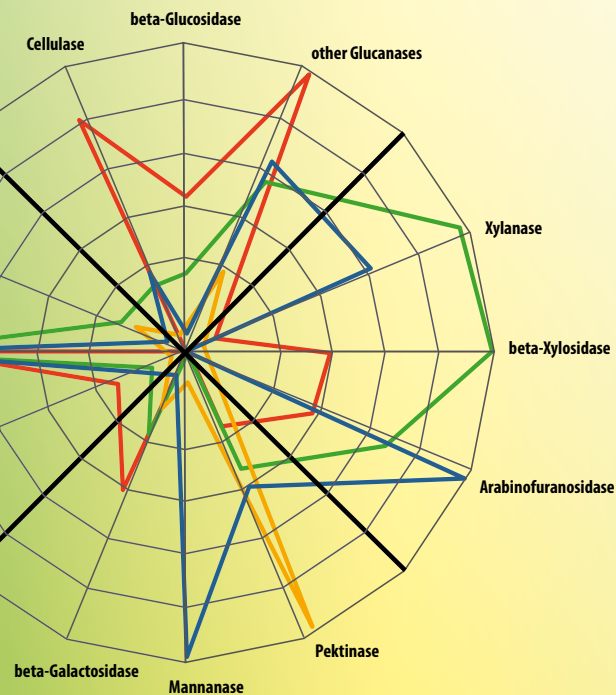


NEW

BC.ZYM

**Customised modular concept for
lower viscosity and
improved substrate utilisation**



SCHAUMANN Biogas Competence
BIOENERGY

BC.ZYM

Effect

The BC.ZYM components are complexes of active substances comprising specific biocatalysts (enzymes and cofactors) that accelerate or facilitate the breakdown of organic substrates.

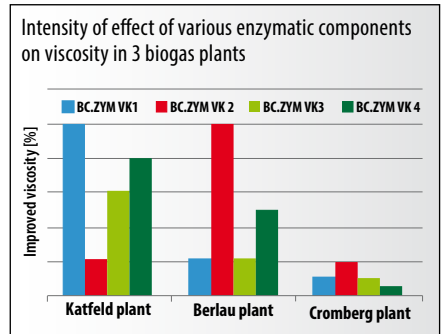
Many degradable substances such as cellulose, hemicellulose, proteins and starches are not readily accessible when presented in various substrates.

BC.ZYM ensures that the necessary intermediate enzymatic steps are completed, i.e. exposure and breakdown of cell membrane molecules and cross-links, reduction of the so-called cage effect and separation of high-energy metabolites. Once these steps are completed, decomposition takes place rapidly and efficiently.

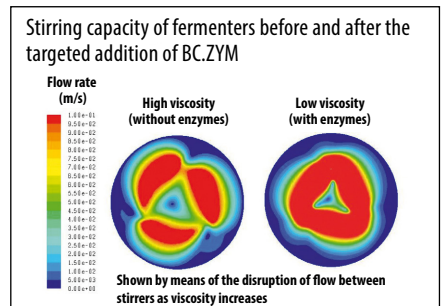
Endogenous bacteria involved in the biogas process complete the next stages of biogas production.

Evaluations of numerous test series performed on the contents of fermenters of various biogas plants, and the use of sophisticated analytical methods have shown that both the concentration of enzymes and the composition of the enzyme pool in fermenters vary significantly, and the effectiveness of enzymes in fermenters varies correspondingly as a result. The main factors causing these differences are the material and structural properties of the input substrates, the fibre-specific degree of decomposition the physico-chemical process parameters and the availability of bacterial enzymes. The modular BC.ZYM system

takes these specific factors into account and can be precisely tailored to fermenter contents.



Reduced enzymatic activity can also result in poor substrate utilisation and/or poor stirring capacity and flowability, even in fermenters with stable biological processes. This results in poorly mixed areas in the fermenter (dead zones), which may cause severe biological and technical disruptions. The BC.ZYM components reduce viscosity, increase stirring capacity and flowability and thus support effective substrate breakdown.



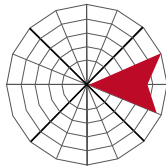
The modular BC.ZYM system

BC.ZYM supplies enzyme components specifically optimised for biogas processes. The BC.ZYM components comprise all enzymatic activities necessary to complete the various, complex decomposition stages. Each BC.ZYM component is specifically designed to achieve a particular effect.

Main effects of enzymatic activities of selected BC.ZYM components



BC.ZYM VK1 fibre viscosity – breakdown of crystalline glucans



BC.ZYM SK2 release of sugars from xylans

BC.ZYM components are grouped in three modules:

Module 1:

BC.ZYM VK 1 to 4

Main effect: Improved fermenter flow properties.

BC.ZYM VK 1, for example, contains all of the

enzymes and cofactors necessary to expose and break down crystalline glucans (e.g. cellulose) in plant fibre.

Module 2:

BC.ZYM SK 1 to 4

Main effect: Targeted breakdown of compounds resistant to decomposition.

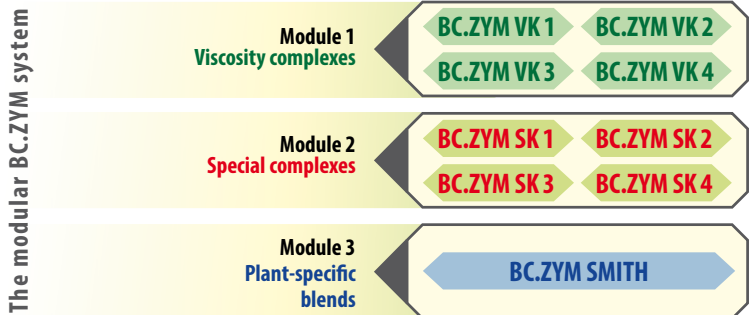
BC.ZYM SK components are generally applied once the viscosity in the fermenter has been reduced. They ensure that complex molecules are transferred into substances able to penetrate microbial cell membranes.

Module 3:

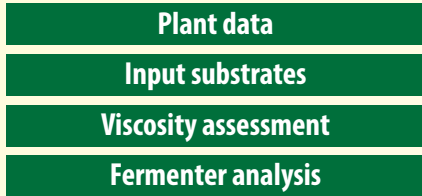
Plant-specific blend

Tailored combination of BC.ZYM components in order to maintain optimum fermenter operation in the individual plant.

The modular BC.ZYM system is the first of its kind to allow BC.ZYM blend to be precisely applied based on the specific enzyme profile in the respective plant.

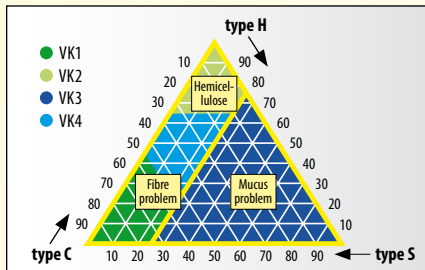


Product application for the specific reduction of viscosity



Evaluation triangle for selecting the BC.ZYM VK component from Module 1

The feedstock mix of a biogas plant can increase the viscosity in the fermenter. Hemicellulose (H), cellulose (C) and mucins (S) are used as differentiating evaluation criteria.



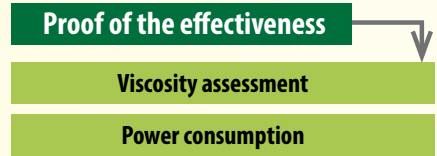
The evaluation triangle is the basis for selecting the correct product. Your Schaumann BioEnergy specialist consultant will advise you on site.

Selection of a product from Module 1 “Viscosity complexes” based on the available data and evaluation criteria:

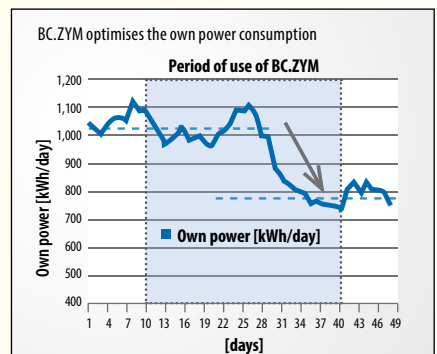
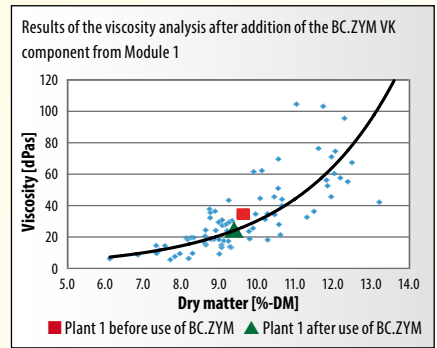


Examination of the viscosity and power consumption

The examination of the effectiveness of the product in the fermenter can take place after adding the product from BC.ZYM Module 1.



Addition of BC.ZYM reduces the viscosity, shortens the stirring and pumping times in the fermenter, and reduces own power consumption.





Fine adjustment of the enzyme use

Targeted, fermenter-specific enhancement of the BC.ZYM SK product for sustainable improvement of substrate utilisation.

Results from the first addition

Input substrates

Fibre classification

Selection of a product from Module 2 “Special complexes” based on the available data and evaluation criteria:



or / and creation of a plant-specific blend:



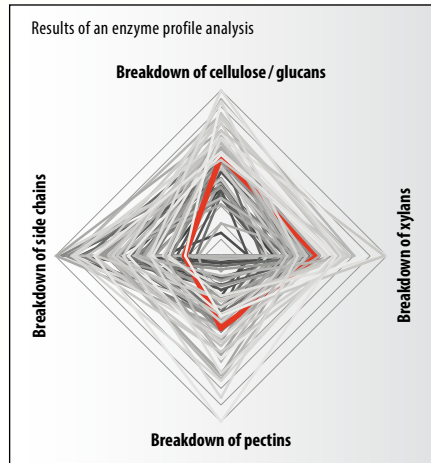
Use of BC.ZYM components appropriate for the input substrates improves the breakdown of the substrate and significantly lowers the viscosity.

Long-term periodic adjustment

Enzyme profile analysis

With the continuous addition of BC.ZYM, every fermenter achieves its own enzyme profile. The targeted enhancement of under-represented enzyme activities sustainably boosts the breakdown of difficult substrate components.

The enzyme profile analysis shows the effect of the added BC.ZYM components and allows dynamic adjustment of the plant-specific BC.ZYM blend. Thus, you can react to changes in the substrate mix.



The result of the enzyme profile analysis allows fine adjustment of the plant-specific BC.ZYM blend.



Maximum efficiency with customised BC.ZYM components

The modular BC.ZYM system is the first of its kind to allow the enzymatic status of biogas fermenters to be detected and the efficient breakdown of substrate to be enhanced in a targeted manner.

BC.ZYM

The result → More profit for you

- Improved specific substrate utilisation
- Increased stirring efficiency
- Improved pumpability
- Improved utilisation of cost-effective input substances
- Improved process stability
- Higher company profit

