3A-biogas

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

www.3A-biogas.com

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

Contents

- Introduction and Background
- 3A-biogas and existing treatment of dry material
- CRAFT-Project: History, aims and methods
- Project - Consortium
- Key issues
- Conclusions

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

Technology	Process	Substrate	Outputs
Composting	aerobic	solid state	Compost
3A-biogas	**anaerobic**	**solid state**	**Energy & Compost**
Liquid fermentation	anaerobic	solid / liquid	Energy & liquid Digestate

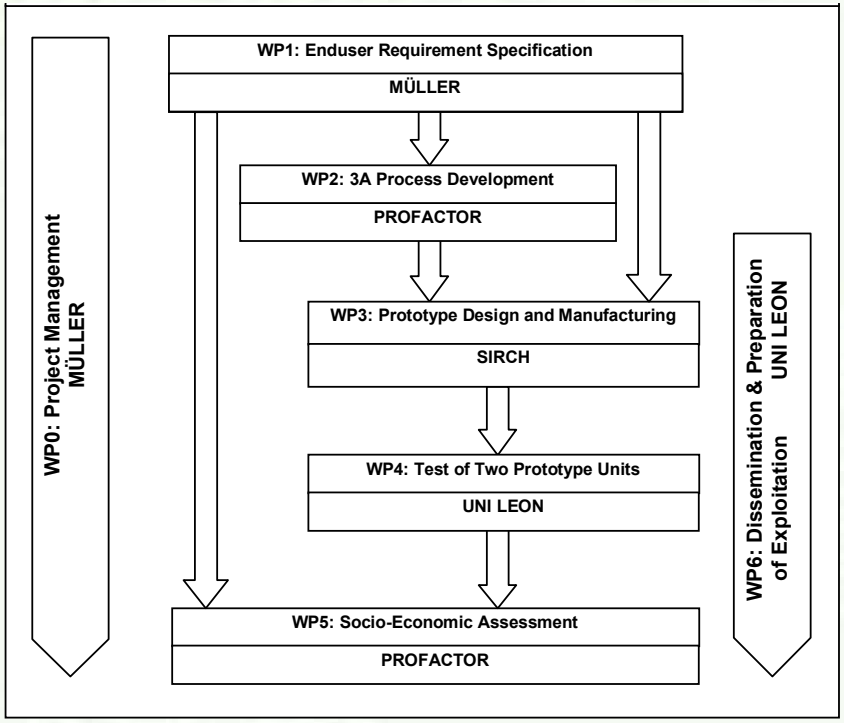
- **3A-biogas combines positive aspects**
  - sanitation within the process
  - biogas production
  - dry compost without wastewater

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)

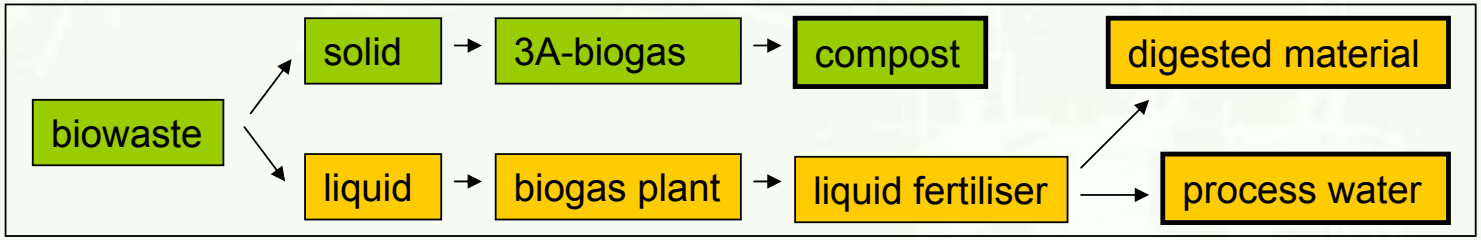
CRAFT-Project: Consortium

- **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

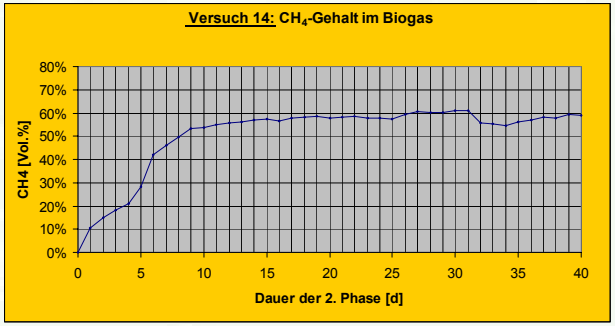
- **3A-biogas** - second treatment line for dry substrates in addition to existing liquid biogas plants

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

3A biogas

www.3A-biogas.com