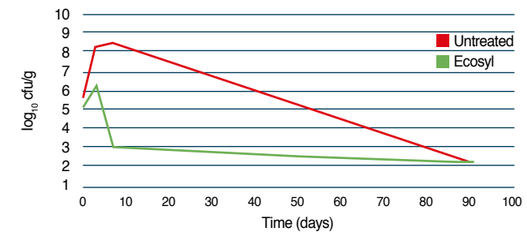
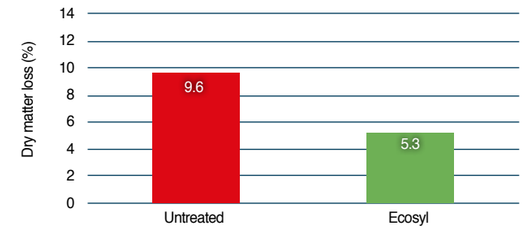


Figure 4: Reduced dry matter loss in multi-cut silage treated with Ecosyl compared with untreated *(Source: Volac two-year research project, average of four cuts)*



Cut to Clamp

A Volac initiative

Serious about making more milk from forage? If you still have last season's silage analysis reports, they offer a goldmine of tips for making better silage.

Understand your analysis for secrets to better silage

Ken Stroud (inset) says there is a trick to knowing how to interpret your silage analysis.

Imagine having a handy list of areas where silage-making could be improved – would you use it?

Or would you continue making silage as you always have, knowing your list was sitting unused on a shelf?

There is a list: your silage analysis. The trick is knowing how to interpret it.

Volac business manager Ken Stroud says: "A grass silage analysis does not just provide the basis for ration formulation. It is also packed with clues for potential silage improvements.

"Usually, the main figures looked at on the analysis relate to nutritional quality: metabolise energy [ME], digestibility [D value], protein and % dry matter [DM].

"These are important, but only half the story. Other figures indicate how efficient the fermentation has been, how well protein has been preserved and whether there has been soil contamination.

"This is all valuable information. Even if silage looks reasonably nutritious, if the fermentation process which has preserved it has not been efficient, it means the silage could have been even better.

"If the fermentation was particularly poor and silage has become unpalatable, no matter how good it is nutritionally, if cows will not eat it, that is a huge waste."

Knowing the root cause of these issues provides your 'to do' list for making better silage, Mr Stroud says. He suggests scrutinising the following:

CUT TO CLAMP

A SIX-stage blueprint for better silage:

- Cutting
- Wilting
- Harvesting
- Treating
- Clamping
- Feeding

Lactic acid and volatile fatty acids (VFAs)

Use lactic acid and VFAs to assess fermentation efficiency, says Mr Stroud.

He says: "In an efficient fermentation, beneficial bacteria convert sugar in grass into lactic acid and nothing else. This is efficient because lactic acid is very good at preserving silage, but also because the process of converting sugar only to lactic acid wastes very little energy from grass.

"In a poor fermentation, undesirable bacteria convert sugar not only into lactic acid but also into a range of other, less efficient, VFAs and other wasteful by-products, such as carbon dioxide.

"Carbon dioxide is wasted DM, while excess VFAs are unwanted because they are weaker at preserving silage and silages with high VFAs are less palatable.

"Ideally, you want a high ratio of lactic acid to VFAs. A good target is 3:1, but higher if possible, such as 5:1."

To achieve this, Mr Stroud says a proven additive, such as Ecosyl, can be a huge help.

He says: "Ecosyl applies one million beneficial lactic acid-producing bacteria per gram of forage treated. But more than this, the bacterial strain it contains, Lactobacillus plantarum MTD/1, is highly efficient at driving the fermentation to being dominated by lactic acid, rather than these by-products.

"Where fermentations are carried out without an additive, natural lactic acid bacteria populations can be much less efficient. Even worse, if 'bad' bacteria from soil or slurry are present, fermentations can be extremely poor.

"The silage's ash figure helps gauge soil contamination. To minimise slurry bacteria, if slurry must be applied between cuts, apply as soon as possible onto clean stubble and ahead of regrowth. This will maximise sunlight reaching the undesirable bacteria to help kill them off, and allow the fresh grass to grow above the slurry. Slurry bacteria can result in poor silage palatability and big DM losses."

Ash content

An ash figure above 9% indicates a problem with soil contamination, says Mr Stroud.

Minimise this by rolling fields and checking soil is not being introduced into silage by machinery, for example by rakes and tedders set too low.

Energy value: ME and D value

ME, the amount of energy available to the cow, is a nutritional measure and is linked to the D value, since the more digestible the silage, the more energy she can derive from it.

But it also gives an indication of how good the preservation has been, says Mr Stroud, since undesirable microbes will feed on the most digestible part of the silage first.

Mr Stroud says: "Aim for at least 11 ME and 70 D value or above for milking cows. As well as preserving more energy through better fermentation, for example Ecosyl has been shown to boost ME by 0.6MJ/kg DM, reseeding also helps.

"Younger leys tend to be higher in energy. Also, cut before heading.

"After heading, grass digestibility falls by about 0.5%/day."

Sugar

As with ME, a low silage sugar content can indicate an inefficient fermentation or it can be due to low sugar in the grass.

Mr Stroud says: "Generally, the higher the sugar content the better. Aim for above 3%. Wilting concentrates sugars, but it is important to wilt rapidly to minimise the time the crop continues respiring for and using up sugars before it is ensiled."

Crude protein (CP)

CP is the total nitrogen in the plant, which consists of the nitrogen in actual (true) protein the animal can use, plus nitrogen fertiliser that the grass had absorbed but not yet converted into useable protein.

Too high a protein content is not necessarily good, because it buffers the fermentation.

Mr Stroud says: "A good figure is 16-18% protein; higher often indicates residual fertiliser still in the crop.

"Low protein may be a sign the grass was cut too late, since younger grass tends to be higher in protein, or possibly that fertiliser dose was too low. But it can also mean grass was wilted for too long, because until it is stable in the clamp, enzymes in grass will break protein down.

"Since nitrogen fertiliser is not applied to clover swards, they can analyse low for CP but still perform well."

Ammonia

In conjunction with CP, look at ammonia content, says Mr Stroud.

It gives an indication of protein breakdown, although it can also be produced from excess nitrogen.

Mr Stroud says: "The lower the ammonia content, the less protein has been broken down, or the less bagged fertiliser is still present as residual nitrogen in the crop. Ammonia should be below nine.

"Wilting rapidly, ensiling promptly and achieving an efficient fermentation will all preserve protein. Also, make sure you optimise nitrogen inputs so the grass has chance to fully utilise what is applied."

DM percentage

Mr Stroud says: "If silage is too wet or too dry, cows struggle to eat enough of it, which is not wanted with high-yielding cows.

"The ideal target is 28-32% DM. This helps minimise effluent risk.

"Any drier and there is increased risk of losses from silage heating [aerobic spoilage].

"To make it easier to reach this DM quickly, cut at the correct growth stage, because lighter, leafier grass is easier to wilt, and assess whether increased tedding may be required."

Acidity

The more moisture the silage contains, the more acidic (lower pH) it will tend to be, which increases the acid load on the cow. Mr Stroud says: "The ideal pH will depend on the percentage of DM, since drier silages need less acidity to make them stable. For silage at 30% DM, aim for a pH of 4. Wilting to the optimum 28-32% DM helps to avoid excess acid loading."

Intake potential

Intake potential is a combination of several factors, including percentage of DM, pH, fermentation quality, chop length, with shorter chop lengths increasing intake potential, and D value, since more digestible silages travel through the cow faster.

Mr Stroud says: "Aim to optimise each of these parameters because a higher intake potential is important for maximising milk from silage. The ideal intake potential is above 100%."

For more information on Volac's Cut to Clamp initiative, visit **cuttoclamp.com**

Cut to Clamp

A Volac initiative

Grassland society hears tips for extra tonnes of quality silage

Good silage will be key to making the most of good milk prices in the face of high fertiliser and feed costs.

The aim of the event was to help farmers produce quality silage and do so efficiently.

David Merrett

Peter Smith

Preserving more energy and protein is all about good fermentation.

The message from Volac silage specialist Peter Smith, at a clamp talk for farmers in the Gloucestershire Grassland Society, was that good silage will be vital to making the most of good milk prices in the coming season.

David Merrett, the society's chair, explained that as an independent organisation, the society aimed to help producers make better use of forage and utilise grassland for both profitability and environmental sustainability.

The aim of the event was to help farmers produce quality silage and do so efficiently, to improve business resilience against volatile costs.

Mr Merrett said: "Looking at fertiliser costs, it has never been more important to make good silage and make this with the least amount of fertiliser."

Giving pointers on how to capture maximum nutrient value in grass silage, Mr Smith said in an untreated clamp that even the best silage can lose 10% of its dry matter (DM).

However, 'bad' bacteria do not just consume fibre in silage, they feed on sugars and proteins. So in nutritional terms, losses are greater.

Nutrient preservation

Mr Smith said: "To minimise clamp losses, one of the first things to focus on is ensiling at the optimum % of DM. Wetter silages require a bigger fermentation, which uses up more energy from the grass to get to a stable pH.

"Ensiling at 30% DM is ideal, not only for reducing these losses but also for reducing heating and for aiding silage intake by the cow."

In terms of silage metabolisable energy (ME), he said the ideal is 11-11.5 ME or above for dairy diets. If first-cut ME is lower than expected, it is often a sign of late cutting or might be because the sward contained a lot of carryover grass from winter rather than fresh growth.

Protein is also important and the level at harvest would depend largely on the type of grasses and on nitrogen (N) fertiliser usage, said Mr Smith, with protein levels falling as the crop ran out of N.

Mr Smith said: "As an indicator of protein preservation, scrutinise the ammonia levels on your silage analysis. Ammonia comes from protein breakdown. The lower the ammonia, the more efficient the fermentation has been and the more of the protein that was originally in the grass that will still be present.

"Preserving more energy and protein is all about good fermentation. And a good measure of the efficiency of a fermentation is the ratio of lactic acid to volatile fatty acids [VFAs].

"VFAs are often the result of less desirable fermentations. So you want a ratio of beneficial lactic acid to weaker VFAs of at least 3:1.

"In a good fermentation, in which sugar in grass is converted by 'good' bacteria only into lactic acid, there is no loss of DM and virtually no loss of energy in this process.

"But if enterobacteria from slurry contamination ferment these sugars, 40% of the DM and 17% of the energy are lost, and if clostridial bacteria from soil contamination are involved, 50% of the DM and 18% of the energy go to waste.

"To improve fermentation, trials show that treating with Ecosyl produces a much faster pH fall, which inhibits 'bad' bacteria. It has also halved DM loss and improved digestibility and true protein preservation."

Earlier cuts

Discussing other ways to improve silage in the face of high costs and strong milk prices, Mr Smith urged growers to consider cutting grass younger.

He said: "If you want quality silage you need young grass. Do not cut by calendar date. As we approach the longest day of the year, the lignin in grass increases, but cows cannot digest lignin.

"Plus, seasons are less settled nowadays. So if there is a weather opportunity to cut early, you could be better off taking it rather than waiting and risking poorer weather and a poorer crop.

"After heavier grass crops, regrowth will also be slower and another topical reason for cutting younger and taking more cuts is to allow more opportunities to apply slurry. This will be useful if applying less bagged fertiliser this year.

"To reduce slurry bacteria risks, applying slurry to the stubble as soon as possible after harvest allows more time for it to dissipate into the soil, whereas delaying application allows regeneration of the stubble, which can provide a micro-climate for bad bugs to thrive."

Another reason to cut earlier, said Mr Smith, is that if less N is applied, grass could head earlier due to nutritional stress.

He said: "Do not be scared to cut earlier and more often. In Volac trial work, grass from a five-cut system had an average digestibility three D units higher than grass from a three-cut system and was almost 3% higher in crude protein. Over the season, the five-cut approach also yielded 0.92 tonnes/hectare more DM.

"If you normally cut every six or seven weeks, consider cutting a week earlier if the weather permits and the N has been used up. Having higher quality silage puts you in a better position to capitalise on good milk prices. Another benefit is lighter cuts are faster to wilt."

Wilting speed

Whenever grass is cut, Mr Smith said rapid wilting is key. After cutting, bacteria have free access to sugars once inside the grass, so increase in numbers. Also, cut grass uses sugar by continuing to respire.

Faster wilting reduces these losses and means fewer bad bacteria spoiling the fermentation. This is why it is important to cut at the correct time of day and ted promptly. Grass wilts fastest during the first two hours after cutting, he added.

Mr Smith said: "In our trial work on a light, multi-cut crop on a warm and dry July day, cutting at 10am and tedding immediately resulted in grass reaching 30% DM in just four-and-a-half hours. This compared with seven hours to reach 30% DM if grass was not tedded until five hours after cutting or 24 hours if grass was left in rows.

"In real life, we have to deal with the weather. But the quicker grass can be wilted, clamped and fermented, the less sugar and protein which will be lost."

The other question farmers ask, said Mr Smith, is whether to treat with an additive. Without an additive, he said the preservation of silage DM and nutrients was much more open to chance.

"There will be bacteria naturally present on the grass, but you do not know if they are good or bad ones, or how many.

"A proven additive outcompetes bad bacteria, putting you in better control of the fermentation, to the extent that feeding a range of silage crops made with Ecosyl has been shown to deliver an average of an extra 1.2 litres of milk/cow/day."

TOPICAL TIPS

- Consider cutting grass younger for multiple benefits
- Mitigate slurry risks; especially if applying more slurry or cutting more often
- Wilt rapidly to 30% dry matter to retain more sugar and protein
- Learn from previous silage analyses – for example, lactic acid to VFA ratio – to gauge whether preservation can be improved
- Utilise the benefits of a proven additive as Ecosyl can add 1.2 litres of milk/cow/day

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Cut to Clamp

A Volac initiative

Silage lessons from last year

Last season's heatwave provided some big lessons for making grass silage. So what can we learn from 2022?

Volac's silage experts around the UK agree that if you were fortunate enough to escape last season relatively unscathed, there were still key lessons.

If someone had told you at the start of 2022 that by summer you would be staring at a grass silage shortfall due to drought, would you have approached earlier silage cuts any differently?

Not all parts of the country experienced drought, but even if you were fortunate enough to escape relatively unscathed, there were still key lessons, Volac's silage experts around the UK agree.

Peter Smith, who operates throughout Wales and parts of the English Midlands, says: "The major grass silage lesson that 2022 underlined for me was that a multi-cut approach can bring big advantages.

"The term multi-cut can put some farmers off, but it does not necessarily mean cutting six times a season. It might simply mean taking four cuts rather than three.

"The important point is to take that first cut earlier. For example, in April rather than late May, when there is an increased risk of grass going to head.

"For a number of years we have seen that farmers with the best silage have tended to cut earlier and more often.

"Last season underlined this because the drought triggered a stress response in grass which caused it to head prematurely, so there was little extra growth after that point and quality was lost. Producers who cut earlier avoided this."

Fresh regrowth

By taking first-cut earlier, Peter says it clears out over-wintered grass to encourage fresh regrowth for a better second cut, plus it means some silage is safely 'banked'.

He says: "A survey we conducted among more than 700 UK dairy farmers at the end of last year showed almost half (45%) of those making multi-cut had already taken two cuts by the end of May, compared with only 17% in the conventional group.

"And nearly twice as many multi-cut makers as conventional silage-makers felt their silage quality was actually better than normal in 2022 – at 20% versus 12%."

Overall, Peter says grass silage yields were 5-10% down in his area, but harder hit were the southern counties of England, where Volac silage expert Ken Stroud says they were 10-15% down.

Ken agrees that 2022 underlined the benefit of a multi-cut approach.

Ken says: "Although the summer drought hit grass growth particularly hard in southern England, in spring we actually had good growing conditions, so initially there was plenty of grass.

"While some farms used this as an opportunity for an early first-cut, those who waited until later started to run into problems with crops producing excess bulk.

"This had two consequences. Firstly, bulky crops took longer to wilt and we know that longer wilting leads to higher in-field losses in sugars and proteins.

"Secondly, they contained a lot of dead grass in the sward base and dead grass is prone to yeast and mould growth, leading to problems with silage heating.

"Those who took the opportunity for an early first-cut produced some superb second cuts of up to 12.25MJ/kg dry matter [DM] of metabolisable energy [ME], while poorer crops were down at about 10.3 ME."

Silage stocks

Another negative legacy of seasons like 2022 when silage yields are down, says Ken, is if spring grass growth for turnout the following year is slow, because there will be limited silage stocks for buffer feeding.

He says: "Sometimes, it can be difficult for farmers to grasp the benefit of multi-cut because they focus on the cost of additional cuts. But it is important to see the bigger picture.

"From our own trial work, cutting grass five times actually yielded more DM over the season and produced grass on average three D units higher in digestibility and almost 3% higher in crude protein.

"Extra cuts may cost a bit more, but having extra silage in stock can be a life saver, and producing better quality silage is the foundation for more milk from forage. If you look after it, well-conserved silage can last in the clamp for years."

Northern England

In northern England, Jason Short reports a more mixed 2022 silage season, with some locations experiencing a favourable summer with good grass growth while others were hit by drought.

Overall, Jason says northern England grass silage yields were down 5-10%. He says forage maize did not come to the rescue because maize yields were as much as 20-40% down.

Jason says: "Years like 2022, when grass quality and quantity are down, underline the importance of not letting any more slip away in the clamp or bale.

"This comes down to good harvest practice and good clamp management, but also down to correct additive choice so fermentation is not simply left to chance.

"Research on the additive Ecosyl has shown it to halve DM losses, which means more DM is available to feed.

"In other work, Ecosyl treatment has also been shown to boost average ME by 0.6 MJ/kg DM, to improve digestibility by three D units and to preserve more true protein.

"In independent dairy trials, feeding a range of silages preserved with Ecosyl also boosted milk yield by an average of 1.2 litres per cow per day. Sometimes farmers think protecting silage with an additive is expensive. But what is actually expensive is losing DM or quality after you have gone to the expense of making silage, then having that poorer silage impact on milk from forage."

Scottish silage

Volac business manager in Scotland, Alan Smith, says there was no drought in Scotland in 2022.

Indeed, it was one of the best years he can remember for grass growth, with second and third cuts producing good yields and quality. But there were issues with some first cuts – which, once again, those cutting early managed to avoid.

Alan says: "Some farmers took first cuts early, but then we had one to two weeks of poor weather and, by the time others got to first cuts, grass crops were heavier and of poorer quality, which was not ideal for dairy diets.

"Other than that, just because we had generally kind weather for making silage in Scotland in 2022, we cannot assume the same will happen this year.

"To preserve silage with a quality fermentation, use a joined-up approach combining good in-field and harvest management, good ensiling practices and a proven additive.

"By investing in producing good silage, it puts farms in a stronger position. Not only is home-produced silage a financially attractive feed, it is also highly sustainable."

SILAGE-MAKING LESSONS FOR 2023

- Consider taking first cut earlier for less risk of quality losses due to heading, less risk of bulky crops and potentially better contractor availability
- Consider more cuts over the season; this is shown to produce better grass quality and higher overall DM yield
- Get wilting technique right; trials have shown that tedding immediately after cutting dramatically reduces wilting time. Lighter crops are also easier to wilt
- Use a proven additive to improve fermentation; Ecosyl has been shown to produce a rapid pH fall and inhibit 'bad' bacteria; it has also halved DM loss, preserved more ME and true protein and improved milk yield from silage

CHECK OUT THE CAMPAIGN FOR BETTER SILAGE

- As well as its Cut to Clamp initiative, Volac is proud to be one of the sponsors of *Dairy Farmer's* Campaign for Better Silage. See page 45 or visit FGinsight.com/bettersilage

For more information on Volac's Cut to Clamp initiative, visit **cuttoclamp.com**

The Ecosyl range of silage additives

Developed over a period of 30 years, the range is based on the high performance *Lactobacillus plantarum* strain MTD/1.

ECOSYL 100

Silage additive for clamped grass and legumes

MTD/1

Features and benefits:

- Contains *Lactobacillus plantarum* strain MTD/1.
  This strain has more independent proof behind it than any other, especially for improved animal performance.
- Guaranteed to apply 1 million MTD/1 bacteria per gram forage.
  For faster domination of the fermentation, especially in difficult situations.
- All of the bacteria are active immediately.
  No delay in starting fermentation – no need for 'helper' strains.
- Faster, more efficient fermentation.
  Inhibits undesirable microorganisms faster and reduces protein breakdown. More palatable and nutritious with lower DM losses.
- Versatile liquid application.
  Standard or low volume.

- One pack treats 100t
- Variable liquid application – from 20 ml (ULV) to 2 l/t
- 48 hour tank mix life (ULV up to 12 days if refrigerated)
- Dry application 200 g/t
- 24 month shelf life in a cool, dry place
- GMO free, suitable for organic use

DA Ecostable™

Silage additive for clamped grass and legumes at risk of aerobic spoilage

MTD/1

Double Action

Features and benefits:

- Applies 1 million MTD/1 bacteria per gram forage.
  Dominates the fermentation quickly.
- Faster, more efficient fermentation.
  Inhibits undesirable microorganisms faster and reduces protein breakdown. More palatable and nutritious with lower DM losses.
- Applies potassium sorbate.
  Inhibits yeasts and moulds that cause aerobic spoilage.
- Reduced aerobic spoilage.
  Delayed and less extensive heating for reduced DM losses and a more palatable, more nutritious silage with less risk of mycotoxins.

- 1 pack treats 50 t
- Liquid application – 2 l/t
- 48 hour tank mix life
- Dry application – 500 g/t
- 30 month shelf life in a cool, dry place
- GMO free

DA Ecobale™

Silage additive for bales

MTD/1

Double Action

Features and benefits:

- Applies 1 million bacteria per gram forage of a 1:1 mixture of *Lactobacillus plantarum* strain MTD/1 and a specially selected strain of *Pediococcus pentosaceus*.
  Dominate the fermentation quickly.
- Faster, more efficient fermentation.
  Inhibits undesirable microorganisms faster and reduces protein breakdown. More palatable and nutritious with lower DM losses.
- More consistent fermentation.
  Less bale variability so more consistent rations. Ideal for fussy feeders such as horses.
- Applies potassium sorbate.
  Inhibits the yeasts and moulds that cause aerobic spoilage.
- Reduced aerobic spoilage.
  Delayed and less extensive heating for reduced DM losses and a more palatable, more nutritious silage. Less risk of moulds and respiratory problems with horse haylage.
- Less risk of mycotoxins and listeria
  Healthier cattle and sheep

- 1 can treats 16t
- Liquid application only – 3 l/t
- 48 hour tank mix life
- 24 months shelf life in a cool, dry place
- GMO free

Ecocool™

Silage additive for forages at risk of aerobic spoilage e.g. high DM grass, maize & wholecrop cereals

MTD/1 PJB/1

Features and benefits:

- *Lactobacillus plantarum* strain MTD/1 for a faster, more efficient fermentation.
  Inhibits undesirable microorganisms faster and reduces protein breakdown. More palatable and nutritious with lower DM losses.
- *Lactobacillus buchneri* strain PJB/1.
  Converts lactic acid to acetic acid which inhibits the yeasts and moulds that cause aerobic spoilage.
- Reduced aerobic spoilage.
  Delayed and less extensive heating for reduced DM losses and a more palatable, more nutritious silage with less risk of mycotoxins.
- Versatile liquid application.
  Standard or low volume.

- One bottle treats 100t
- Liquid application only – variable from 20 ml to 2 l/t
- 48 hour tank mix life
- 24 month shelf life in a cool, dry place
- GMO free, suitable for organic use

Cut to Clamp

A Volac initiative

www.cuttoclamp.com

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Brought to you by Volac, producers of Ecosyl

For more details: **Freephone 0800 919808 (UK)**
or 00800 86522522 (Ireland)

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