

Bio Energy

News

NEW

PANTA RHEI

Homogenous digestate

Panta Rhei – everything flows

You know the issue: digestate storage over long periods of time can lead to crust formation and by the time it comes to spreading crusts can be more than a metre with stirrers no longer able to break them up.

To homogenise, external stirrers have to be brought in at great cost, the roof needs to be opened causing considerable loss of biogas and an explosive atmosphere in addition negatively affecting your site's carbon footprint.

Cause and Effect

Large amounts of agricultural waste in a plant's diet can facilitate crust formation. Farmyard manure contains long-fibred straw as well as high concentrations of nitrogen: broken down into ammonium, nitrogen increases pH, inhi-



Panta Rhei's ingredients adhere to fibre components in the digester and continue their work in the final storage tank enhancing the degradation process and increasing feedstock utilization as a result.



Panta Rhei – everything flows – feedstock example from 90% chicken manure at 7.8 g NH₄⁺ and 90 g/l oDM – in lab reactors at ISF Schaumann Research

Table: High ammonium concentrations (> 3.5 g/l) increase digester pH and oDM in comparison to low ones (< 1.5 g/l) (Source: Schaumann BioEnergy data)

	Low ammonium concentration ^{*)} <1.5 g/l	High ammonium concentration ^{*)} > 3.5 g/l
Ø NH ₄ ⁺	1.26 g/l	4.33 g/l
Ø pH	7.5	8
Ø oDM	57.3 g/l	68.1 g/l

^{*)} 234 biogas plants studied

^{*)} 146 biogas plants studied

biting fibre-degrading microbial enzymes. As a result, oDM remains high while gas yields drop. This connection could be shown by Schaumann BioEnergy in a study looking at 380 AD plants (see table): high ammonium concentrations lead to an increase in pH followed by an increase in oDM.

The solution in the digester

In heated digesters BC.ZYM products can improve viscosity and break up crusts within 10 days. However, in unheated storage tanks enzymatic breakdown of crude fibre is slowed by low temperatures, high pH and high ammonium concentrations. In addition, insufficient

mixing prevents enzymes from adhering to fibrous components, further impeding degradation.

The solution in storage tanks

Panta Rhei – everything flows.

Panta Rhei, the most recent development of ISF Schaumann Research, combines cation exchangers, emulsifiers, liquifiers, pH-stabilisers and enzymes. Starting in the digester and continuing into storage units, they combine their efforts in adhering to fibrous components and boosting the degradation process.

Continued use of Panta Rhei keeps digestate fluid and thus easier to stir and pump.

Dosage

Panta Rhei comes in fermentable bags and is applied into the digester via the feeder; depending on digester volume 1 bag every 1–3 days.

Results

At an oDM-reduction in the storage tank by only 4% and by the increased feedstock utilization that comes with it, the costs of Panta Rhei are quickly amortised.

And the actual benefit in the storage tank:

Panta Rhei – everything flows.

Dr. Udo Hölker