jbs progas® ferm

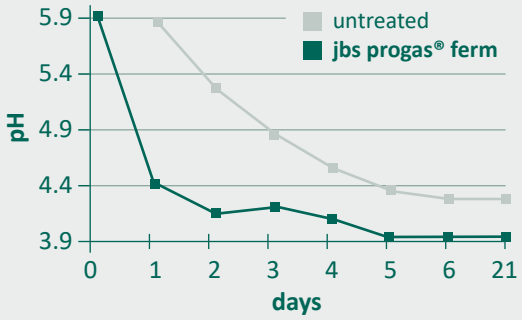
Silage additive for all types of forages

jbs progas® ferm has been developed by the world's leading manufacturer of lactic acid bacteria: Chr. Hansen, Denmark. It is an efficient silage additive optimizing the fermentation of energy crops.

Fermentation losses inevitably occur in each fermentation. In addition to these, yeasts will metabolize valuable carbohydrates into volatile components such as CO_2 or ethanol during storage.

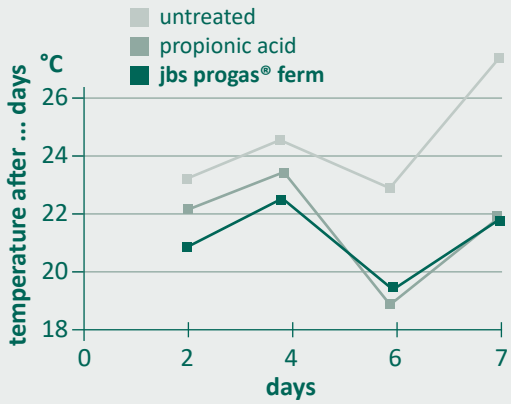
jbs progas® ferm protects a huge amount of energy by accelerating the fermentation (in the initial phase) and inhibiting yeasts (during storage). Thus **jbs progas® ferm** saves approx. 50 % of DM losses, consequently providing more feed for your methanogenic bacteria.

Accelerates dropping of pH
Alberta, Canada, whole plant silage (barley)



In addition to efficiently producing lactic acid, **jbs progas® ferm** is able to inhibit yeasts, thus improving the silage's stability without producing acetic acid in the process.

Improves the stability
CEDAR, University of Reading, UK (maize)



Fachverband Biogas e.V.

jbs
growth & success
for the best agriculture – worldwide

At a glance

- suitable for all crops (maize, grass, whole plant silage etc.)
- available in 100 g pouch, sufficient to treat 200 tonnes of forage
- manufacturer: Chr. Hansen, Denmark

Reasons for using jbs progas® ferm

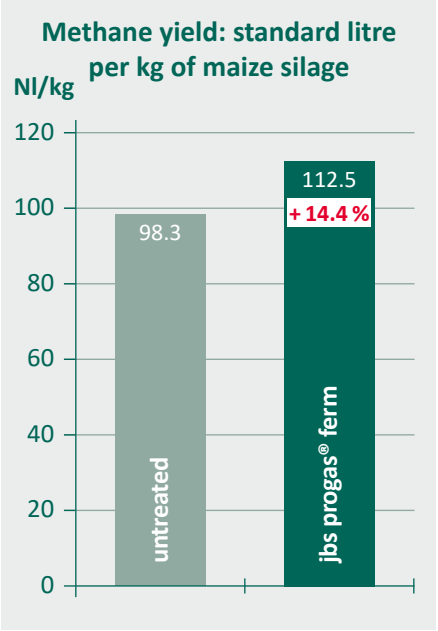
- **increases methane yield by 12.9 %** (trials conducted at Leipniz-Institut für Agrartechnik Potsdam-Bornim e. V. 2008)
- contains homofermentative bacteria (forming lactic acid only)
- improves digestibility if used in dairy farming
- reduces DM losses
- lowers the pH
- increases the silage's energy content
- speeds up fermentation
- inhibits yeasts
- reduces the risk of heating after opening
- reduces the risk of fungal growth and decomposition
- reduces losses caused by surface or top spoilage
- reduces losses at the cutting surface
- wide spectrum of applications

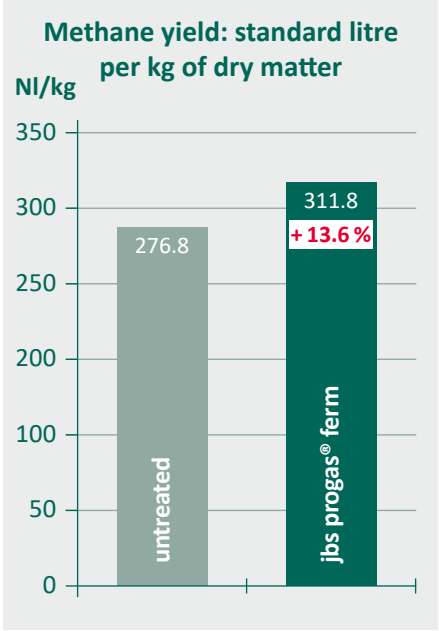
jbs progas® ferm saves and protects energy and nutrients before and after opening.

Biogas trial with jbs progas® ferm

conducted at Leipniz-Institut für Agrartechnik Potsdam-Bornim e. V. 2008

Maize silage (37.7 % DM) was ensiled in four small containers per treatment for 49 days. The trial was conducted in line with DLG regulations.





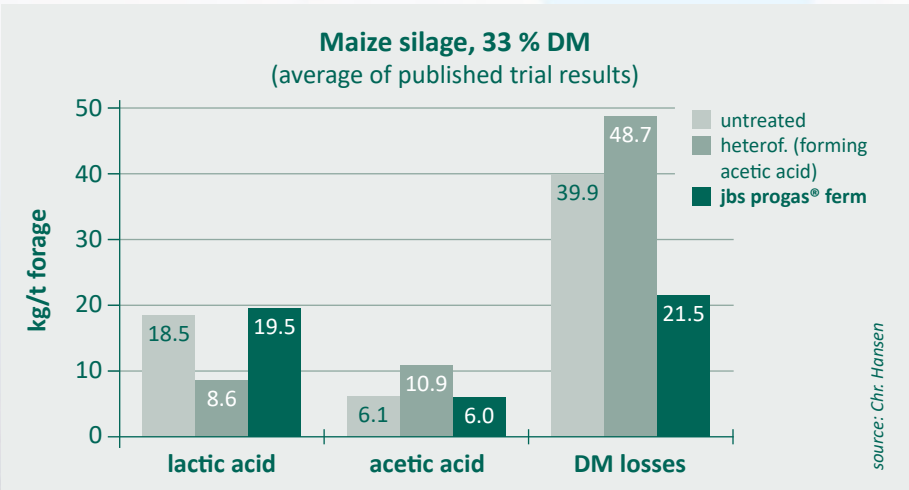
source: Leipniz-Institut für Agrartechnik Potsdam-Bornim e. V. 2008

Homo- or heterofermentative lactic acid bacteria?

One crucial aspect of a successful fermentation is that plant sugars have to be converted into lactic acid as soon as possible. Lactic acid acidifies rapidly, thus lowering the pH and preventing the growth of harmful microorganisms. Not all types of lactic acid bacteria (LAB) are equally efficient in forming lactic acid.

Please note: Both alcohol and the CO_2 generated by this energy are highly volatile. **jbs progas® ferm** consists of homofermentative LAB only, thus preserving valuable nutrients in the silage.

Fermentation of sugar by inefficient **heterofermentative** LAB (e. g. *Lactobacillus buchneri*)	sugar / starch ⟶ lactic acid + acetic acid + alcohol + CO_2
Fermentation of sugar by **homofermentative** LAB contained in **jbs progas® ferm**	sugar / starch ⟶ 100 % lactic acid

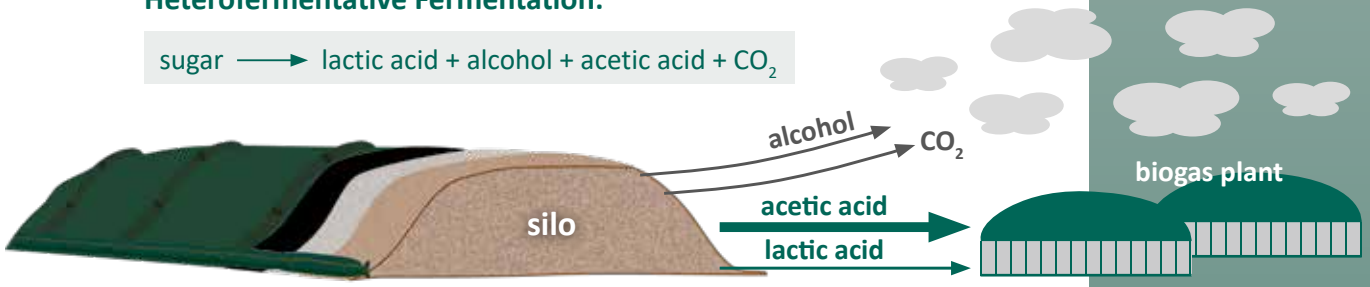


source: Chr. Hansen

Homo- or heterofermentative lactic acid bacteria?

Heterofermentative Fermentation:

sugar ⟶ lactic acid + alcohol + acetic acid + CO_2

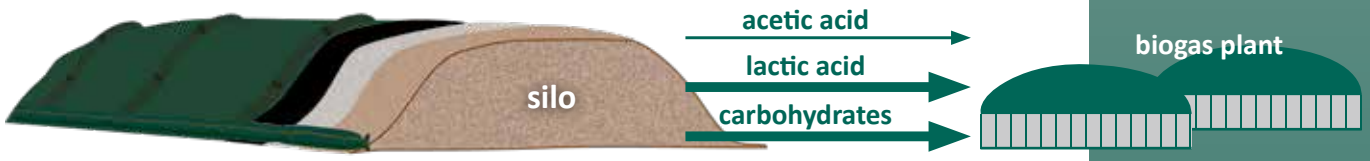


Acetic acid producing bacteria – i. e. heterofermentative lactic acid bacteria – specifically produce acetic acid, alcohol and CO_2. This is reflected in low contents of residual sugar.

In practice, these „acetic acid producers“ are used to improve the stability; They are, however, disadvantageous as they burn up a lot of energy. The stability is increased, but this is accompanied by higher DM losses compared to untreated.

Homofermentative Fermentation:

sugar ⟶ 100 % lactic acid



Lactic acid producing bacteria – i. e. homofermentative LAB – transform sugar into lactic acid at a ratio of almost 1:1. This rapid fermentation saves nutrients, thus preserving a large amount of carbohydrates, which would be lost if the silage were left untreated or treated with acetic acid producing bacteria.

Isn‘t acetic acid better for your digester?

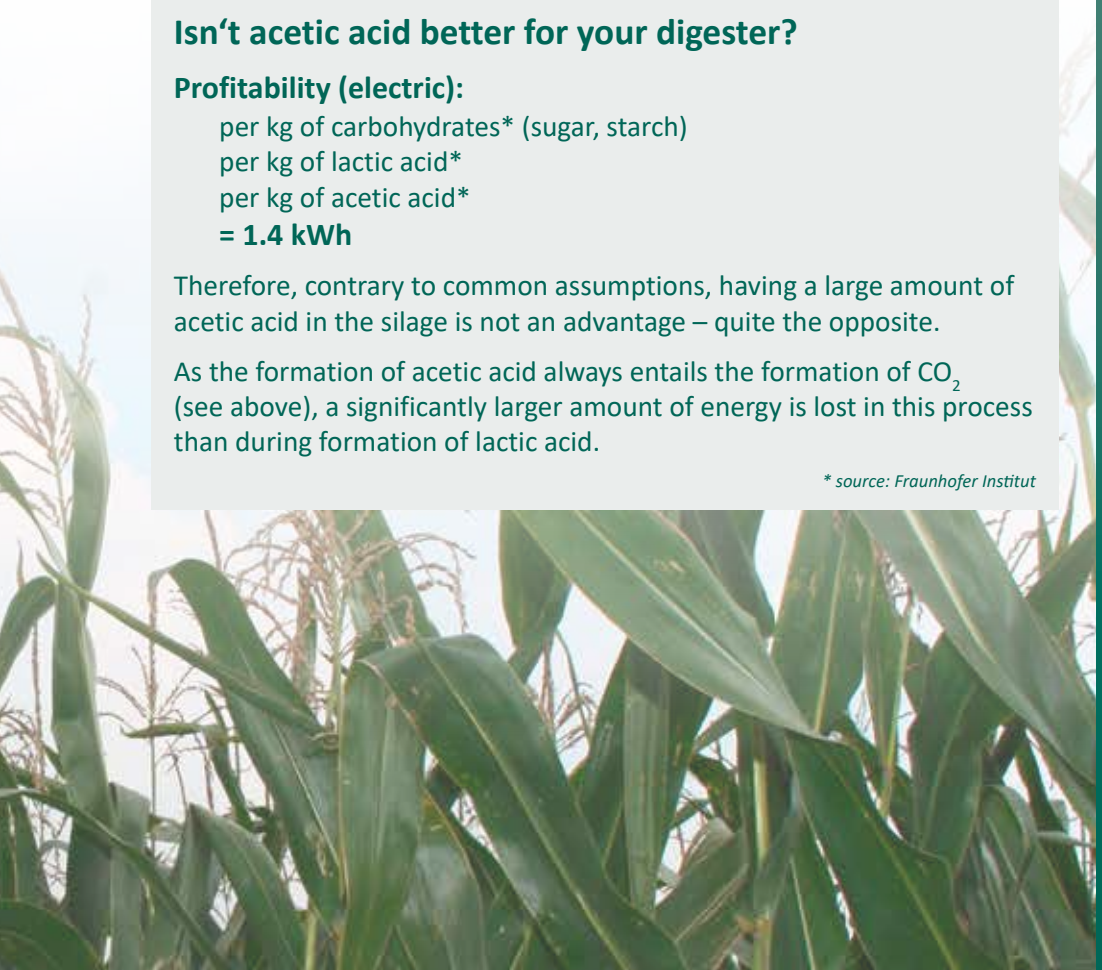
Profitability (electric):

per kg of carbohydrates* (sugar, starch)
per kg of lactic acid*
per kg of acetic acid*
= 1.4 kWh

Therefore, contrary to common assumptions, having a large amount of acetic acid in the silage is not an advantage – quite the opposite.

As the formation of acetic acid always entails the formation of CO_2 (see above), a significantly larger amount of energy is lost in this process than during formation of lactic acid.

** source: Fraunhofer Institut*



Field trials

Many biogas plant owners still believe that application of silage additives only makes sense if the silage is fed to dairy cattle. However, using suitable additives in silages for biogas production pays of rather quickly – as can be seen from the field trial with **jbs progas® ferm** below.

Farm profile: Agrargen. „Ländeken“ Meinsdorf, Ökotec plant, digester: 1 × 2,385 m³. 1 × 1,500 m³. Grass silage: 3,000 t. Maize silage: 18,000 t

„We did a first test run with **jbs progas® ferm** *in our maize silage in 2008. The analysis of this silage revealed a pH of 3.8 in 31.9 % DM. Analysis results were rated as „very good“. The silage smelled slighlty acidulous and bready.*

We determined that treating the silage with **jbs progas® ferm** *increased the gas yield in the digester by approx. 10 %. We were particularly impressed by the treated silage‘s stability.We often keep the fermentation substrate in the storage container for 1 - 2 days over the weekend – in the past, this resulted in huge problems with heating and moulding. Fermentation substrate treated with* **jbs progas® ferm** *is still totally stable after two days.*

We will continue to use **jbs progas® ferm**.“

Subject: Fresh matter losses

In optically flawless silages of optimum silage management, fresh matter losses between 3 - 4 % are considered rather good. These losses can rarely be seen by observing the silo.

3 % FM losses
≙ approx. 10 % DM losses
⟶ 10 % DM losses
≙ approx. 30 kg sugar / starch

These losses occur during the **natural** fermentation process and are – contrary to common assumptions – no indication of management flaws.

jbs progas® ferm can cut these losses nearly in half, thus increasing the silage‘s energy value significantly above that of untreated silage.

Monetary considerations of the effects of jbs progas® ferm

The reduction of DM losses signifies an additional 18.4 kg of carbohydrates per tonne of silage. According to the German research facility “Fraunhoferinstitut”, 1 kg of carbohydrates generates approx. 1.4 kW/hel.

18.4 kg × 1.4 kW/h = 25.76 kW/h

Assuming a remuneration of 0.16 € per kW/h – cautiously calculated –, this comes up to a gain of approx. 4.12 €/tonne of silage at costs of significantly less than 1 € –

coming up to a profit of 120 - 150 € per ha of maize!

Always as close as your telephone!

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