

# EUSDR Workshop – 17.09.2019



## Biological treatment of organic waste and possibilities of reducing foreign substances

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- 1. Company presentation**
- 2. Overview of treatment procedures and areas of application**
- 3. The BIODEGMA method**
- 4. Understanding composting as a process**
- 5. Possibilities of reducing foreign substances**

## Company group



### BIODEGMA GmbH

- Engineering
- Construction of compost plants
- Construction of MBA plants
- Plant upgrades

Planning and plant construction

### BEM Umweltservice GmbH

- Biowaste utilisation
- Commercial waste treatment
- Exploitation of heat-rich fractions

Plant operation and waste recycling

## 2. Overview of treatment procedures and areas of application



**Aerobic treatment**

**Anaerobic treatment**

Composting/stabilization

Fermentation

Static systems

Dynamic systems

Dry fermentation

Wet fermentation

Encapsulated systems

Full flow

Open systems

Partial flow

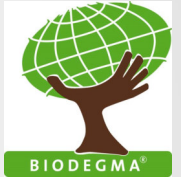
## Dynamic systems:

### windrow composting:

- + encapsulated system
- + odour measuring and reduction via biofilter
- + process control
- + high throughput capacity
- high energy costs
- high maintenance costs
- high investment costs

-> only useful for plant capacities > 40,000 t/y

operating costs: 80 - 100 €/t (incl. capex)



fully automated systems in buildings



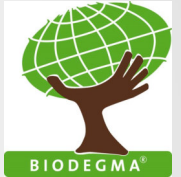
## Dynamic systems:

### line composting:

- + encapsulated system
- + odour measuring and reduction via biofilter
- + process control
- + high throughput capacity
- high energy costs
- high maintenance costs
- high investment costs

-> only useful for plant capacities > 35,000 t/y

operating costs: 70 - 100 €/t (incl. capex)



fully automated systems in buildings

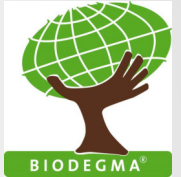
## Dynamic systems:

### windrow composting:

- + flexibility with regard to treatment capacity
- + low energy costs
- + low maintenance costs
- + low investment costs
- odour emissions
- process control
- space requirements
- acceptance

-> applicable for wide range of throughput services depending on location (distance to development)

operating costs: 20 - 45 €/t (incl. capex)





## Static systems:

### In-vessel composting:

- + closed system
- + exhaust air treatment
- + process control
- + flexibility
- small treatment batch
- high logistics effort
- high maintenance effort
- winter mode

-> applicable only to throughput of 15,000 t/y  
Operating costs: 45 - 60 €/t (incl. capex)





## Static systems:

### tunnel-composting:

- + closed system
- + exhaust air treatment
- + process control
- + flexibility regarding to plant capacity
- construction effort
- energy costs
- high maintenance effort

-> applicable from throughput of 15,000 t/y  
Operating costs: 60 - 85 €/t (incl. capex)



### Fully or partially automated systems

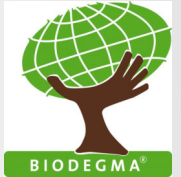


## Static systems:

### membran-composting:

- + closed system
- + exhaust air treatment
- + process control
- + flexibility regarding to plant capacity
- + low energy demand
- + low maintenance effort
- + low investment costs

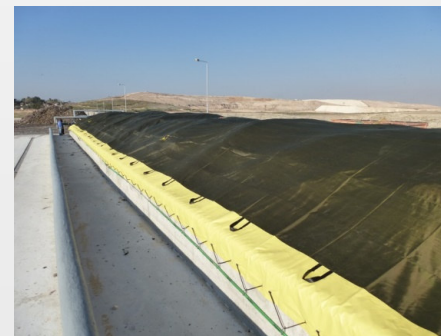
-> applicable for throughput of 5,000 - 150,000 t/y  
Operating costs: 30 - 45 €/t (incl. capex)



Tunnel solution



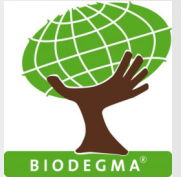
Covered windrow



Covered windrow box



# BIODEGMA GmbH

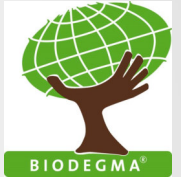


- 23 years of experience in the planning and construction of biological waste treatment plants with semipermeable membranes (Gore® Cover)
- More than 65 plants in different climatic zones
- In total, BIODEGMA plants handle more than 1.3 Million tons of waste per year

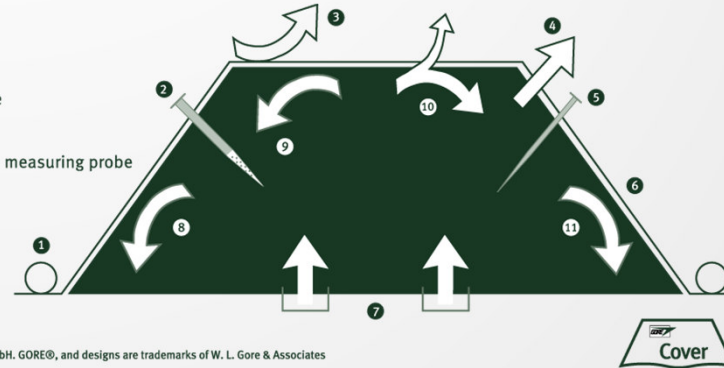




# BIODEGMA GmbH



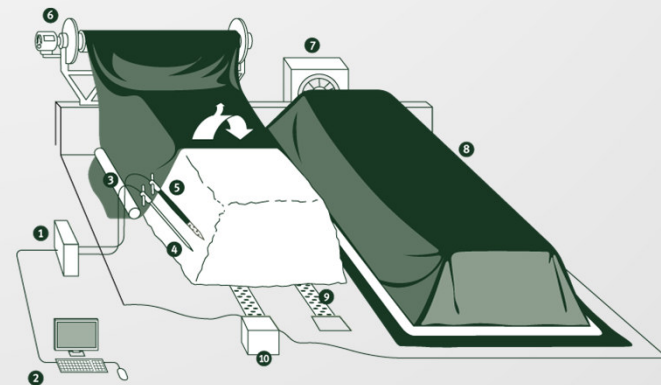
- 1 Tarpaulin retainer
- 2 O<sub>2</sub>-measuring probe
- 3 Weather impact
- 4 CO<sub>2</sub>
- 5 Temperature profile measuring probe
- 6 GORE® Cover
- 7 Air
- 8 Heat
- 9 Odour
- 10 Moisture
- 11 Micro-organisms



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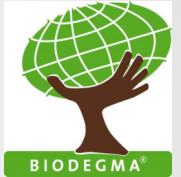
- 1 Control unit
- 2 PC
- 3 Tarpaulin retainer
- 4 Temperature profile probe
- 5 Oxygen/Temperature probe
- 6 Winding gear
- 7 Ventilator station
- 8 GORE® Cover
- 9 Drainage system
- 10 Siphon



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# BIODEGMA GmbH



Energy input: 3-7 kWh/t input

Maintenance effort including replacement of semi-permeable membranes after 6 years: 1.00-1.60 €/t input

Low resource consumption = small carbon footprint



# BIODEGMA GmbH

Scientific accompaniments on the topic of odour reduction through semi-permeable membranes:

- Fischer, Sihler: Geruchsminderung durch semipermeable Planenabdeckung bei der Mietenkompostierung, University of Stuttgart; August 1995
- Michael Kühner: Preiswerte Kompostierung unter semi-permeablen Planenabdeckungen im Vergleich zu etablierten aeroben Abfallbehandlungsverfahren. Dissertation Universität Stuttgart, April 2000
- Lohmeyer, Bächlin, Rühling: Abschätzung von Geruchsemissionen aus 5 Anlagentypen, Pilotstudie im Auftrag des Ministeriums für Umwelt und Verkehr Baden-Württemberg, August 2002
- Gewitra mbH: Ermittlung der Emissionssituation bei der Verwertung von Bioabfällen; UFOPLAN des Umweltbundesamtes; August 2007-September 2008





# How to produce a high-quality compost??





## Composting is not just a question of technology, but a question of the process



- As far as possible, unmixed collection

**Collection-systems:**

**testing removal vs. delivery-systems**

**no plastic bags but paper bags!!**

**no collection on unpaved surfaces to avoid contamination with  
stones**

**Quality control**

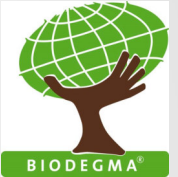
**Educational work through advice**

Waste acceptance

- Quality control input
- First separation of bigger foreign substances

**both for the removal and delivery-System**

**manual sorting of bigger foreign substances  
(plastic bags, glass, bulky waste, contaminated wood and so on)**



- As few crushing work steps as possible with high contaminants



**Shredding unit:**

**slow Runner vs. fast runner**

**implementing the rotting windrow:**

**wheel loader vs. compost turner**



Fine preparation

- Screening
- Windsifting for foils
- Heavy part separator for stones

**Mobile screening system in combination with wind sifters (source: Komptech, Austria)**

**Hurrikan**

[TO PRODUCT OVERVIEW](#)

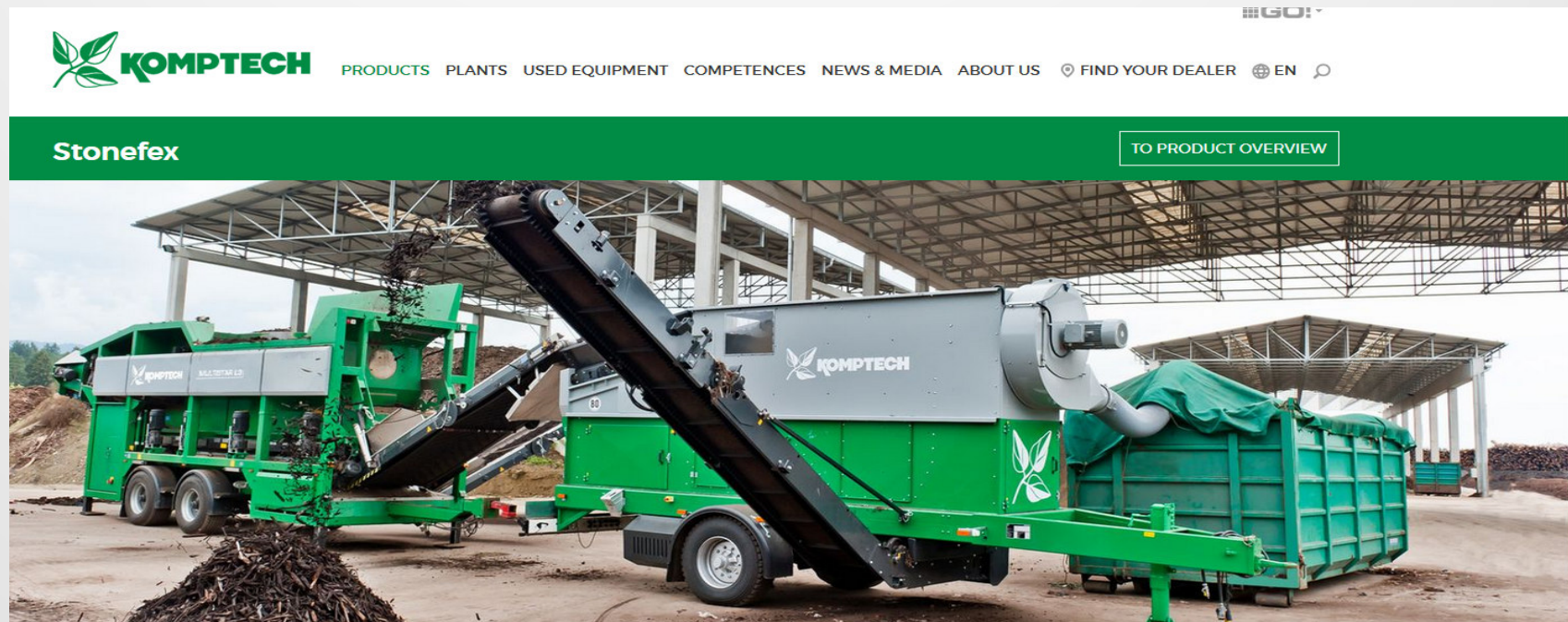




Fine preparation

- Screening
- Windsifting for foils
- Heavy part separator for stones

**Mobile screening system in combination with heavy-duty separator (Source: Komptech, Austria)**





**Thank you for your attention**