



3A-biogas

**Three step fermentation of solid state biowaste
for biogas production and sanitation**

DI Oliver Schmidt

Müller Abfallprojekte GmbH / Austria, Project Co-ordinator

DI Johann Bergmair

Profactor Produktionsforschungs GmbH / Austria, RTD-Partner



**BIO-ENERGY
ENLARGED PERSPECTIVES**

Budapest ,16-17 October 2003

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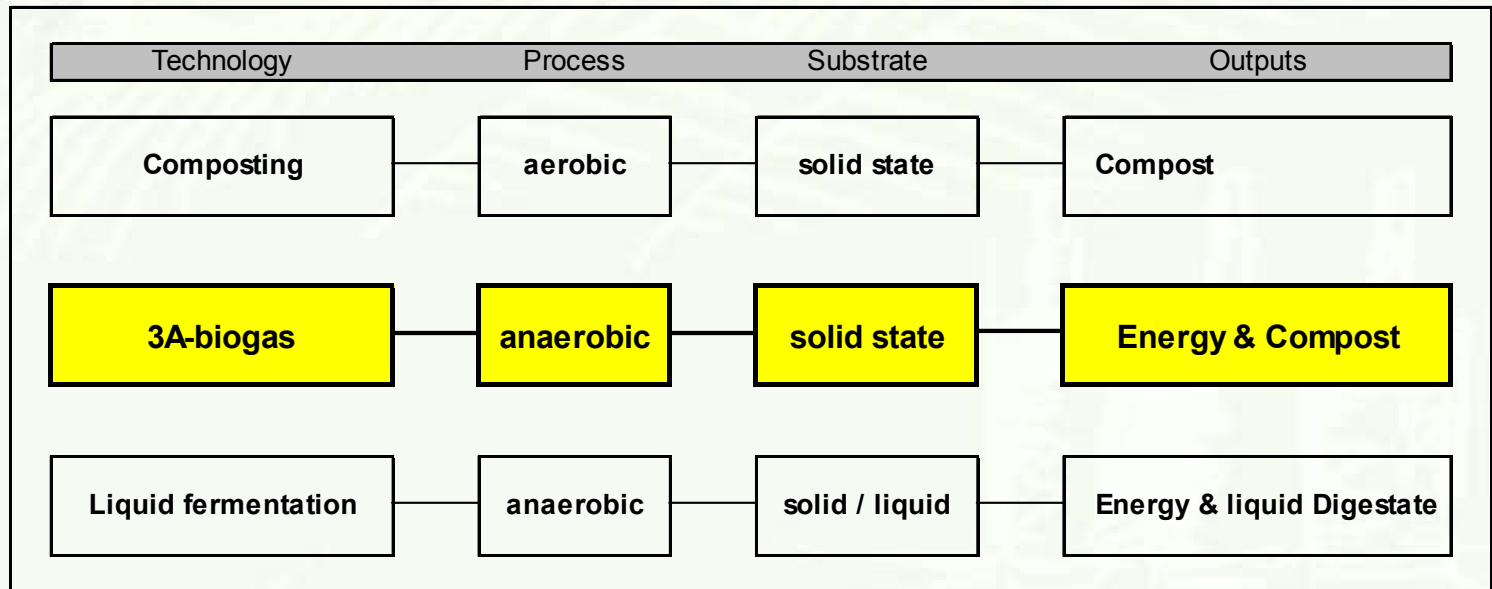
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- 3A-biogas and existing treatment of dry material
- CRAFT-Project: History, aims and methods
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Background

- Catchword: **Renewable Energy**
- One way: **Biogas**
- Solid state biowaste has unused energy potential:
 - Biowaste separately collected and municipal solid waste
 - agricultural waste and manure
 - waste from garden, horticultural and industry
- Biogas can be used in various ways:
 - CHP-units, gas turbines (possibly trigeneration)
 - fuel cells (after additional gas upgrading)



3A-biogas and existing treatment



- **3A-biogas combines positive aspects**

- sanitation within the process
- biogas production
- dry compost without wastewater



CRAFT-Project: History and Aims

- **Previous achievements**

- procedure was patented by Prof. Steffen in 1988
- laboratory experiments
- partners came together for co-operative research

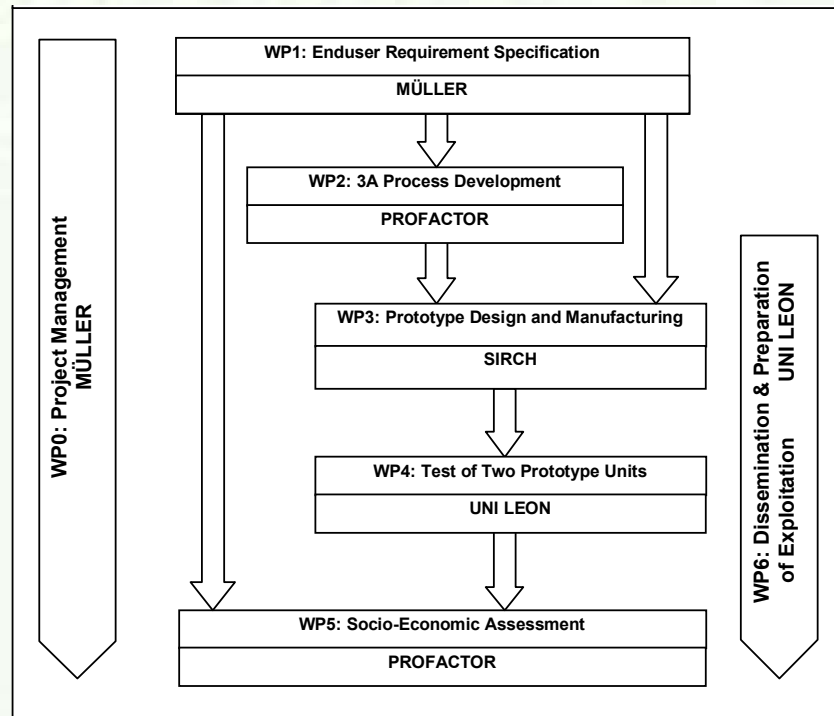


- **Aims of the project**

- up-scaling to prototype size (modular batch system)
- investigation of proper material composition
- definition of relevant process parameters
- development of low cost process control unit

CRAFT-Project: Methods

- **Planned work**



- **Time period**

- project started at Dec. 1st, 2002
- duration of 2 years
- current status: manufacture of the prototypes (WP3)

CRAFT-Project: Consortium

• Structure

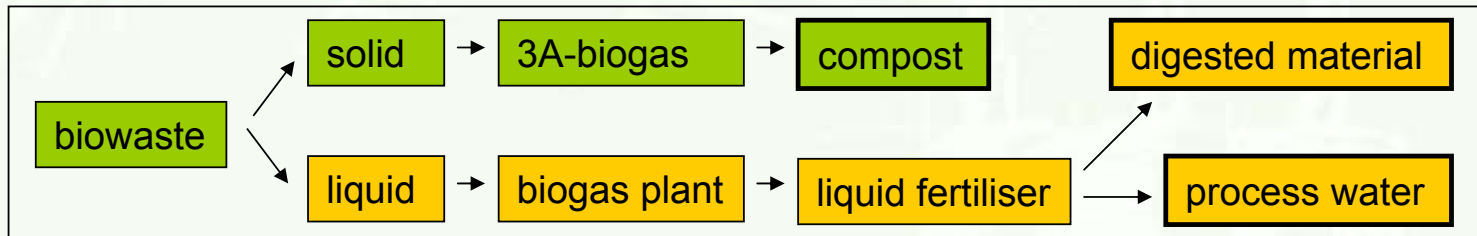
- 6 SME's and 3 RTD's from 3 European member states:
 - 3 End-users (Hebio/A, Beta Nutror/E, Biomasa/E)
 - 2 engineering enterprises (Müller/A, Inecosa/E)
 - 1 mechanical engineer (Sirch/D)
 - 3 research institutes (Profactor/A, S.I.G./D, Uni Leon/E)
- market orientated research and development with synergies



Key issues

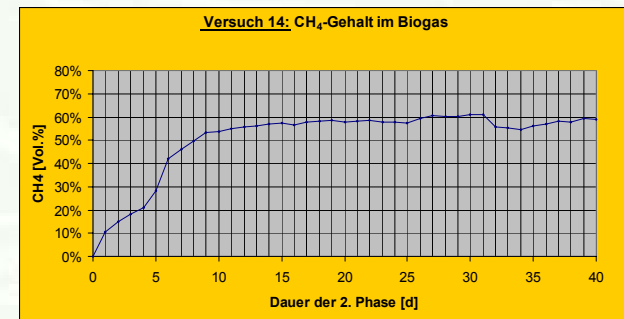
- **3A-biogas** - second treatment line for dry substrates in addition to existing liquid biogas plants

EXAMPLE WASTE MANAGEMENT ENTERPRISE



- **Optimised process control system**

promotes high biogas yield
(up to 300Nm³/t DM)
best quality of biogas and compost



Key issues

- **Sanitation** in the aerobic phase up to 70°C
European Directive 2nd Draft - Biological Treatment of Biowaste
 - sanitation at composting or anaerobic digestion
 - end product requirements
- **Circulation** of the leachate – crosswise percolation improves process quality
 - anaerobic microbiology as inoculum
 - pH balance and humidity
 - avoids wastewater
- **Additional application**
for multiple solid waste treatment e.g. MSW
reducing the content of organics

Conclusions

- **Advantage**

of treating solid state materials in a 3A-biogas fermentation plant is combination of the positive aspects from anaerobic fermentation and composting



- **Enduser profiles**

- Existing liquid biogas plants
Second treatment line for solid input substrates
- Compost plants
Energy production + deodorization



Conclusions

- **Substrates**

appropriate materials for the process are e.g.

- energy crops
- farmyard manure
- separately collected biowaste
- waste from the food industry
- garden and horticultural waste
- organic fraction of MSW



“Renewable energy based on solid state biowaste is an area with considerable unused potential”

Thank you for your attention



www.3A-biogas.com