Growing maize for silage?

Cut to Clamp

A **Volac** initiative

Growing maize for silage?

Read our handy Cut to Clamp guide to help you get the most from this valuable forage.

1 Planning

The high energy and starch content of forage maize make it a highly valuable silage. But it's also one of your riskiest forages in terms of preserving it.

With its two opponents knocking on the door of: (1) aerobic spoilage (heating) caused by yeasts and moulds in the presence of air; and (2) risks to fermentation, especially when making greener, moister maize silage – it only takes one slip of management to significantly reduce its feed quality, or the tonnes of dry matter (DM) in your clamp.

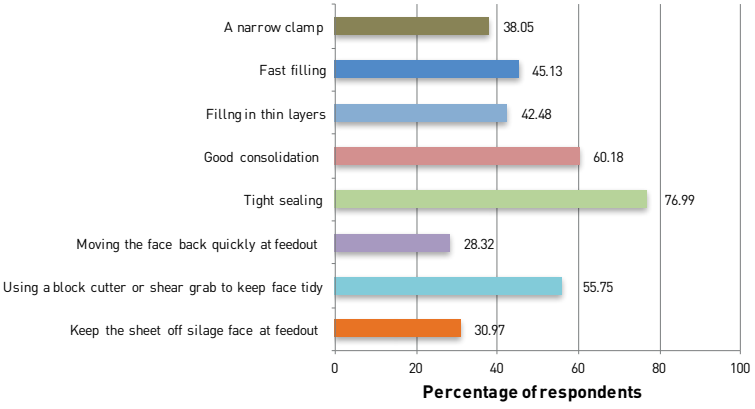
Indeed, results from two years of surveys of UK dairy farms suggest there is huge scope for improving how maize silage is made.

For example, while good consolidation and tight sealing were the most common methods used to manage aerobic spoilage (heating) – named by 60% and 77% of respondents respectively in the 2017 survey – this still left a large percentage of producers who weren't using these important techniques to the full.

When planning your maize harvest, make sure you take the importance of good preservation into account, and that your contractor is lined up for your anticipated harvest date and has the appropriate additive.

If growing modern, 'stay green' varieties, they should not have died off (or dried off) by the time they are harvested.

Methods used to minimise aerobic spoilage (heating and moulding) of maize silage



Source: Ecosyl survey of UK dairy farmers growing forage maize, 2017

Harvesting

Harvest at the optimum dry matter.

Harvesting maize at the wrong whole plant DM can result in reduced silage quality. Don't leave maize to die off before harvesting it, as many farmers do. Harvest instead according to the correct dry matter – for example, when the whole plant is at around 30-33% DM. However, don't leave it to get too dry as this makes it more difficult to consolidate in the clamp.

To help identify the % dry matter, the cob and kernel maturity, which directly correlate to DM, can roughly be assessed in the field in two steps.

1. Collect at least five representative cobs and pull back the outer leaves. Pressing your fingernail into the kernels should result in a soft cheese texture at top of the cob and leave no indentation in kernels in the middle and bottom.
2. Secondly, break the cobs in half to examine kernels. A visible line will indicate where the solid yellow starch changes to the milky white sugar portion of the kernel. One-third to one-half of the kernel should be yellow starch.

These rough assessments should be confirmed with an oven or microwave DM test.

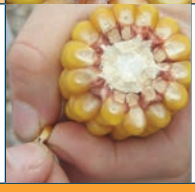
Use the optimum cutting height and chop length.

In addition to percent dry matter, get plant cutting height right. The bottom of a maize stalk has little nutritional value. Most of the energy and dry matter yield comes from the cob. So, set your cutting height based on the DM content and energy content you want to achieve. In all cases, always leave at least 15 cm of stubble to avoid soil contamination. The stem below this height is also likely to contain high levels of Fusarium – carrying the risk of mycotoxins.

For chop lengths, while short chop lengths make consolidation easier in the clamp, they will have a direct impact on how the silage performs in the rumen.

Consider a chop length of 1.5 to 2 cm. Be aware, though, that longer chop lengths will make consolidation to remove air from the clamp more difficult, increasing the risk of aerobic spoilage (silage heating).

Cob Ripeness

Grain Description	Starch Level	Approx. Time until Harvest	Appearance of Grain/Cob	Approx. Whole Plant DM%*
Clear Grains	No Starch	1 month+		Less than 18%
Milky Ripe	Starch Kernel can be found	2-3 weeks		18-25%
Soft Dough	Good Gritty Starch	7-10 days		25-28%
Firm Dough	Smallest drop of moisture can be squeezed from grain	Harvest for Forage now		Approx. 30%
Hard and Mature	Floury Starch	Combine		More than 35%

Treating

Maize silage can be prone to losses from inefficient fermentation. These losses are invisible and can run at about 8% for maize harvested at the recommended dry matter content. However in some cases they may be higher – e.g. with some suggestion that DM losses can be as high as 20-30% between the field (pre-harvest) and what finally ends up in the rumen.

More recognisably, maize silage is also very prone to losses that occur when the silage heats up. These losses take place when naturally-occurring yeasts on the crop survive the fermentation process and initiate the process of aerobic spoilage (characterised by heating) once the clamp is opened. This affects the keeping quality and allows the growth of moulds that can potentially produce mycotoxins, which carry through to the ration.

Greener maize with a higher moisture content may need extra help with fermentation. That said, even if harvesting at the correct DM, the base of the plant is almost certainly starting to senesce, so will contain a lot of yeasts and moulds that will be introduced into the clamp.

Select the right additive.

When it comes to selecting an additive there are two areas to be addressed: the fermentation and aerobic spoilage (heating). Treating to improve the fermentation can certainly pay dividends, as the more efficient bacteria in Ecosyl (*Lactobacillus plantarum* MTD/1) will help to overcome the high levels of poor bacteria that can be present – e.g. in the leaf joints and on any damaged or dying leaves. Improving the fermentation has also been shown to improve animal performance and should be the basis of any treatment.

If heating is considered a risk, then using a combination product combining MTD/1 with either a second bacterium such as *Lactobacillus buchneri* PJB/1 (as in the product Ecocool) or with a chemical preservative, will also help to keep the clamp cooler for longer.

MTD/1

MTD/1 PJB/1

Some examples of the benefits of including *Lactobacillus plantarum* MTD/1 bacteria to produce a faster, more efficient initial fermentation:

- Makes better use of available sugars
- Preserves more nitrogen as true protein
- Reduces fermentation DM losses
- Minimises undesirable microbial activity
- Animal performance

Some examples of the benefits of including *Lactobacillus buchneri* PJB/1 bacteria to inhibit the activities of the yeasts and moulds that cause aerobic spoilage:

- Less heating
- Lower DM losses
- Less physical waste
- Higher energy feed
- Less risk of mycotoxins

An example of an additive containing both of these beneficial bacteria is Ecocool.

Benefits of Ultra Low Volume (ULV) application

Certain bacterial additives can be applied in ultra-low volumes of water – down to just 20 ml/tonne of forage.

Compared with traditional, higher water volumes, ULV can offer a number of benefits to both the contractor applying the additive and to the farmer whose crop is being treated:

- Much less fetching and carrying of water – allowing more time to be spent at the clamp e.g. on consolidation, which is also important for producing good silage
- Less mixing and fewer stoppages in the field to fill up – leading to time savings
- More acres harvested per day – leading to increased chance of harvesting crops in optimum condition e.g. if the weather breaks

Before using this method, check first whether your additive is approved / suitable for ULV application. Some additives (e.g. Ecocool) are suitable, but others are not.

Clamping

Preparation

Always clean clamps out before refilling.

Next, line the clamp walls with polythene sheeting – leaving a large overlap to ensure proper sealing with the top sheet. Thorough sheeting is vital to keep oxygen out of the clamp because this is what is required for the yeasts that cause aerobic spoilage (characterised by heating) to grow. It is important to take steps to prevent them growing at every stage of silage-making, otherwise they will continue growing and cause major problems later.

Also, keep the area surrounding the clamp clean to avoid soil contamination brought in by machinery. Soil introduces more spoilage organisms into the clamp.

Clamps also need to be filled and sealed within 2 days of cutting to get the fermentation process started and to minimise air exposure.

Consolidation

Filling the clamp evenly in thin layers of a maximum of 15 cm will help with consolidation, since this is the maximum depth that can be compressed effectively.

Use single wheeled packers, and roll continuously for increased packing pressure. And make sure packers can keep up with the speed of arrival of new loads into the clamp. Don't compromise consolidation, because this is essential for preventing air ingress.

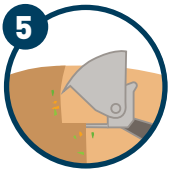
Ideally, calculate the weight of machinery needed to achieve a target bulk density of maize in the clamp of around 750 kg of fresh weight per cubic metre. As an example, estimates suggest that even having two, 14-tonne tractors rolling continuously wouldn't be enough to achieve this with a fairly typical harvest rate of 120 tonnes per hour.

After filling, in order to protect the shoulders and clamp surface, which are particularly vulnerable to aerobic spoilage, apply salt and fork into the top few inches.

Sheeting

To help keep clamps airtight, seriously consider an oxygen barrier film if you don't already use one. On top of this, to make the most of resources while getting a tight seal, use two 500-gauge polythene sheets, for example with the bottom layer being new and the top recycled from the previous year's clamp. Alternatively, a single 1000-gauge sheet can also be used.

After sealing with the plastic sheets, protect them from damage with a woven sheet and weigh down well. Use plenty of mats, gravel bags, touching tyres or silage bales, as the more weight on top the less chance of losses in the top of the clamp. Skimping on this final task can be costly later. Finally, use netting over the top to stop birds pecking through the sheets, and bait to ensure you keep rodents at bay.



Feeding

After sealing maize in the clamp, leave for the required amount of time (at least three weeks) before opening so that it has time to consolidate fully and stabilise.

Face care

While air exposure can't be avoided completely once it's time for the clamp to be opened, its damage can be minimised by using a block cutter or shear grab to keep the face tidy.

In addition, to minimise the period of exposure to air, move the clamp face back quickly at feedout – at a minimum of a metre per week in cooler seasons, and more in the summer. To aid rapid progression across the face, use narrow clamps wherever possible – for example, consider dividing wider clamps into two.

To prevent mould, never leave the sheet hanging over the face, since this creates a microclimate that encourages mould growth. Cut or roll the sheet back as you progress through the clamp, keeping weights on the front edge. Silage that falls off the face should also be cleaned up, since mouldy spores can blow up and contaminate the clamp.

TMR

Once out of the clamp, maize silage being fed as part of a total mixed ration (TMR) may benefit from using an additive with yeast and mould-inhibiting components at feedout to combat spoilage and keep it fresh.

What is aerobic spoilage?

What is aerobic spoilage?

On exposure to air silage can begin to break down resulting in heating and high DM losses. This process is known as aerobic spoilage.

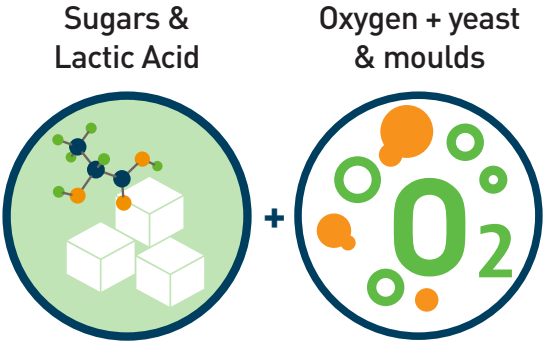
Aerobic spoilage is initiated mainly by yeasts which can grow using a variety of different substances particularly residual sugars and lactic acid.

After the initial yeast activity, moulds join in. They are able to grow on a wider range of substances so spoilage accelerates. Such silages will also have reduced palatability.

Example of aerobic spoilage

Aerobic spoilage - the process

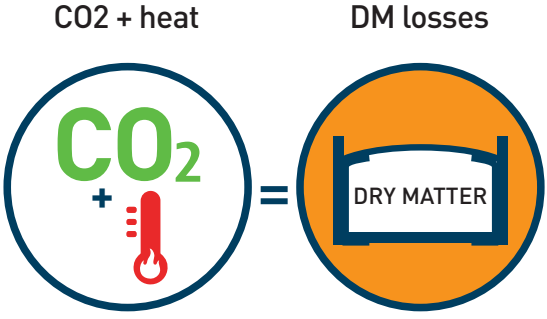
Silage



Aerobic spoilage: process

In the presence oxygen yeasts break down sugars and lactic acid in the silage, raising the ph. This in turn allows moulds to grow.

Heating Silage



Consequences

The growth of yeasts and moulds generates heat and CO2, resulting in high DM losses, reduced palatability and nutritional value, and increased mycotoxin risk.

What are the major influences on aerobic spoilage?

Ensiling

- Yeasts and moulds present at ensiling
- Several factors influence the exposure to air, including
  - Crop DM
  - Speed of filling
  - Compaction
  - Effective sealing

Feedout

- Feedout rate and technique
- Silages with high yeasts at opening
- Silages high in sugars
- Silages fed in warm weather
- Aerated silages, eg mixed in TMR

How do we minimise aerobic spoilage?

Minimise spoilage from harvest to feed out:

Short chopping

Can improve compaction and exclude air

+

Ecocool inoculant to help with aerobic stability

Inhibits spoilage from micro-organisms

+

Good Sealing & Weighting

To exclude air

+

Good Clamp Management

Face management & Feed out techique

What is Ecocool?

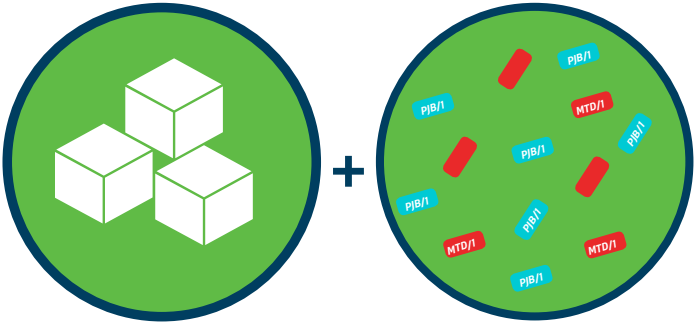
Specially formulated to control aerobic spoilage and fermentation.

- It provides two specially selected high-performance bacterial strains PJB/1 and MTD/1
- PJB/1 for aerobic stability: PJB/1 is a unique strain of Lactobacillus buchneri
- MTD/1 for fermentation: MTD/1 is a unique strain of Lactobacillus plantarum

How does Ecocool minimise aerobic spoilage?

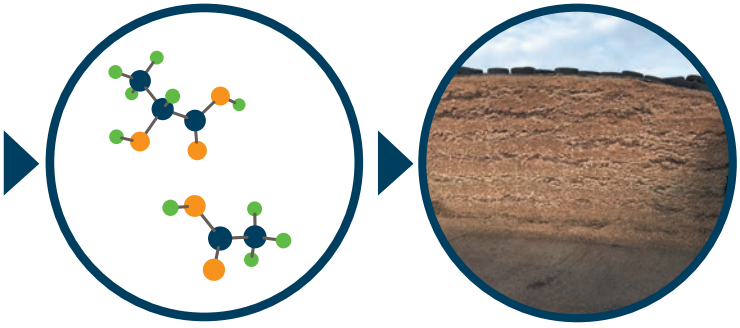
- Ecocool contains L. buchneri which produces acetic acid.
- Acetic acid is very effective at reducing the levels of yeasts and moulds
- Reducing yeast levels leads to less heating and lower aerobic DM losses when exposed to air.
- Reduced mycotoxin risk

Ecocool mode of action



Natural plant sugars

Ecocool's *L. buchneri* PJB/1

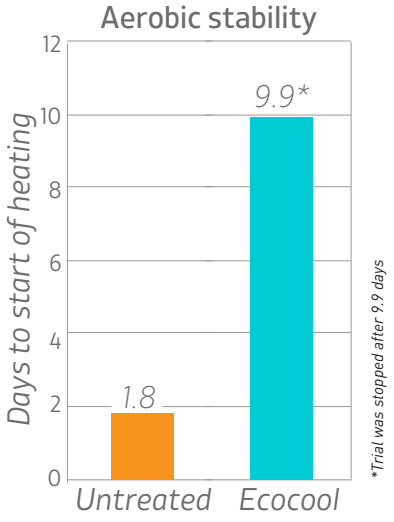


Lactic acid and Acetic acid

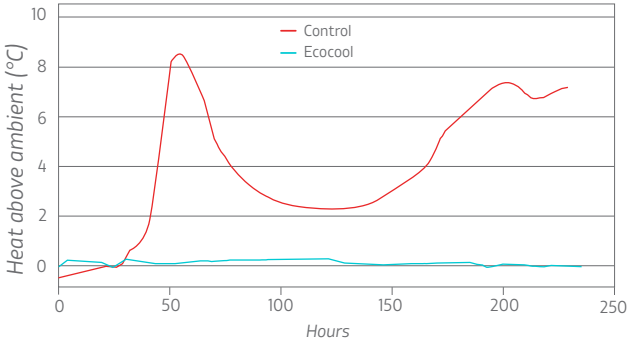
Acetic acid has stabilised the silage

PJB/1 for aerobic stability

Maize (37% DM)



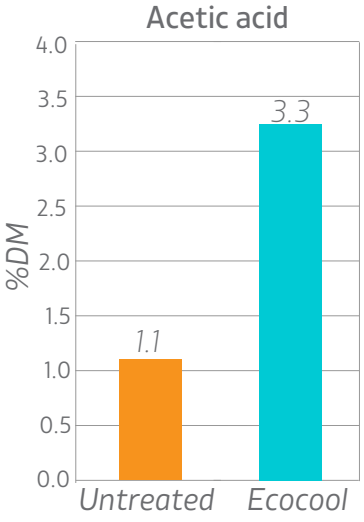
- The Ecocool treated silage remained completely stable throughout the trial*

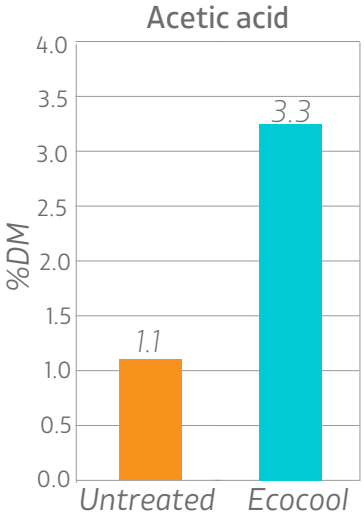


- Ecocool significantly reduced heating relative to the untreated silage

Ecocool vs Untreated trial work

Maize (37% DM)





- *L. buchneri* in Ecocool generated more acetic acid than untreated silage
- The higher acetic acid levels in Ecocool silage reduced yeasts by more than 100 fold

Cut to Clamp

A Volac initiative

Maize silage

With grass silage stocks under severe pressure, Volac's latest Cut to Clamp initiative for maize silage could not have come at a better time.

Put 1,000 tonnes of maize into your clamp and, typically, you might only end up with 700t for feeding livestock, says Volac product manager Jackie Bradley.

Many of those missing tonnes will have effectively provided a meal for undesirable micro-organisms, she says, and all at your expense.

"About 80 of those tonnes are typically lost due to inefficient bacterial fermentation in the clamp, while another 200 are typically lost to yeasts and moulds causing aerobic spoilage, commonly detected as heating. But losses can be much higher.

"The serious point is that many farms would not want those typical losses in a good forage year, let alone a bad year such as this one. Plus, it is not only quantity at stake. There can be quality losses too."

While losses cannot be eliminated entirely, Mrs Bradley says they can be cut. This is what the new Cut to Clamp Maize initiative is all about.

Mrs Bradley says: "There is no single answer to achieve this. Instead, Cut to Clamp Maize guides farmers through five important loss-reducing steps: planning, harvesting, treating, clamping and feeding.

"Help is available via literature, a dedicated website, and free on-farm silage consultations."

1. PLANNING

THE starting point to cutting losses is to understand what causes them, says Mrs Bradley.

She says: "Successful silage production starts with rapid production of acidic conditions in the clamp through fermentation. These acidic conditions, in turn, 'pickle' the forage.

"Fermentation happens naturally, but the problem with a natural fermentation is there are both good and bad bacteria present.

"Bad bacteria will ferment sugar in the crop into lactic acid, which you want, but also to carbon dioxide, which waste's your silage's energy.

"They also produce unwanted weaker acid at this stage, which allows undesirable micro-organisms to feed on your silage for longer.

"By comparison, good bacteria, such as Lactobacillus plantarum MTD/1, ferment sugar only to stronger lactic acid, which rapidly inhibits the undesirable micro-organisms. They also don't produce carbon dioxide, so there is less loss of dry matter."

That said, this is only part of the picture, says Mrs Bradley, because maize is also susceptible to aerobic spoilage (heating), in which undesirable yeasts survive the initial fermentation, feeding on the lactic acid when exposed to air, and further reducing tonnes of dry matter through production of carbon dioxide and heat. It can also lead to reduced silage palatability and mycotoxin production, she notes.

Lining the clamp walls with side sheets before filling the clamp is a key step to reducing air ingress.

"As well as ensuring a good fermentation in maize, it is therefore vital to stop these yeasts, by both reducing their numbers early on and keeping out the air they need.

"Planning is about laying the foundations for this. Minimise contamination from last year's mouldy silage by cleaning the clamp and surrounding area. Start to make the clamp airtight by lining walls with polythene, a better barrier than concrete."

Other planning tasks include informing your contractor of anticipated harvest date, she says, rather than only calling on the day. That way, you'll have a better chance of harvesting the crop on time.

2. HARVESTING

THE aims at harvest are to harvest the crop at the optimum dry matter, using the optimum cutting height and optimum chop length, says Mrs Bradley.

Optimum dry matter

She says: "Aim to harvest at a whole plant dry matter of 30-33%. Harvest too early and starch in the kernels won't be fully formed. Harvest too dry, and it is more difficult to consolidate and remove air from the clamp, increasing the risk of heating.

"To gauge the optimum dry matter, collect at least five representative cobs. Pressing your fingernail into exposed kernels should result in a soft cheese texture at top of the cob, but leave no indentation in kernels at the middle and bottom. Next, break cobs in half. A visible line will indicate where the milky white sugar portion in the kernels changes to solid yellow starch. You want one-third to one-half of the kernel as yellow starch. Confirm dry matter results using an oven or microwave test.

"If growing 'stay green' varieties, the cob may be ready even if the plant does not look it. If you wait until the plant looks mature, it may be past its best."

Optimum cutting height

Even if looking for extra bulk this harvest, don't be tempted to cut plants too low, says Mrs Bradley. The base of the stalk has little nutritional value and mould spores often start here, plus it increases the risks of soil contamination and mycotoxins, she explains.

Optimum chop length

"As with cutting date, chop length is about achieving the correct balance. Short chop lengths will make consolidation to remove air from the clamp easier, but will impact on how silage performs in the rumen. Consider chopping to 1.5-2cm," she suggests.

boost from new initiative

Making good maize silage could offer a lifeline for many farms this winter.

> "IT IS NOT ONLY QUANTITY AT STAKE. THERE CAN BE QUALITY LOSSES TOO
>
> **Jackie Bradley**

3. TREATING

THE reason we treat is to take control of the clamp's microbial processes, Mrs Bradley says.

"You control other stages, such as liming, analysing silage and balancing the ration. But people don't take control of the preservation.

"Decisions at ensiling can affect the quantity and quality of the silage you feed for 200 days of the year.

"For maximum control, choose an additive targeted at both improving fermentation and reducing heating.

"Ecocool, for example, contains wϕ strains of beneficial bacteria; one for each of these issues. In trial work, while the temperature of untreated silage climbed to 8degC above ambient just 55 hours after air exposure, Ecocool-treated silage showed no heating for more than nine days."

Use an additive to improve fermentation efficiency and keep maize cool.

4. CLAMPING

DURING clamping, says Mrs Bradley, you want the best fermentation and to starve spoilage organisms of air.

She says: "Fill the clamp in horizontal layers no more than 15cm deep, which is the maximum that can be consolidated effectively to squeeze air out. Many people still fill using a wedge, but this makes it difficult to maintain 15cm layers, with many clamps not consolidated enough.

"Calculate the weight of machinery needed to pack to a density of 750kg/cu.metre of fresh maize.

"As an illustration, two 14t tractors rolling continuously would not be enough to achieve this with a typical harvest rate of 120t/hour."

Once the clamp is filled, start the sealing process with an oxygen barrier film on top, suggests Mrs Bradley.

"On top of that, use a single 1000-gauge or two 500-gauge polythene sheets, then pull tight and fold together with the side sheets to create a seal.

"To prevent damage, put a woven sheet over the top, then weight with mats, gravel bags, touching tyres or bales. Net to stop birds, and bait to stop rodents."

5. FEEDING

THE feeding stage is about continuing to protect silage quality, says Mrs Bradley, and keeping it cool once exposed to air.

She says: "Minimise air ingress into the open clamp by using a block cutter or shear grab to keep the face tidy and move the face back quickly.

"Never leave the top sheet hanging over the face. It gets extremely hot under there on warmer days, encouraging mould.

"Instead, roll the top sheet back, and do it so it diverts rain water on top of the clamp away from the face. Rain getting into silage causes fluctuations in percentage dry matter, and cows like stable dry matters.

"Any silage that falls off the face should be cleaned up to minimise mould spores."

Remove old maize silage to minimise spoilage spores contaminating the rest of the clamp.

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

Cut to Clamp

A Volac initiative

Preserving the

Want more milk from your maize silage? The microbial processes in maize clamps have a huge impact on its nutritional value. So understanding them is key.

Picture the scene – trailers full of freshly-harvested maize entering your farmyard.

But every so often, rather than unloading the sweet-smelling forage into your clamp, two or three out of every 10 trailers simply peel off and dump it in the slurry pit, rendering it worthless. Far-fetched?

According to Volac silage microbiologist, Dr Mark Leggett, this is about the scale of loss that can occur in maize clamps through a combination of inefficient fermentation and aerobic spoilage (heating). Both are caused by unwanted micro-organisms, as Dr Leggett explains.

"A lot of investment goes into growing a maize crop so there is no point in letting its nutritional value go to waste."

A lot of investment goes into a maize crop, so there is no point in letting its nutritional value go to waste, says silage microbiologist Dr Mark Leggett.

Hidden losses

Worryingly, Dr Leggett says it is not just detectable problems, such as heating and visible wastage, that cause losses. A clamp may look fine but suffer from substantial hidden losses.

Equally, it is not just tonnes of dry matter at stake. The feed quality of the silage that remains will be depleted, and fungal contamination can make silage unpalatable, leading to cows rejecting it, he adds. So what can be done?

Firstly, Dr Leggett says it is important to really understand the unwanted microbial processes, so you can focus on controlling them.

He explains: "Fermentation losses, which are typically about 8%, or roughly equal to one trailer load in 10 being lost, occur because the primary fermentation is simply not efficient enough. This is important because fermentation is essentially the 'pickling' process that preserves the silage.

"Meanwhile, losses from aerobic spoilage, which can reach 20% or two trailer loads in 10, are caused when yeasts and moulds that are present naturally on maize plants are allowed to survive in the clamp and proliferate on exposure to air. This leads to heating, as the energy in the maize is 'burned up'. Alternatively, if you see mould growth, losses are likely to be even higher."

To give maize the best protection, Dr Leggett urges farmers to tackle both problems before irreversible damage is done.

Farmers have no control over the number of good and bad micro-organisms present on maize at harvest.

Improve fermentation

A key step to successful ensiling, says Dr Leggett, is the rapid production of acidic conditions (low pH) in the clamp.

This process of fermentation is carried out by lactic acid bacteria, he says, and is important in order to quickly inhibit spoilage bacteria. However, not all lactic acid bacteria are the same.

"While some bacteria will ferment the sugars in maize purely to beneficial lactic acid, others will also ferment the sugars to other materials. These include carbon dioxide, which is not good because the carbon in carbon dioxide is a direct loss of dry matter.

"While you cannot control the types of bacteria naturally present on the crop at harvest, you can do various things to set maize up for a better preservation *(see panel, right)*. You can also take better control of the process by adding beneficial bacteria to dominate the fermentation.

"By applying a quality additive in this way, it not only provides beneficial bacteria but also a strain of them, such as Lactobacillus plantarum MTD/1, specially-selected to be highly efficient at lactic acid production.

"By achieving a more efficient fermentation, the benefits can include lower dry matter losses and faster inhibition of unwanted spoilage bacteria," he points out.

Tackle aerobic spoilage

Unfortunately, no matter how efficient the fermentation, it cannot inhibit all

Examples of efficient and less efficient fermentations

SUGAR → Efficient bacteria eg, *L. plantarum* MTD/1 → Lactic acid + Lactic acid

SUGAR ⇢ Less efficient bacteria ⇢ Lactic acid + Acetic acid + CO_2

CO_2 = lost dry matter

milk value of maize

spoilage micro-organisms in maize clamps, explains Dr Leggett.

This is because certain yeasts can survive in low pH conditions, he says, and then grow on lactic acid when the clamp is exposed to air – causing aerobic spoilage.

"By feeding on the lactic acid, they reduce the silage's dry matter through production of carbon dioxide and release of heat. But also, because lactic acid is being used up, the pH rises again.

"This allows other fungi, such as Aspergillus and Penicillium, to grow. Other consequences include reductions in nutritional value and palatability, and potentially mycotoxin production."

Just as with naturally-occurring bacteria on maize, Dr Leggett says farmers have little control over the numbers of these yeasts present on the crop at harvest. What is achievable, however, is to limit their growth in the silage.

"You do this with best practice clamp filling followed by good consolidation and sealing to deprive them of air.

"Similarly, you can put yourself in much better control by including something to inhibit them. This can be a preservative-based chemical, such as sorbate, or an additional beneficial bacterial strain, such as Lactobacillus buchneri, which generates acetic acid that has anti-yeast properties.

"As an example, the dual-acting additive Ecocool contains the PJB/1 strain of Lactobacillus buchneri. It also contains Lactobacillus plantarum MTD/1, which is proven to produce a rapid fermentation.

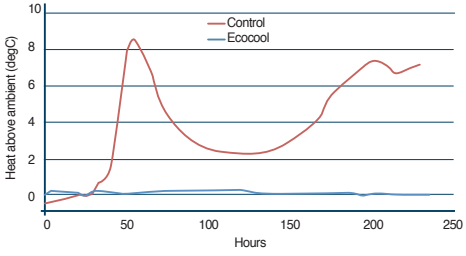
"Treatment with Ecocool has been shown to both reduce yeast levels and keep silage taken out of the clamp cool and stable for more than 10 days."

SETTING UP MAIZE FOR BETTER PRESERVATION

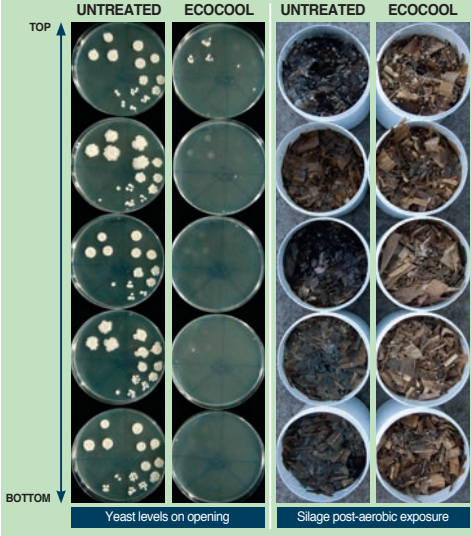
- Harvest the crop at 30-33% dry matter – it optimises starch content and, by avoiding it being too dry, it makes the crop easier to consolidate to remove air
- Don't cut too low – the base of the crop contains more mould spores, which contribute to aerobic spoilage (heating)
- Consider a chop length of 1.5-2cm to aid consolidation
- Make use of a dual-acting additive to improve fermentation and control heating by inhibiting yeasts and moulds
- Fill clamps in horizontal layers a maximum of 15cm deep – the most that can be consolidated effectively
- Compact to a density of 700kg of fresh maize per cubic metre and sheet thoroughly to create an airtight seal

Benefit of Ecocool for keeping maize cool (37% DM)

Ecocool-treated silage remained stable for more than 10 days upon opening



Effects of Ecocool for reducing fungal growth in different parts of the clamp



Inhibition of yeasts with Ecocool

	No additive	With Ecocool
	Number of yeasts (colony forming units per gram of forage)	
After ensiling	1,500,000	<1,000
After air exposure	440,000,000	<1,000

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

Cut to Clamp

A Volac initiative

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