WEBER ENTEC

PRESENTATION WEBER ENTEC ULTRASOUND TECHNOLOGY

AHK-ITALY – 12.-15.10.2020

APPLICATION OF ULTRASOUND DISINTEGRATION

BIOGAS PLANTS

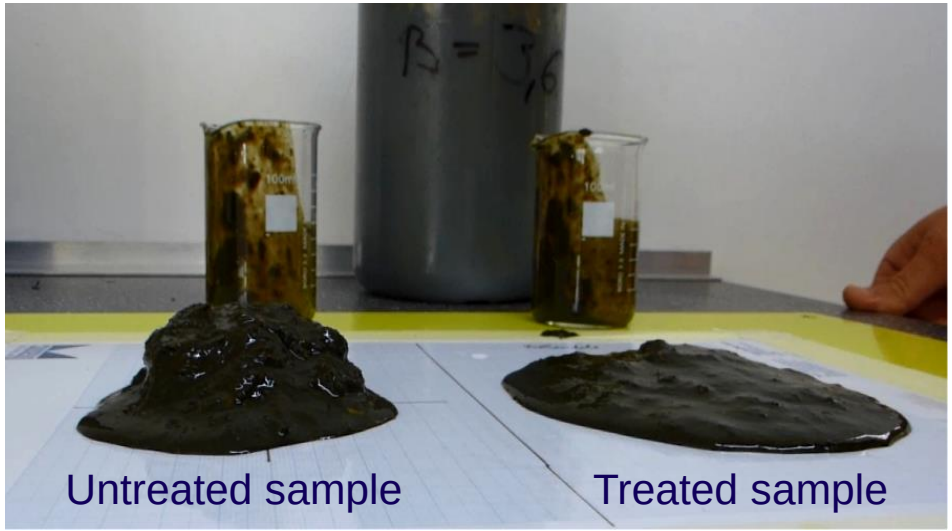
- Increase of biogas production
- Reduction of feed stock at equal performance
- Acceleration of organic degradation
- Consistent decrease of viscosity
- Reduction of pump- and stirring energy demand

WWTPs

- Increase of biogas production
- Reduction of sludge to be disposed
- Consistent decrease of viscosity
- Improved decanting
- Elimination of foam / fibrous bacteria

EFFECTS OF THE ULTRASOUND DISINTEGRATION

IMPROVED FLOW PROPERTIES

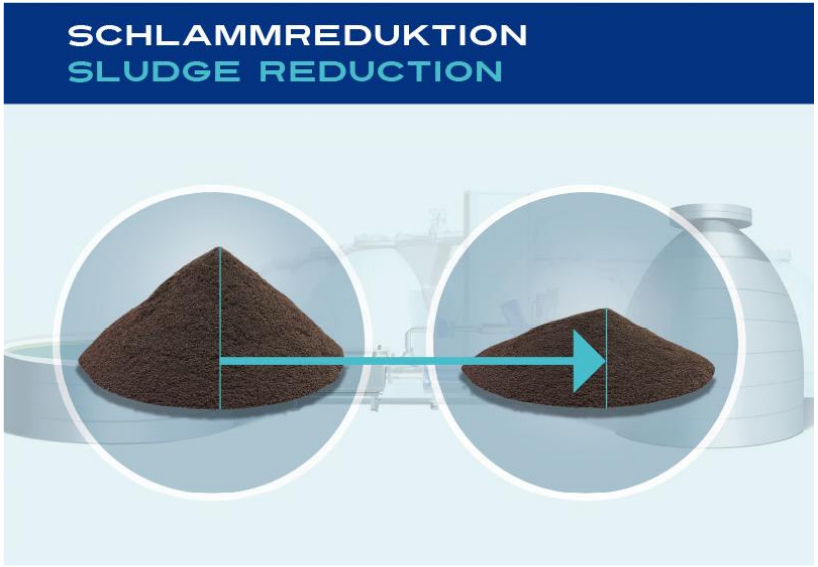


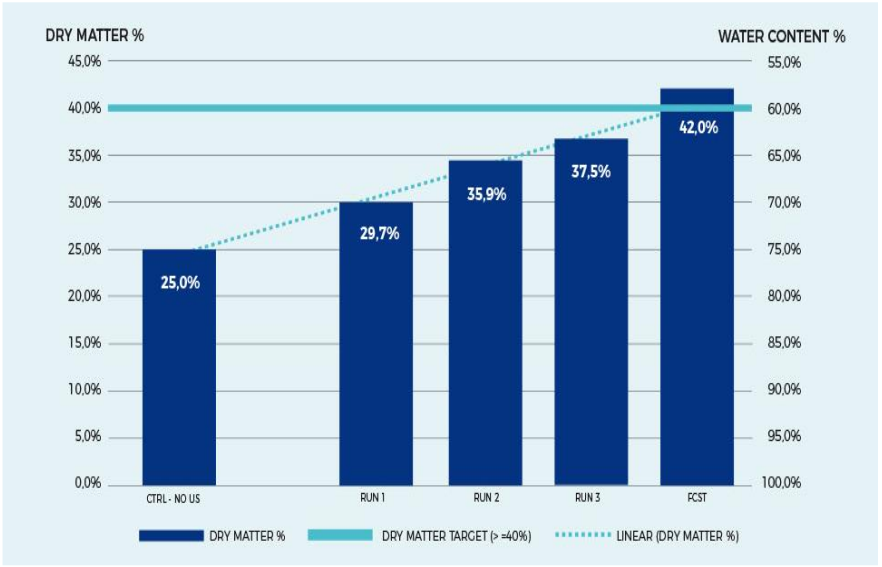
Direct comparison of the untreated and treated sample just after operation of the disintegration machine

After BioPush Treatment:

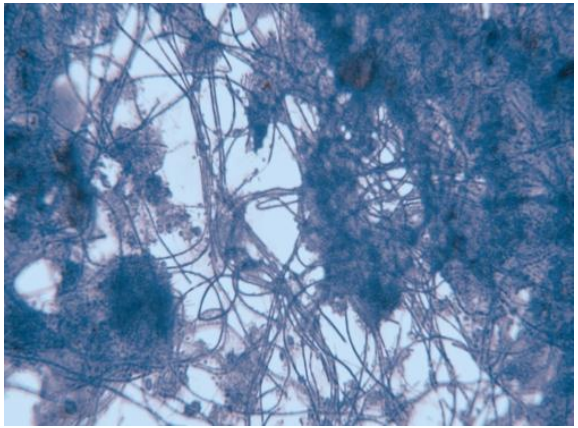
- Reduced viscosity
- Improved flow properties
- Decrease of energy consumption (pumping, stirring)
- More stable biology
- Higher proportion of difficult substrate usable (grass, manure,…)

IMPROVED DEWATERING PROPERTIES

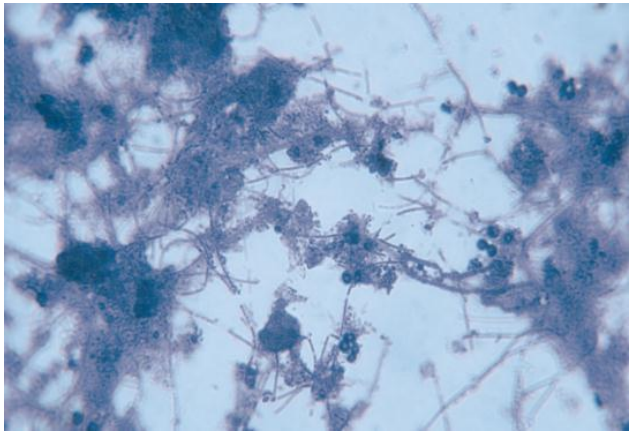




ELIMINATION OF THE FIBER BACTERIA



Before ultrasound treatment



After ultrasound treatment

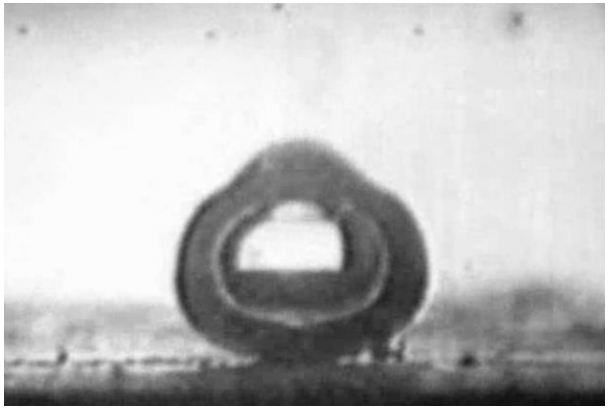
PHYSICAL PRINCIPLE – CAVITATION

Ultrasound liberates enzymes and shears up the substrates

Physical principle: Cavitation

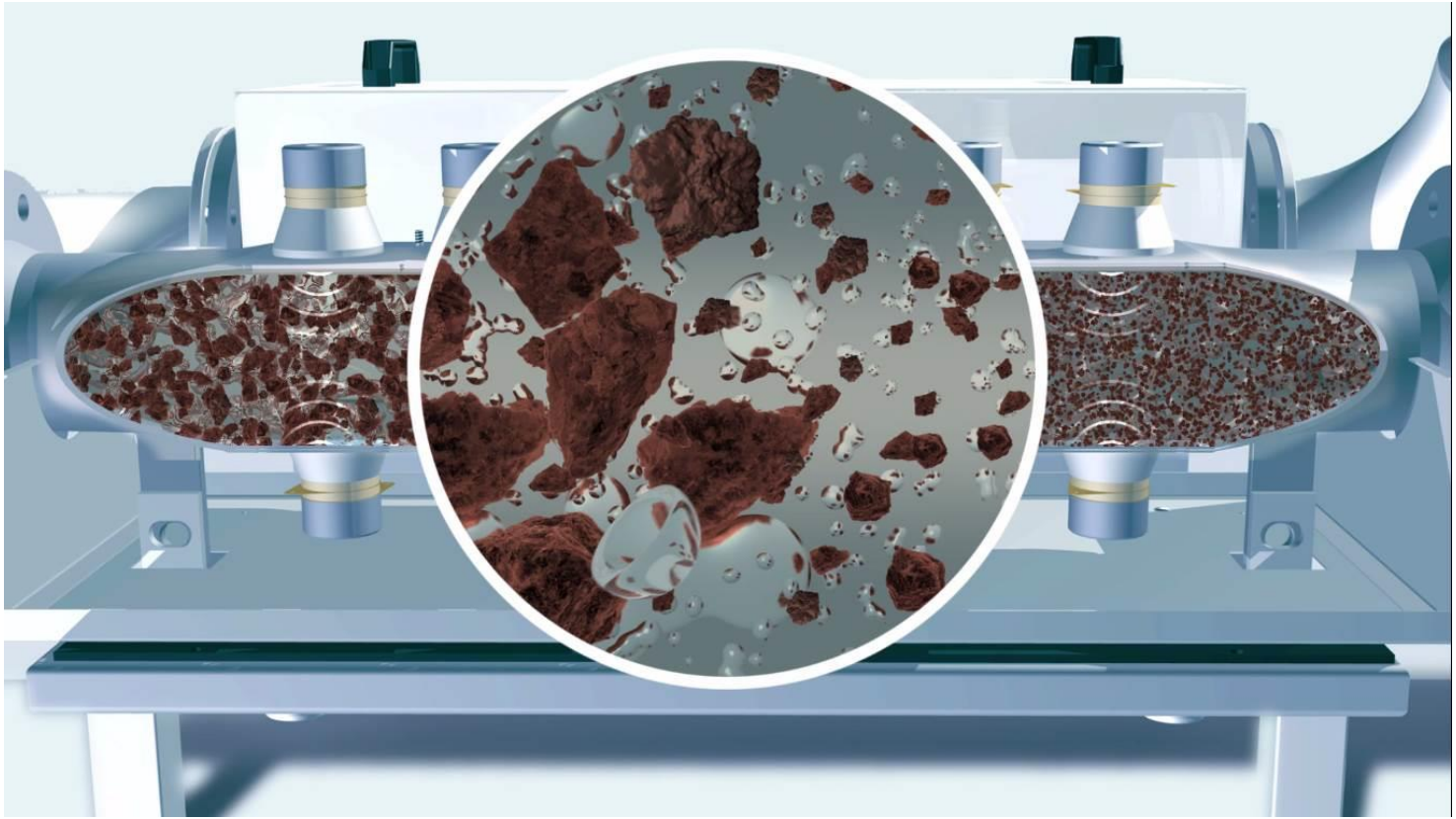
Short term local µm-radius

- Extreme high temperature (up to 5.000 C°)
- Extreme high pressure (up to 1.000 bar)
- Extreme high acceleration ⟶ Shear forces



Cavitation bubble prior to implosion

ULTRASOUND REACTOR BIOPUSH – THE NEXT GENERATION ULTRASOUND



GENERAL MACHINE DESIGN – DESIUS

1 Ultrasound unit

Cell rupture and surface augmentation

Mobilization of Exo-Enzymes

Sustained decrease of viscosity in fermenter

Ultrasonic power 2 kW per unit

High durability – up to 3 years and more

2 Mechanical Pre- treatment

Improved sound efficiency and machine protection RotaCut

3 Feeding pump

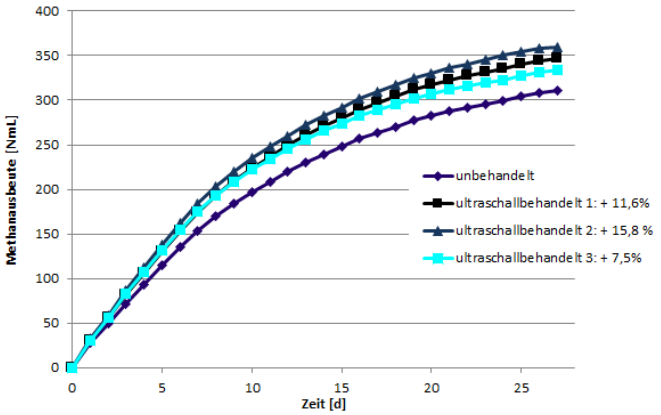
Excentric screw pump 0.5 to 2.6 m^3/h

4 Sensors

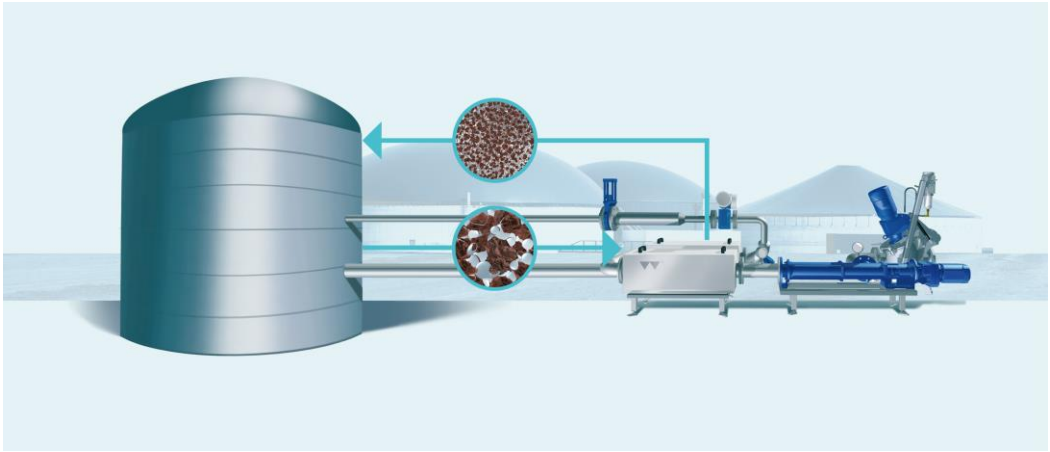
2 x pressure gages,
2 x temperature sensor,
1 x flow meter

BATCH TEST WITH AMPTS II

- Sampling of various specific energy levels to identify „sweet spot“ and process window
- Sampling of untreated material (control)
- The substrate mixed with ioculum will be digested until no more significant gas production will occur (approx. 30 days)
- Comparison of treated and untreated samples

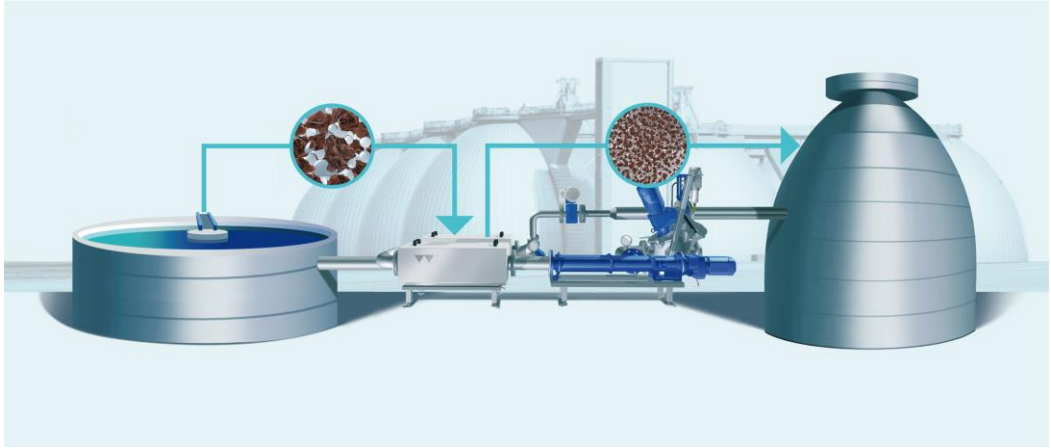


POSSIBLE INTEGRATION EXAMPLES IN BIOGAS PLANTS



Main digester Ultrasound unit

POSSIBLE INTEGRATION EXAMPLES IN WWTP



TWAS Ultrasound unit digester

OVER 100 MACHINES CASE STUDIES AND REFERENCES WORLDWIDE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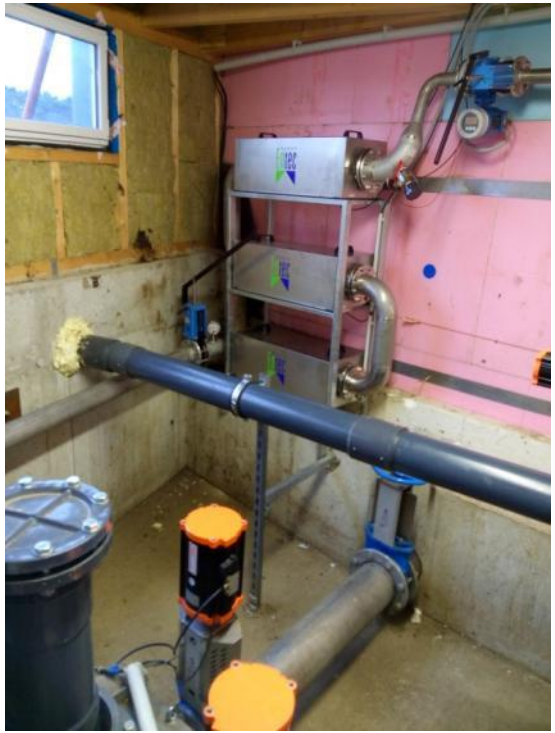


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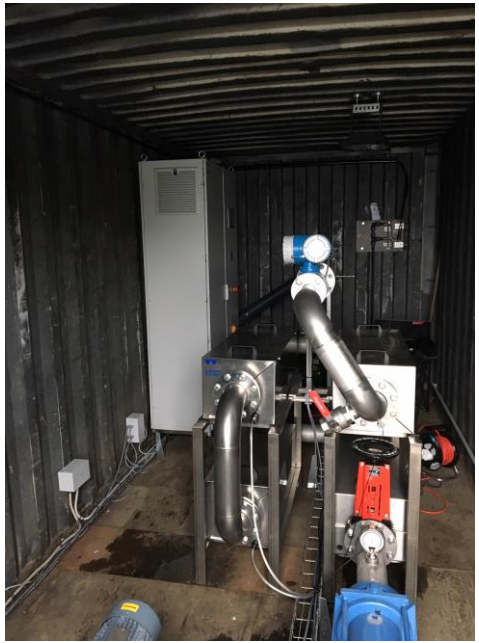

THANK YOU !

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