Treatment of Biowaste: State of the Art and Trends in Europe

Josef Barth, ECN and INFORMA, Germany
ECN - Summary

Exchange of Experience

Circulation of Information

Common Strategies

Exchange of Knowledge

European Reference Point

European Standards

Sep. collection

Anaerobic Digestion

MB-Treatment

< Composting Quality & Markets >

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EU Waste Composition

Organic parts in Municipal Solid Waste

- Maximum: Greece 49%
- Minimum: UK 22%
- Average: EU 32%

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European Organic Waste Situation:

Potential organic Waste in EU15: 50 Mio. t / year

Treatment (2004):
11 Mio t Biowaste
7 Mio t Greenwaste
3,5 Mio t Digestion

=> 42 % (+2 % to 2002)

8,5 Mio t compost

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Why Composting?

• More flexible system
• Simpler technology – but trend to in-vessel plants
• Less complicate microbial biology
• Works with wooden material
• Cheaper than anaerobic digestion
• **But**: Complicate and expensive odour management
Degradation of source separated waste from the households, gardens and industry

- Around 1800 plants - 40 % treat only garden waste
- Annual capacity -> 18 million t
- + some 800 small on farm co-composting plants

- **Target**: Production of a **PRODUCT** for the market of organic fertilisers and soil improvers
80 industrial plants with 3.5 million t/y capacity

- Less requirement of space
- Easier emission/odour management
- 46% are dry, 49% are wet digestion system
- Better removal of impurities (plastic, metals..)
- Recovery of energy (subsidies 0.1 €/KWh) and fuel

-> 5000 on-farm co-digestion plants (Germany, Austria)

- **But:** more expensive and complicate technique
Quality Assurance QAS at sites guarantees high compost quality

- Raw material
- External control
- In-house control
- Quality criteria
- Label/certificate
- Declaration
- Application infos
- Training of operators

THE ORGANIC LOOP

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<table>
<thead>
<tr>
<th>Country</th>
<th>Plants in QAS</th>
<th>Plants with certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Belgium/FI</td>
<td>24</td>
<td>10</td>
</tr>
<tr>
<td>Luxemburg</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Netherland</td>
<td>22</td>
<td>4</td>
</tr>
<tr>
<td>Germany</td>
<td>450 c.+ 50 digest.</td>
<td>428 c. + 40 digestion</td>
</tr>
<tr>
<td>Sweden</td>
<td>2 c. + 8 digestion</td>
<td>4 digestion</td>
</tr>
<tr>
<td>UK</td>
<td>45</td>
<td>20</td>
</tr>
<tr>
<td>Norway</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td>QAS introduced</td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td>QAS introduced</td>
<td></td>
</tr>
</tbody>
</table>

**QAS Monitoring in total:**
- 620 plants with capacity of 9 million tons composting and 2 million tons digestion
Plants offer large range of different compost products

Bagged for private customers  Loose for professionals
Why Separate Collection?

- More than 40% of urban waste is organic waste
- Recyclable via composting and digestion
- Fulfils waste regulations and recycling targets
- Separate collection and composting is cost competitive to mixed waste treatment!!!
- Segregation at source leads to high purity ...
- and to good quality (only 20% heavy metals contents compared to mixed waste compost)

Clean recyclables = products = find markets
## Quality of Separate Collection

<table>
<thead>
<tr>
<th>Country</th>
<th>Degree of purity of collected biowaste</th>
<th>Amount of organic material in the restwaste (grey bin)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>97 to 99 %</td>
<td>15 - 25 %</td>
</tr>
<tr>
<td>Belgium (FL)</td>
<td>97 to 99 %</td>
<td>50 %</td>
</tr>
<tr>
<td>France</td>
<td>95 %</td>
<td>-</td>
</tr>
<tr>
<td>Finland</td>
<td>97 to 99 %</td>
<td>27 %</td>
</tr>
<tr>
<td>Germany</td>
<td>95 to 98 %</td>
<td>30 - 40 %</td>
</tr>
<tr>
<td>Italy</td>
<td>96-98 % (door-to-door)</td>
<td>small</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>98 to 99 %</td>
<td>46 - 50 %</td>
</tr>
<tr>
<td>Netherlands</td>
<td>97 to 98 %</td>
<td>around 50 %</td>
</tr>
<tr>
<td>Spain (Catalonia)</td>
<td>&gt; 95 % (door-to-door)</td>
<td>-</td>
</tr>
<tr>
<td>Sweden</td>
<td>95 to 98 %</td>
<td>20 - 30 %</td>
</tr>
</tbody>
</table>

High quality (97% purity) - but restwaste must be treated
Mechanical Biological Treatment MBT (2004)

Pre-Treatment of rest waste after separate collection by composting or digestion to stabilise it before landfilling

- 180 Mech. biolog. treatment plants - 14 million t/year mainly in Italy, Germany and Austria

- **Target**: Production of **WASTE** with very low organic matter content which is suitable for landfilling
Laws and regulations allow several treatment possibilities
No longer competitive biowaste treatment methods!!

<table>
<thead>
<tr>
<th></th>
<th>Green-/Bio-waste Composting</th>
<th>Anaerobic Digestion</th>
<th>Sludge Treatment</th>
<th>Mechanical Biolog. Pre-Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>x</td>
<td>(x)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Germany</td>
<td>x</td>
<td>x</td>
<td>(x)</td>
<td>x</td>
</tr>
<tr>
<td>Sweden</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>-</td>
</tr>
<tr>
<td>Draft BWD</td>
<td>x</td>
<td>x</td>
<td>-</td>
<td>x</td>
</tr>
</tbody>
</table>

The "integrated" waste stream approach in required
= best treatment solution according to local conditions