

Thermophilic digestion

Application

Fermentation represents a natural and anaerobic dissimilation process during which organic biomass is transformed. Certain bacterial strains are capable of converting organic material mainly into methane (CH₄), carbon dioxide (CO₂) and water. The efficiency of the conversion is determined by the system and the nature of the substrate. This anaerobic digestion process takes place in two different ranges on the temperature scale, i.e. from 30-40°C (mesophilic range) and from 50-55°C (thermophilic range).

Thermophilic digestion is often applied for treatment of industrial organic waste products, WWTP sludges or manure. It is also possible to combine various waste streams, which is then called co-digestion. An additional advantage of thermophilic digestion is that the greater part of pathogens, viruses and germs are pasteurized during digestion at elevated temperature.

A unique mixing- and heating device of Colsen (Digestmix®) allows for a very stable and efficient operation of the digester.

The biogas thus produced is desulphurized (BIDOX®) and can be used effectively for the production of heat and/or power in a CHP application or can be upgraded to natural gas quality.



Digestmix®, a unique mixing & heating system

Process & Results

During thermophilic digestion of organic substrate the following conversion levels are realized:

Organic substrate	Conversion (%)
Primary WWTP sludge	90%
Secondary WWTP sludge	50%
Waste streams food industry	95%
Manure	70%
Maize etc.	85%

Biogas production is greatly dependent of the nature of the substrate and certain influent and process characteristics. High conversions are obtained as a result of :

- Stable process temperature
- Excellent mixing
- Continuous feed
- Customized process control

The digestate is separated into a liquid and a solid fraction. As a result of the high degree of degradation the amount of residuals in the digestate is limited. The dewatered solid fraction represents about 10 % (w/w) of the original influent volume. The liquid fraction can be further processed or purified based on customer needs. In general, post treatment aims at the reduction of nitrogen, phosphorous and COD from the digestate.

Colsen offers both the realization and the operation assistance for a digester. Colsen digesters do not have moving parts and are equipped with plugging-free heat exchangers. Based on the requirements of the customer the tanks can be constructed from a range of materials and equipped with various types of roofs. Existing systems can be readily upgraded.

EN-2015