The importance of Quality Assurance for a sustainable recycling of biowaste
Workshop

• Quality assurance and markets of compost and digestate products in the Flemish Region
  – Vlaco, Wim Vanden Auweele

• Compost story
  – IOK Afvalbeheer, Jonathan De Witte

• Digestate story
  – AM-Power, Henk Dedeyne

• Interactive session: your opinion and discussion
Total in 2017: 3,546,500 tonnes, of which waste: 2,292,000 tonnes
Quality Assurance: the Vlaco QAS

- Legal obligation
- Compost and digestate products
- Clear end-of-waste criteria included
- Input / process / output / reasoned use
- Sampling and analysis under recognition
- Benchmarked with ECN-QAS
- Extra quality: label
Professional treatment: Quality Assurance

✓ ‘Good practice’
✓ Based on self control
  by treatment plant
    • Internal quality system
    • Protocol of acceptance for input
    • Process control
    • Quality control of the end-products
    • Reasoned use of the end-products
✓ Independant control
  by VLACO npo on the self control of the company
    • Sample taking
    • Analysis
    • Audits + admin. controls

• Agricultural value, proces value
• Input requirements (impurities, Vlarema)
• No dilution
• Registration and traceability
• Risk Assessment through sampling + analysis protocol (recognised labs)
• Screening of suppliers of biowaste

• Optimising of the process
• Minimal process time, tracing
• Critical process factors
• Monitoring and steering
• Recognised labs (external control)

• Product information document
• Composition + application

 VLACO-certificate = end-of-waste
Interactive map: certified products
### Reasoned application

#### Groencompost

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Waarde</th>
<th>Einheid</th>
<th>Interpreteatie</th>
</tr>
</thead>
<tbody>
<tr>
<td>droge stof en vochtsomstandigheden</td>
<td>52.4</td>
<td>% op vet</td>
<td>laag te nat</td>
</tr>
<tr>
<td>rotomorfologische eigenschappen</td>
<td>20.3</td>
<td>% op vet</td>
<td>zeer hoog</td>
</tr>
<tr>
<td>organische stof (op droge zt)</td>
<td>28.7</td>
<td>% op vet</td>
<td>normal</td>
</tr>
<tr>
<td>pH</td>
<td>6.6</td>
<td></td>
<td>6.4-6.6</td>
</tr>
<tr>
<td>totaal kalk (CaO)</td>
<td>0.120</td>
<td>% op vet</td>
<td>laag</td>
</tr>
<tr>
<td>totaal kalk (CaO)</td>
<td>0.160</td>
<td>% op vet</td>
<td>voldoende</td>
</tr>
<tr>
<td>materiaal dat niet omgezet is</td>
<td>1.5</td>
<td>%</td>
<td>laag</td>
</tr>
</tbody>
</table>

#### Overkoopstabilisatie en uitblijvende methylen

<table>
<thead>
<tr>
<th>%</th>
<th>ligation</th>
<th>kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>detergentie</td>
<td>28.10</td>
<td>26.3</td>
</tr>
<tr>
<td>waterzouten</td>
<td>6.95</td>
<td>0.5</td>
</tr>
<tr>
<td>waterflee</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>waterkalk (K2O)</td>
<td>0.59</td>
<td>0.2</td>
</tr>
<tr>
<td>totaal waterkalk (CaO)</td>
<td>5.30</td>
<td>0.5</td>
</tr>
<tr>
<td>totaal methylen (CaO)</td>
<td>0.40</td>
<td>0.0</td>
</tr>
</tbody>
</table>

#### Werk
- Winkel 1:5 m² tot 15-20 cm diep in de grond.
- Winkel 1:1 m³ tot 20% compost en 80% grond.
- Gazon: Werk 4 m² tot 15-20 cm diep in de grond.
- Steun in het nagenoeg 0.5 m³ groencompost over het bedekkende gazon.
IOK Afvalbeheer

Intermunicipality Region ‘Kempen’

Waste management for 520.000 inhabitants (29 cities - rural area)

Activities
Prevention – direct communication to inhabitants
Separate waste door-to-door collection (> 120 trucks)
Recycling stations for separate waste collection (18)
Mechanical-biological treatment of residual waste (120.000 t)
Biological treatment of bio-waste (65.000 t)
Collection of bio waste (1)

Door-to-door collection ‘kitchen and garden waste from households’

- 30,000 t/y (56 kg/inh)

Recycling Stations collection of ‘organic waste’: garden waste of households

- 35,000 t/yr

Municipalities (own waste)
Treatment – ‘Energy Conversion Park’

**Biowaste**

**Digestion combined with composting facility**

**Materials**

**Biomethane**
5 GWh/yr

**Electricity and Heat**
2 x 6 GWh/yr
Materials - overview

- Compost (23,600 t/yr)
  - Biowaste compost
    - Regular (< 16 mm) 14,000 t/yr
    - Fine (< 5mm) 2,600 t/yr
  - Green compost 7,000 t/yr
- Potting Soil 150 t/yr
- Woody materials (1,700 t/yr)
  - Mulch material 1,300 t/yr
  - Biomass (energy) 400 t/yr
Materials - distribution

30% directly to households – mostly biowaste compost (own distribution)
15% to municipalities (bulk)
55% to companies (bulk)
Compost in Flanders

In 2017, in Flanders the production of quality assured compost was:

- 325.000 tonnes of green compost
- 108.000 tonnes of biowaste compost (kitchen, fruit and garden waste compost)
Digestate story
AM-Power

- Located in Pittem, Belgium
- Treatment capacity = 180,000 t
- Largest biogas plant in Belgium
- Operational since 2011

<table>
<thead>
<tr>
<th>Plant</th>
<th>Feedstock</th>
<th>Current technologies</th>
<th>Investments</th>
<th>Products (full scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM Power Pittem, Belgium</td>
<td>Manure, Food waste (180,000 ton)</td>
<td>Digester, Nutrient recovery by reverse osmosis (RO) (TRL 5)</td>
<td>Innovative combination of RO and a vaporizer to produce mineral N,K concentrates (TRL 7)</td>
<td>Biogas, N+K-concentrates</td>
</tr>
</tbody>
</table>
Impression of AM-Power
Problem statement

• 250 million tons organic biological waste (OBA) in the EU
• Loss of P en N to the water
• ..... But also loss of energy and valuable nutrients
From waste product to high quality end-product.

But first **GREEN POWER** and **GREEN HEAT**

- **Energy:**
  - Installed capacity = 9 MW
  - Production capacity = 7.5 MW

- **Nutrients:** focus on valorisation of nutrients of digestate
DIGISTATE end-products

Current Process AM-Power

- Raw Digestate
- Liquid Fraction
- Mineral Concentrate
- Solid Fraction
- Dried Digistate
Recycling of nutrients.... not a simple process

• Many possibilities ...

• A lot of trial & error

• Great investment of time and money
BUT our goal is to recycle even more nutrients!

HOW?

• AM-Power is a demo plant in a large European H2020 project called “SYSTEMIC”
• In this way, it is possible for us to continue investing in even more nutrient recuperation.
• Therefore we currently place a large vacuum evaporator
NEW Process AM-Power
Interactive session with audience
Vlaco’s carbon footprint-tool & use in communication - WRF - 26.02.2019
Go to www.menti.com and use the code 57 30 92

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To be covered

- CO$_2$-tool Vlaco (12’)
- 2 x questions (12’)
- Wrap-up (6’)

- Goal: inspire & retriev
1. Vlaco’s CO$_2$-tool (WHAT?)

- What is (surplus) value of composting/compost?
  - a.o. net avoided emissions, nutrients, carbon stored, biodiversity, soil, water,…: CO$_2$ and/or €

- What is
1. Vlaco’s CO$_2$-tool (WHAT?)

- How to fully capture economic/ecologic value of our members activities?
  - In one parameter?
  - In product label?
  - In tool?
  - Climate change!

- .... °2017 start building Vlaco’s carbon footprint tool
  - Excel-based
  - CO$_2$-equivalents (cfr LCA’s)
  - scientific literature/documentated
1. Vlaco’s CO$_2$-tool (WHAT?)

- **TOOL:**
  - Footprint: **positive** & **negative** CO$_2$-eq of process & product
  - **Per tonne** of **applied** compost or digestate (cradle to cradle)
  - Carbon Footprint Product (**CFP**)

<table>
<thead>
<tr>
<th>+</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>No digestion (BAT) ~ prior ow policies</td>
<td>Energy crops</td>
</tr>
<tr>
<td>Emissions (incl energy use) of transports and production</td>
<td>Storage manure</td>
</tr>
<tr>
<td>Production and transports of minerale NPK</td>
<td>C-sequestration (CO$_2$-eq.)</td>
</tr>
<tr>
<td>Renewable energy (digestion: to biogas in CHP or to biomethane)</td>
<td></td>
</tr>
</tbody>
</table>
### 1. Vlaco’s CO₂-tool (RESULTS)

#### Some examples (1/3)

<table>
<thead>
<tr>
<th>Type compost:</th>
<th>Groencompost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hoeveelheid (ton)</td>
<td>100</td>
</tr>
<tr>
<td>Toepassing</td>
<td>Potgrondproductie</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>vermeden uitstoot CO₂-equivalenten van niet (correct) composteren (-)</th>
<th>-371,8 kg CO₂eq/ton compost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>uitstoot CO₂-eq. door aanvoer oba, productie en afvoer van compost (+)</td>
<td>163,9 kg CO₂eq/ton compost</td>
</tr>
<tr>
<td>2</td>
<td>vermeden uitstoot CO₂-eq. vanuit productie, transport en mineralisatie van veen (-)</td>
<td>-577,0 kg CO₂eq/ton compost</td>
</tr>
<tr>
<td>3</td>
<td>vermeden uitstoot CO₂-eq. vanuit productie en transport mineral NPK (-)</td>
<td>-8,7 kg CO₂eq/ton compost</td>
</tr>
<tr>
<td>4</td>
<td>C-sekwestratie (CO₂-eq.) in bodem op lange termijn (-)</td>
<td>-41,0 kg CO₂eq/ton compost</td>
</tr>
<tr>
<td>5</td>
<td>vermeden uitstoot CO₂-eq. van fossiele brandstoffen equivalent aan hernieuwbare energie uit zeefoverloop-verbranding of gft-voorvergisting en eventuele opwerking tot &amp; gebruik van biomethaan (-)</td>
<td>-20,3 kg CO₂eq/ton compost</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTALE VOETAFDRUKVERMINDERING COMPOST**

<table>
<thead>
<tr>
<th></th>
<th>-855,0 kg CO₂eq/ton compost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-85496,7 kg CO₂eq totaal uitgespaard</td>
</tr>
</tbody>
</table>

Koms overeen met

<table>
<thead>
<tr>
<th>de gemiddelde uitstoot/km van ...</th>
<th>534 354 km</th>
</tr>
</thead>
<tbody>
<tr>
<td>de gemiddelde uitstoot van een personenwagen voor een afstand van ...</td>
<td>534 354 km</td>
</tr>
<tr>
<td>de gemiddelde uitstoot/jaar van ...</td>
<td>35,6 personenwagens</td>
</tr>
</tbody>
</table>
1. Vlaco’s CO$_2$-tool (RESULTS)

- Some examples (1/3):
  - Green compost (100 T) for ° potting soil
  - Vlaco CO$_2$-tool:
    - **footprint reduction** (vs reference) of 855 kg CO$_2$eq/ton compost or 85 ton CO$_2$eq for 100 tonnes
    - Emissions by avg family car: 534.354 km
1. Vlaco’s CO$_2$-tool (RESULTS)

- Some examples (2/3):
  - Vfg-compost (30 T) for public green services:
  - Vlaco CO$_2$-tool:
    ✓ **footprint reduction** (vs reference) of 1.259kg CO$_2$eq/tonne vfg compost or 38 tonnes CO$_2$eq for 30 tonnes
    ✓ Emissions by avg family car: 236.196 km
1. Vlaco’s CO$_2$-tool (RESULTS)

• Some examples (3/3):
  – Solid fraction digestate (15 T) for farming:
  – Vlaco CO$_2$-tool:
    ✓ footprint reduction (vs reference) of 110kg CO$_2$eq/tonne digestate or 1,6 tonnes CO$_2$eq for 15 tonnes solid fraction digestate
    ✓ Emissions by avg family car: 10.303 km
Go to www.menti.com and use the code 928305

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1. Vlaco’s CO₂-tool (VALIDATION)

- Validated by OWS and Vinçotte (2017-2018)
- Excel + ‘backgrounddocument’
- OWS:
  - ✓ Rationale/structure
  - ✓ Proper functioning
  - ✓ Conformity ISO14067
    - methodology,
    - review background-documents (chapter requirements),
    - system boundaries,
    - precision, completeness, representativeness, consistency, reproducibility, sources, sound data,
    - emission factors,
    - arithmetical correctness
1. Vlaco’s CO$_2$-tool (VALIDATION)

- **Vinçotte:**
  - ✓ Advice cfr ISO14021 (Self-declared environmental claims for products, **incl advice on communication issues**)
  - ✓ Conformity ISO14067
  
- Background-document & validations need to be public (on demand)
Go to www.menti.com and use the code 432461

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2. Go to www.menti.com

3. Enter the code 432461 and vote!
2. WRAP-UP: Vlaco’s communications

✓ Clear mission statement:
  ➢ ”to make producers, consumers, governments en knowledge centers more aware of the ecological impact of the organic waste treatment sector and its products.”

✓ Website: maximum transparency + logo
✓ Workshops for Vlaco-members
✓ °public webbased CO$_2$-app
✓ ° (social) media plan
✓ Vlaco-publications (2) and media contacts
✓ Direct communication
✓ Elaborate link Covenant of Mayors (cities’ climate plans) through organisations such as Futureproofed
2. WRAP-UP: Vlaco’s future communications

✓ Accompanying product documents/packaging
✓ Target more specific groups
  ✓ farmers
  ✓ Cities & regions (climate plans)
✓ Using to promote biomethane
✓ ....
2. WRAP-UP: CONCLUSIONS?

• Major challenges in setting up & using carbon footprint tool (CFP):
  – What is goal ? (evolution)
  – Research & cooperate
  – Validate – open source
  – Manage tool’s complexity & promote tool’s simplicity (webtool or App)
  – Crucial importance of communication
    » Choose level(s) and target group(s):…..
    » Choose a set of communication channels:…..
    » Make a media & social media plan: …. 
    » Continuous process
Thanks for participating!

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