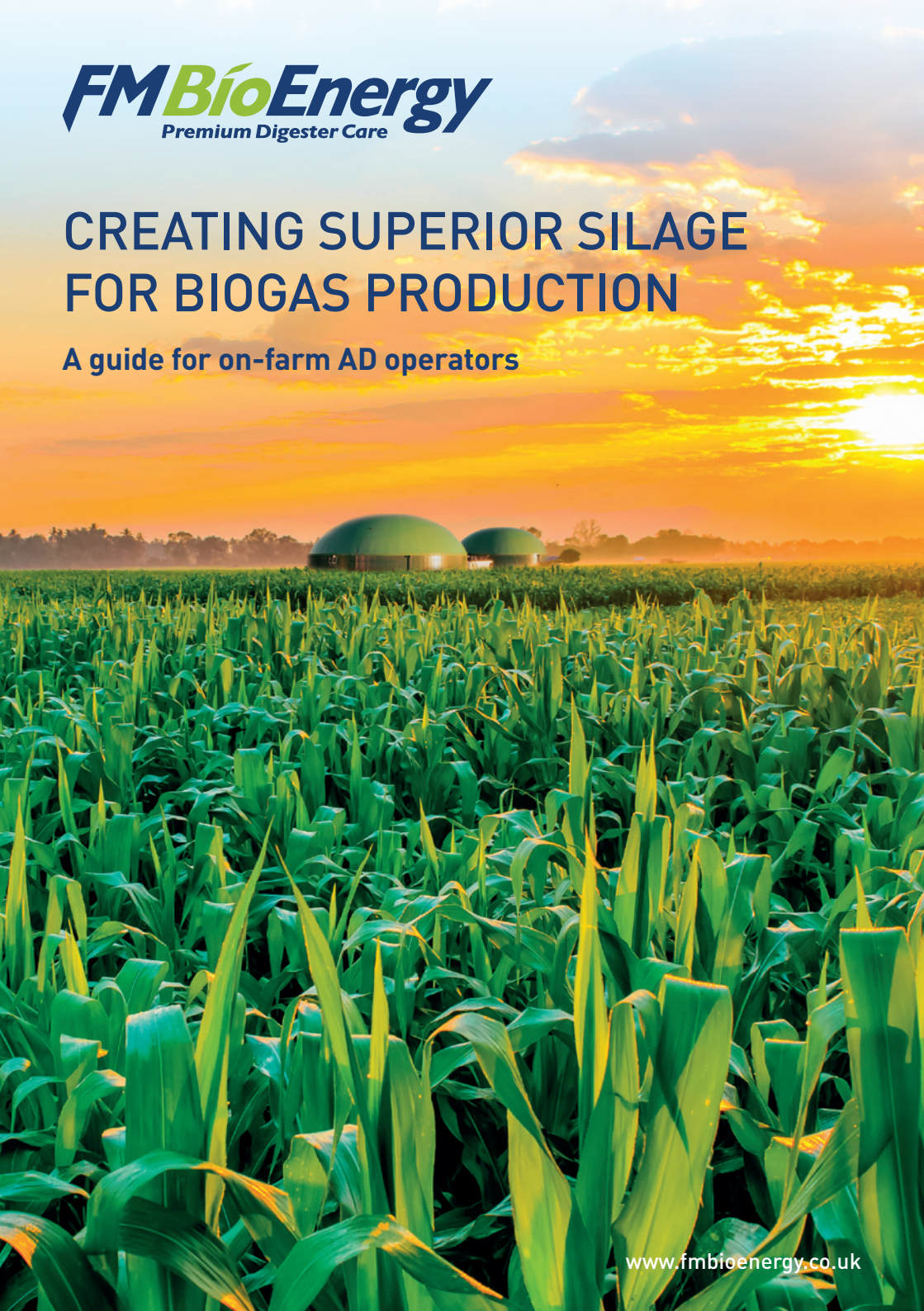
FM BioEnergy
Premium Digester Care

CREATING SUPERIOR SILAGE FOR BIOGAS PRODUCTION

A guide for on-farm AD operators



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The importance of good silage

For crop-fed AD plants, quality of feedstock is the key to efficient biogas production throughout the year. Following best practice at every stage of the process – from harvesting to ensiling to feeding out – will ensure you get the highest gas output from your silage.

Poor quality silage = reduced biogas yield

- **Up to 25% of dry matter can be lost in silage clamps**
- **1/3 of dry matter losses are due to poor practices when unloading the clamp**
- **10°C temperature increase at the clamp face will incur energy losses of 3% per day**
- **Each lost m^2 at the top of the clamp can cost £30+**

"FM BioEnergy's technical expertise and range of silage additives allow us to better control the ensiling process. Not only do they help to produce a more stable feedstock and reduce storage losses, but they also reduce the fermentation period."

David Bermingham, Icknield Gas Ltd.

Common mistakes to avoid

Harvesting at wrong crop maturity

- Harvesting immature maize kernels reduces food for bacteria in the digester
- Low dry matters increase leachate from the clamp
- Silage that is too dry can be difficult to compact – as a guide, the dryer the material the shorter the chop length should be

Incorrectly packing the clamp

- Poor compaction allows air pockets to form
- Avoid over-filling the clamp, as this can prevent it from being sealed correctly
- Match clamp-loading machinery and capacity to harvesting rates

Poor clamp sealing

- Proper sealing creates the anaerobic conditions necessary for fermentation
- Use specific oxygen-blocking covers
- Ensure that sheets have sufficient overlap and use side covers

Exposing silage to the air

- Keep exposed surfaces as small and smooth as possible
- Ideally, remove the entire open area surface to a depth of 2m each week
- Don't take more material than can be instantly fed into your digester

7 steps to superior silage

1 Harvesting

Harvest your crop at the ideal stage of growth to maximise energy content and optimise dry matter yield. For maize, this is when the whole plant dry matter is between 32-36%. Apply a silage additive such as Silasil Energy XD when harvesting to boost the population of beneficial bacteria in the clamp, speed up fermentation time and achieve the optimum pH as quickly as possible.

2 Chop length

Suitability can be tested by squeezing a handful of harvested crop; if moisture runs out, delay harvest or increase chop length (only after considering compatibility with digester contents). If it doesn't stay compressed after squeezing, then shorten chop length.

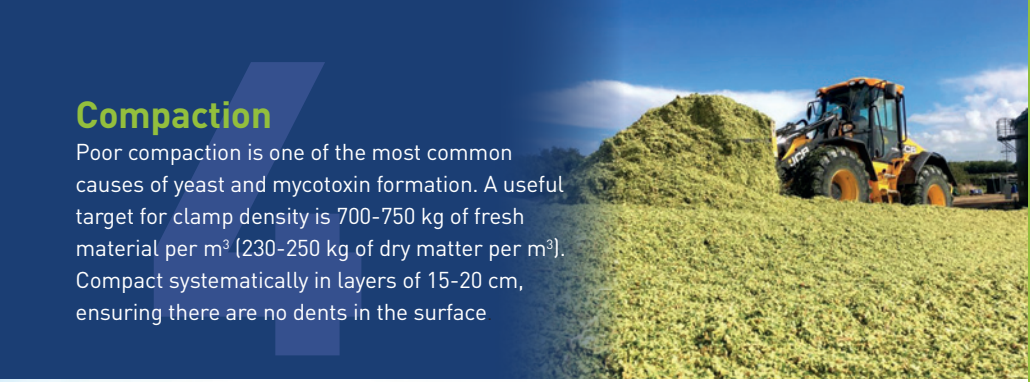
CROP	Optimal DM (%)	Optimal chop length (mm)
Maize	32-36	4-6
Grass	30-40	20-40
Cereals	32-38	6-10

3 Filling the clamp

Create anaerobic conditions as quickly as possible, ideally within three days. Match harvest rate to the speed at which the clamp can be filled and compacted, and space out trailer deliveries.

Compaction

Poor compaction is one of the most common causes of yeast and mycotoxin formation. A useful target for clamp density is 700-750 kg of fresh material per m^3 (230-250 kg of dry matter per m^3). Compact systematically in layers of 15-20 cm, ensuring there are no dents in the surface

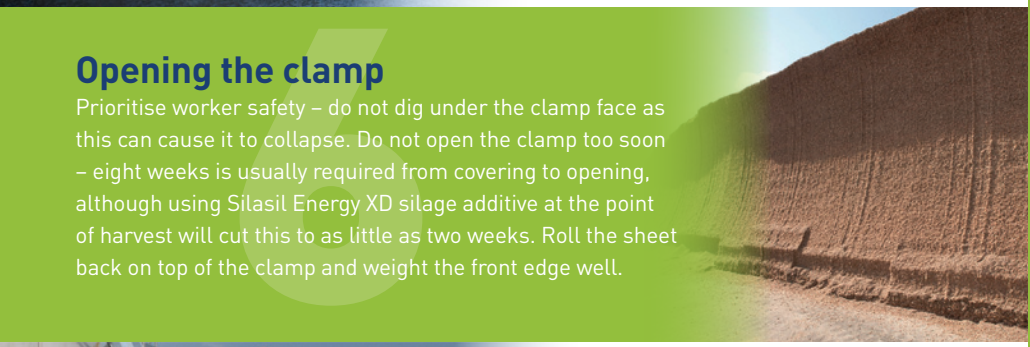


Sheeting

Cover clamp immediately and use dedicated oxygen barrier films to create anaerobic conditions. Ensure adequate overlap (at least 1m) where the sheets meet. Protect plastic sheeting with a woven sheet and use weights placed in 2m parallel lines to the face of the clamp.

Opening the clamp

Prioritise worker safety – do not dig under the clamp face as this can cause it to collapse. Do not open the clamp too soon – eight weeks is usually required from covering to opening, although using Silasil Energy XD silage additive at the point of harvest will cut this to as little as two weeks. Roll the sheet back on top of the clamp and weight the front edge well.



Removing material

Keep the cut face tight and clean and try to 'shave' silage from the exposed face. Exposing the clamp to the air will allow any yeast and mould to respire and cause secondary losses, evidenced by increased silage temperature. Take only what you need and feed into the digester immediately. Remove any spillages to avoid contaminating good feedstock.

Supercharge your silage

FM BioEnergy's Silasil range of biogas-specific biological silage additives provides specialised bacterial strains to ensure a fast and complete fermentation, helping you achieve the optimum pH as quickly as possible. It also helps prevent the growth of spoilage moulds and yeast, through its unique combination of bacteria strains of LAB Buchneri and LAB Diolivorans which produce Acetic Acid and Propanol - all of which ensures the silage remains in good condition on feeding out.

Why choose Silasil Energy XD?

- **Preserves the biogas potential of your silage**
- **Improved gas yields of 9% per hectare**
- **Accredited by the German Agricultural Society (DLG) for increasing methane yield and reducing losses**
- **Reduces fermentation time in the clamp to as little as two weeks**
- **Prevents yeasts and moulds which cause biological instability in the digester**
- **Easy-to-use with low application rate**

"With Silasil Energy XD, ensiling takes as little as two weeks in a clamp, with fewer edge losses and a more stable face when feeding out. We have also noticed that the clamp face no longer heats up, so we are not losing energy at feed out."

David Bermingham, Icknield Gas Ltd.

Additives boost farmer's feedstock

AD operator: JJ Power
Location: Gloucestershire
Plant size: 435 kW
Feedstock: Maize silage, chicken manure and liquid food waste
Silage solution: Silasil Energy XD

When on-farm AD plant operator JJ Power bought in external silage feedstock from an unfamiliar source, their digester soon hit problems; the biology became upset, resulting in a drop in gas output. In order to safeguard the quality of any future silage being fed to their digester, the company decided to use a silage additive from FM BioEnergy.

Tested and certified by the German Agricultural Society (DLG), Silasil Energy XD promised to boost the population of beneficial bacteria, supress the multiplication of problematic species such as yeasts and moulds, and speed up fermentation time in the clamp to as little as two weeks. It also ensures the crop is preserved during storage, decreases aerobic losses, and reduces losses when removing material from the open front of the clamp by preventing reheating. In turn, this increases the amount of gas produced per tonne of crop harvested.

Having regularly used it for a considerable length of time, JJ Power are now convinced of the benefits of Silasil Energy XD. Their plant has suffered no further biological issues and has been running smoothly for the past two years.

"Using Silasil Energy XD at the point of harvest means that wastage levels from the edges and top of the clamp are negligible. It's quite incredible, but when I remove the sheets from a new piece of clamp, the feedstock looks like the day it was first put in."

Nick Cowie, Plant Manager, JJ Power

Why choose FM BioEnergy?

- Expert advice from experienced AD professionals
- Silage-specific solutions
- Long-term biological stability and control
- Increased gas yields
- 30+ years of industry-leading R&D
- Client base represents 35% of UK AD industry
- 400,000 tonnes of UK silage treated with Silasil Energy XD

Get in touch for more information on our range of silage additives

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for farmers
the total feed business