

Biological ensiling agent

SILASILENERGY®

The special biological ensiling agent range
for energy plants



SCHAUMANN
BIOENERGY
CONSULT

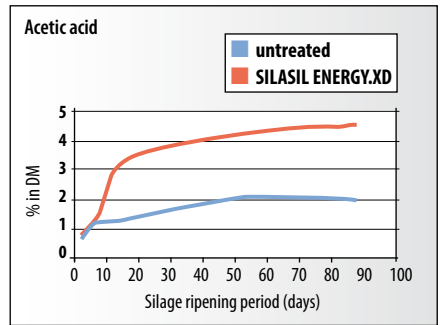
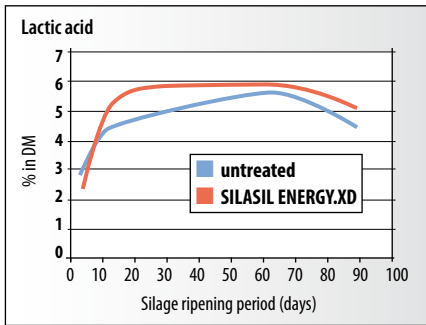
Competence in biogas

How SILASIL ENERGY.XD[®] works

SILASIL ENERGY.XD combines the three lactic bacteria strains *Lactobacillus diolivorans*, *Lactobacillus rhamnosus* and *Lactobacillus buchneri* in a highly effective manner. Its production relies on special technology. The combination of these three strains provides a particular metabolic synergy that ensures that carbohydrate-rich energy crops are preserved more rapidly for biogas production. The metabolism of *L. diolivorans* determines the effectiveness of SILASIL ENERGY.XD. Short generation times and substantial competitive strength give the selected strains of

bacteria clear advantages over harmful natural microbes. The rapid formation of lactic acid in the early fermentation phase creates the basis for the synthesis of additional metabolites with preserving effects (e.g. acetic acid, 1-propanol). These heterofermentative processes ensure that high-quality silage can be protected substantially more quickly against energy losses caused by moulds and yeasts. All of the synergistic metabolic processes of this combination of bacteria strains only consume minimum energy for themselves.

Typical development of specific fermentation products in maize silage treated with SILASIL ENERGY.XD



Area of use

SILASIL ENERGY.XD is highly recommended wherever shortened silage ripening periods of 2-6 weeks are required!

Maize whole crop silage	28–40 % DM
Maize grain products (e. g. CCM)	55–65 % DM
Cereal WCS (as energy plant silage)	28–40 % DM
Energy grass	30–45 % DM
Sorghum	> 25 % DM

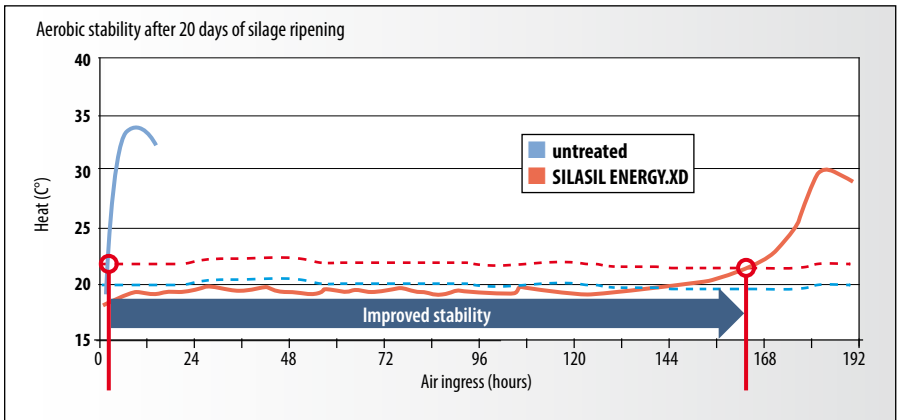
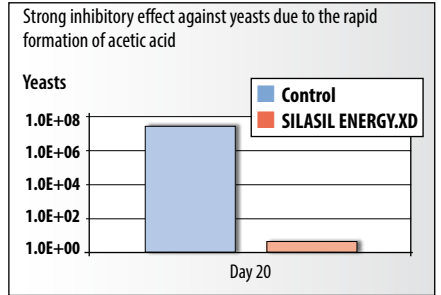
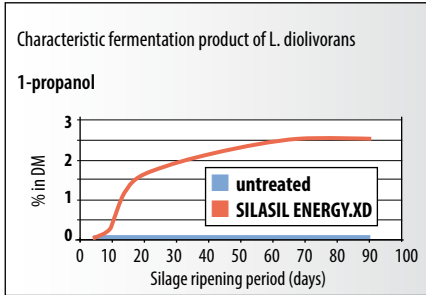
Result

- controls ensiling processes
- shortens silage ripening periods
- reduces process-related energy losses
- improves silage stability both at the face and in intermediate storage

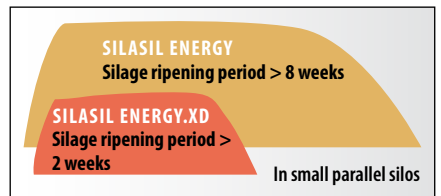
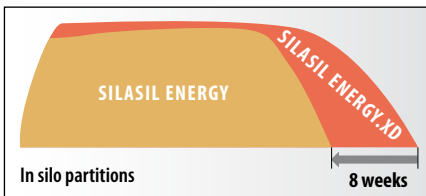
Faster protection against spoilage



category 6b, 2 methane



Recommended use for accelerating silage ripening periods



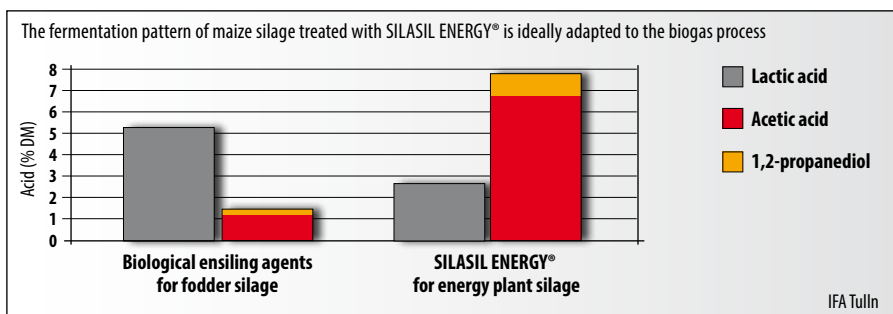


How SILASIL ENERGY.XD® works

SILASIL ENERGY® acts through bacterial strains specially selected for biogas production and creates a specific fermentation pattern. Fast-acting homofermentative bacterial strains start off the fermentation process. After that, the heterofermentative

lactic acid bacterial strains act to promote acetic acid fermentation.

The special fermentation pattern minimises energy losses in storage and increases the biogas yield per tonne of fresh matter or per hectare of arable land area.



Area of use

SILASIL ENERGY® is the biological ensiling agent specially for high-carbohydrate energy plants:

Maize whole crop silage	28 – 40% DM
Maize grain products (e.g. CCM)	55 – 65% DM
Cereal WCS (as energy plant silage)	28 – 40% DM
Energy grass	30 – 45% DM
Sorghum	> 25% DM

Result

SILASIL ENERGY® controls the ensiling process with two perceptible effects:

■ Energy protection in the silo

The special fermentation pattern reduces the risk of aerobic instability, heating up, fungal infection and rotting in the silage, thus providing optimum protection for the energy and nutrients.

■ More energy in the fermenter

Silage treated with SILASIL ENERGY® is easier to hydrolyse. Biogas formation starts perceptibly earlier and the overall degradation to biogas is faster.



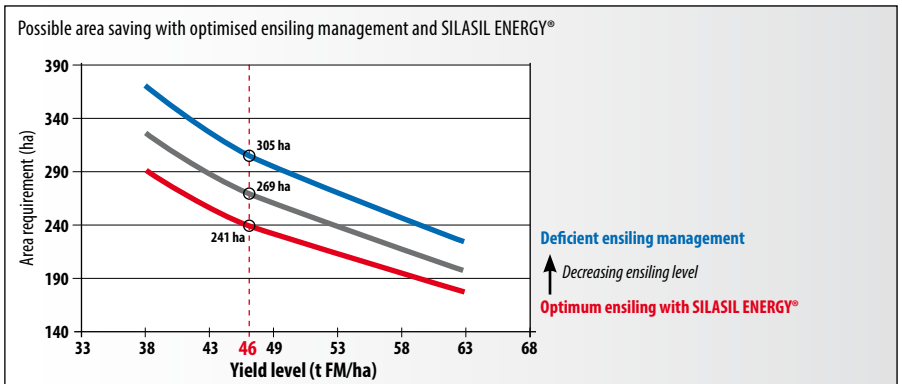
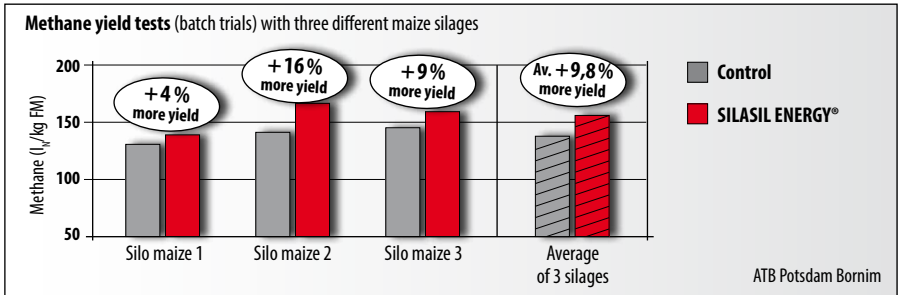
category 6b, 2 methane



Economic efficiency

Using SILASIL ENERGY® increases the area efficiency of the biogas plant. Because of the energy conservation and increased bi-

availability of the substrate, the area requirement can be reduced with correct ensiling techniques and product application.



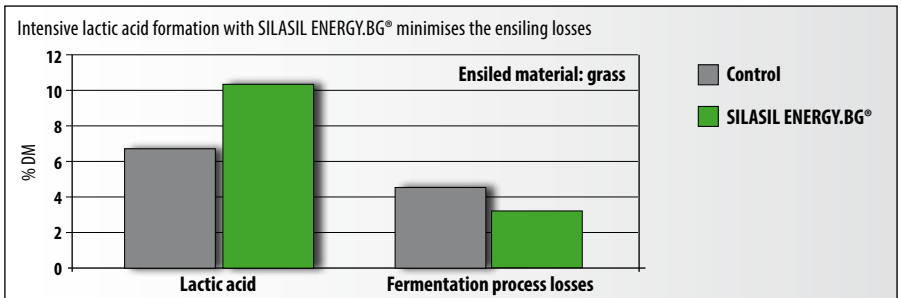
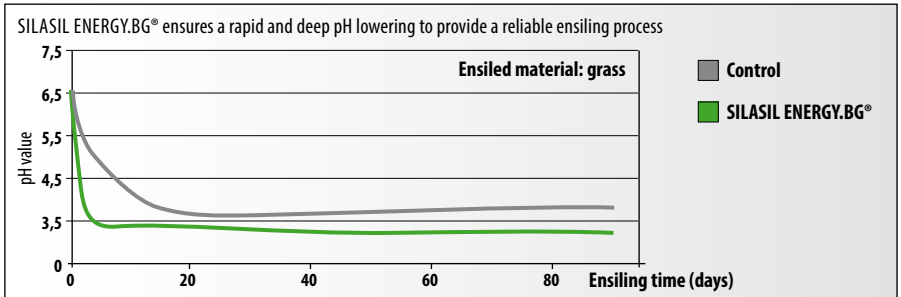
Example of a biogas plant with 500 kW_{el} installed capacity

	Yield level		
	low	average	high
Yields per hectare t FM/ha	38	46	62
Area requirement [ha] 1,300 kW _{el} . /t DM (minimum losses with SILASIL ENERGY®)	292	241	177
Area requirement [ha] with defective ensiling management (15% losses)	326	269	198
Area saving [ha] Losses cut from 15% to 5%	34,3	28	20,8

How SILASIL ENERGY.BG[®] works

SILASIL ENERGY.BG[®] contains homofermentative lactic acid bacteria specially selected for biogas production to protect wet, high-protein, low-sugar energy plants.

The homofermentative fermentation pattern provides effective protection against energy losses through low pH values and a high lactic acid content.



Area of use

SILASIL ENERGY.BG[®] is the biological ensiling agent specially for wet, high-protein, low-sugar plants with 20-35% DM.

Grass | Clover-grass | Green rye | Alfalfa | Intercrops

Result

■ Energy protection in the silo

The controlled inhibiting effect of SILASIL ENERGY.BG[®] on proteolytic and saccharolytic anaerobic fermentation pests protects the crop from energy losses and formation

of toxic metabolites during the ensiling phases. SILASIL ENERGY.BG[®] thus optimally conserves the energy from the storage process until use in the fermenter.

Precise, high-performance micro-dosing system for SILASIL ENERGY ensiling agents

Designed for an easy use, this compact dosing unit features easily adjustable dosing parameters for precise application and a variety of control functions.

SCHAUMANN MD

- Precise micro-dosing
- No additional water tanks
- Alternating concentrate tanks
- Effective control of application
- 400 t with a standard tank fill (10 l)
- Easy-to-use



Strong performance

Separate water tanks are no longer needed. Featuring a broad range of dosage rates even in the latest generation of harvesters with a high output rate of 700 t/h a precise micro-dosage is possible. The ensiling agent is applied as an aerosol directly into the intake flow.

More reliable application

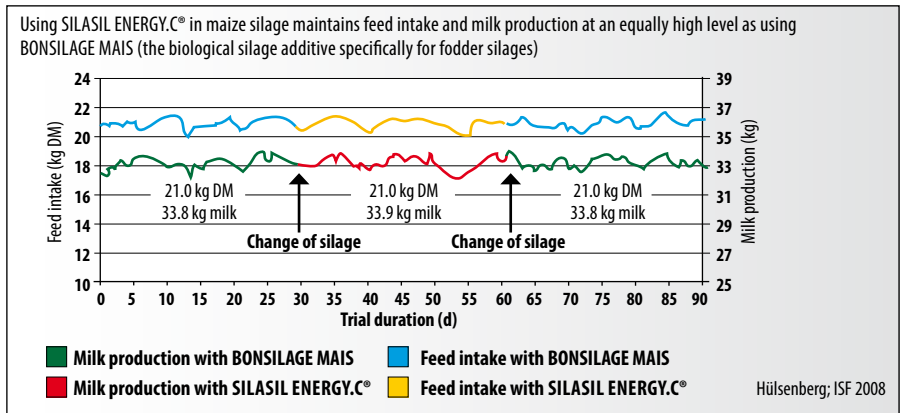
Flow control and nozzle monitoring with optical and acoustic signals enable the application to be controlled effectively from the operator's cab.

Combined use

SILASIL ENERGY.C® for biogas production and animal feed

SILASIL ENERGY.C®, the special combination of one heterofermentative and two homofermentative lactic acid bacterial strains, protects the silage from energyconsuming pests and promotes both ruminant feed intake and the fermenter biogas yield.

With its combination of bacterial strains that promotes feed intake SILASIL ENERGY.C® enables both the biogas plant and the herd to be supplied efficiently from a single batch of silage.



Area of use

SILASIL ENERGY.C® is a biological silage additive developed for high-carbohydrate ensiled material with 25 – 40 % DM for universal use in biogas production and animal feeding:

Silo maize | Cereal WCS | Sweet sorghum | Energy grass

Result

■ Protection against loss of energy and nutrient degradation

SILASIL ENERGY.C® protects against energy loss and nutrient degradation and breaks up the silage for high methane yields. Owing to the specifically adjusted fermenta-

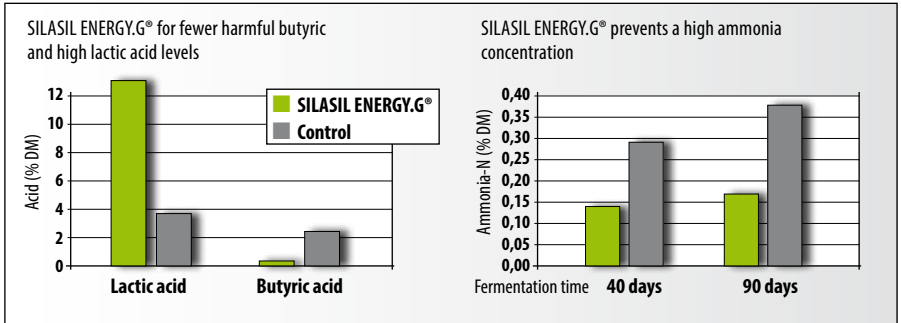
tion pattern and the 'feed intake plus effect', silages treated with SILASIL ENERGY.C® are universally suitable for biogas generation and for animal feeding.

SILASIL ENERGY.G® for biogas production and animal feed

SILASIL ENERGY.G® activates the protective mechanisms of the purely homofermentative lactic acid bacteria for high-protein, low-sugar plants with a high moisture content. Effective control of the pH value with a high lactic acid concentration gives the silage long-term protection against undesirable nutrient degra-

dation. SILASIL ENERGY.G® controls the ensiling process because its special lactic acid bacteria produce a specific fermentation pattern with a strong lactic emphasis. The substrate hygiene achieved is the basis of successful animal feeding and a smoothrunning biogas process.

Ensiled grass	pH	Acetic acid	Lactic acid	Butyric acid	NH ₃ -N
Guideline values for animal nutrition	< 4.3	< 2.0	> 5.0	< 0.3	< 10
SILASIL ENERGY.G®	4.0	1.4	12.7	0.1	7.5



Area of use

SILASIL ENERGY.G® is the biological ensiling agent specially for wet, high-protein, low-sugar plants with 20 – 35 % DM for universal use in biogas production and animal feeding:

Grass | Clover-grass | Green rye | Alfalfa | Intercrops

Result

■ Energy protection in the silo

The special fermentation pattern reduces the risk of anaerobic instability due to Clostridia and the production of process inhibitors such as ammonia and endo-

toxins. SILASIL ENERGY.G® thus optimally protects the energy and nutrients in the silage.



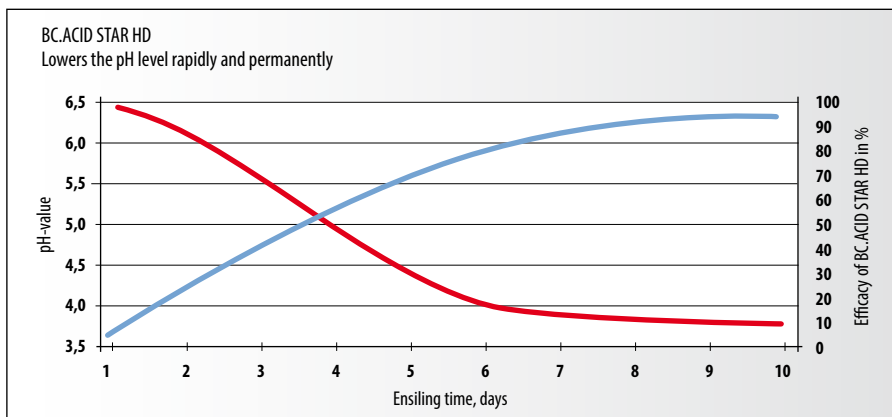
BC.ACID programme

BC.ACID 1, BC.ACID 2 and BC.ACID STAR HD are acid mixtures designed to preserve freshly harvested, moist and pumpable bi-

ogas substrates. Their strong antimicrobial effect prevents the development of moulds and bacteria during storage.

BC.ACID STAR HD

- Special highly concentrated, liquid product which reliably prevents reheating caused by variations if silage quality
- The product is particularly user-friendly, being pH-neutral and non-corrosive
- Suitable for the complete treatment of whole sugar beet, moist maize meal and maize-cob-mix, industrial by-products such as brewer's grains and pressed sugar beet pulp and very dry grass, whole-crop and maize silage



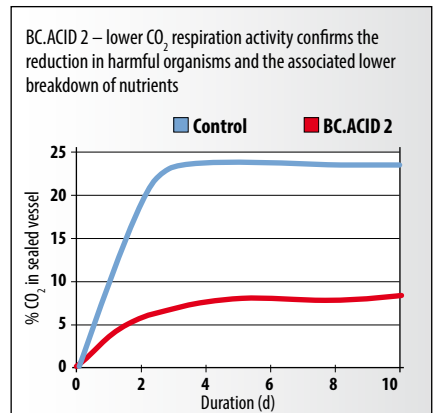
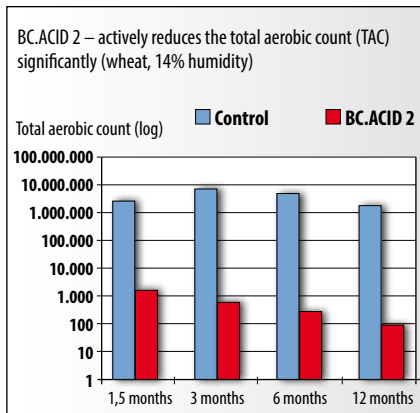


BC.ACID 1

- Acid mix for the preservation of pumpable biogas substrates when stored as pulp
- Suitable for milled cereal, maize-cob mix and other substrates stored in liquid form
- Stable, low-loss storage of substrates in storage vessels, even with fluctuating water content

BC.ACID 2

- Acid mix for the preservation of free-flowing biogas substrates during storage
- Suitable for freshly harvested whole-grain cereals and other free-flowing secondary raw materials
- High impact during storage and particular user-friendly thanks to its low evaporation rate





SILASIL ENERGY® – the first ensiling agent range for energy plants

- Controls the ensiling process
- Protects the ingredients
- Increases the methane yield

Recommended quantities for liquid application

SILASILENERGY^{XD}

2 g powder in 0.05 – 2.0 l water/t ensiled material, corresponds to min. 200,000 CFU/g ensiled material, container quantity for 100 t FM, for biogas production



category 40_2 container

SILASILENERGY

2 g powder in 0.05 – 2.0 l water/t ensiled material, corresponds to min. 200,000 CFU/g ensiled material, container quantity for 100 t FM, for biogas production



category 40_2 container

SILASILENERGY^{BG}

1 g powder in 0.05 – 2.0 l water/t ensiled material, corresponds to min. 200,000 CFU/g ensiled material, container quantity for 100 t FM, for biogas production

SILASILENERGY^F

1 g powder in 0.05 – 2.0 l water/t ensiled material, corresponds to min. 200,000 CFU/g ensiled material, container quantity for 100 t FM, for biogas production and animal feed

SILASILENERGY^G

1 g powder in 0.05 – 2.0 l water/t ensiled material, corresponds to min. 200,000 CFU/g ensiled material, container quantity for 100 t FM, for biogas production and animal feed

All products are suitable for ultra-precise application.



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