The VERA Test Protocol: Verification of emission reduction technologies in agriculture

General aims and current state of test protocol for land applied manure

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Why VERA?

Background:

- **NEC / NERC:** need to fulfil the requirements of emission reduction
- **IED / BREF:** a validation for technology performance which may be accepted as a BAT technology is needed

Why VERA?

VERA
VERIFICATION OF ENVIRONMENTAL TECHNOLOGIES FOR AGRICULTURAL PRODUCTION

- **Secure validation of environmental technologies is necessary**

1. Clear definition of product requirements
2. Harmonization of test procedures in Europe
3. Comparable test quality in Europe
4. Improvement of comparability of products
5. Establishment of a database for tested products

VERA – Fundamentals

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VERIFICATION OF ENVIRONMENTAL TECHNOLOGIES FOR AGRICULTURAL PRODUCTION

VERification of Environmental Technologies for Agricultural production

Effective validation of environmental technologies

Mutual recognition by
✓ common test protocols for verification with scientific experts
✓ International collaboration of authorities

Basic principle:

Credibility by
✓ High measurement quality
✓ Transparency

For: farmers manufacturers authorities

More countries are invited to partcipate!!

What does VERA do?

VERIFICATION OF ENVIRONMENTAL TECHNOLOGIES FOR AGRICULTURAL PRODUCTION

✓ Verification = Confirmation that a test has been performed according to a **standard** (= VERA test protocol).

✓Independent
✓Transparent

NO certification
NO expert opinion
NO national approval!

✓ National requirements or general advices can ONLY be given as information or recommendation to the applicant.

Harmonise experimental conditions and methods

VERIFICATION OF ENVIRONMENTAL TECHNOLOGIES FOR AGRICULTURAL PRODUCTION

➢ Description of the system/technology
- Must be provided by manufacturer/applicant

➢ Requirements for carrying out the test
- Test plan designed by test institution and send to national VERA expert committee, accept/not accept.
- Test carried out by test institution

➢ test report
- Data analysed and a report written by test institute
- Report send to national VERA expert committee, accept/not accept.

Compliance with specific VERA-Test protocol needs to be approved

Environmental technologies in agriculture

Current VERA test protocols

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Test protocol „land applied manure “

<u>Agreed:</u>

- Information required from the applicant / test organisation:
  - Manure:

    type and origin of manure, application rate, N_{tot}, NH_4-N, pH
  - Weather and field conditions:

    date and time of application, soil and crop condition at application, wind speed, humdity, radiation, air- and soil temperature, precipitation incl. 24 hours prior to test.

    Meteorological data recorded on site or taken from nearest weather station

Aspects agreed on:

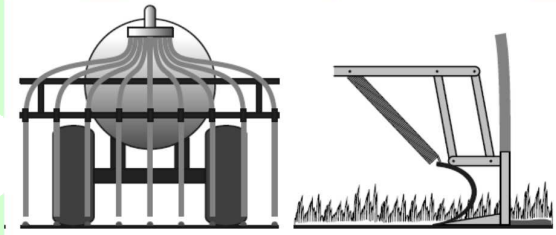
- Aim of test:

  Reduction efficiency compared to a reference application technique

- Reference technique:

  Trailing hose or trailing shoe

  Depending on national legislation

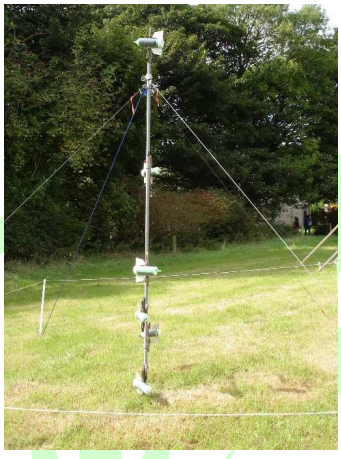


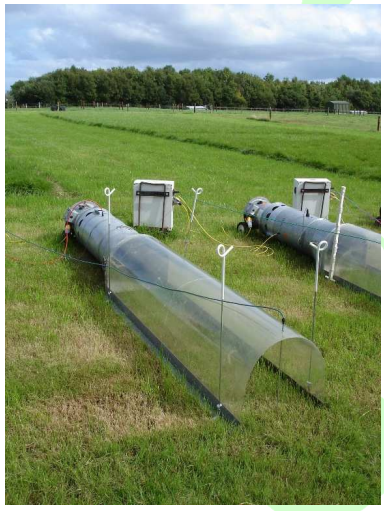
Aspects agreed on:

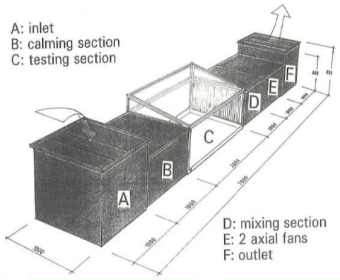
- Measuring technique:

  Must fit requirement to measure on plots of size needed to apply with full-scale machinery

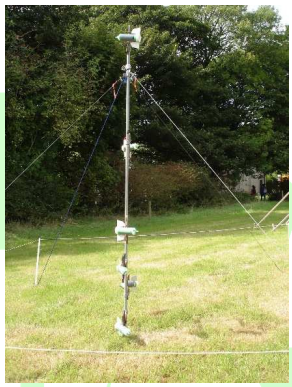
  - Micromet (IHF, Zinst)
  - Windtunnels
  - other techniques, if applied for with proof for applicability and accuracy and accepted by VERA committee.







Aspects agreed on:



- Measuring technique:

  For each technique **<u>minimum requirements</u>** are defined, e.g.:

  - Micromet (IHF, Zinst):
    height of samplers, length of fetch,
    mimimum number of background measurements,
    minimum distance between plots….

  - Windtunnel:
    minimum covered area and hight,
    air exchange rate, number of replicates
    and background measurements

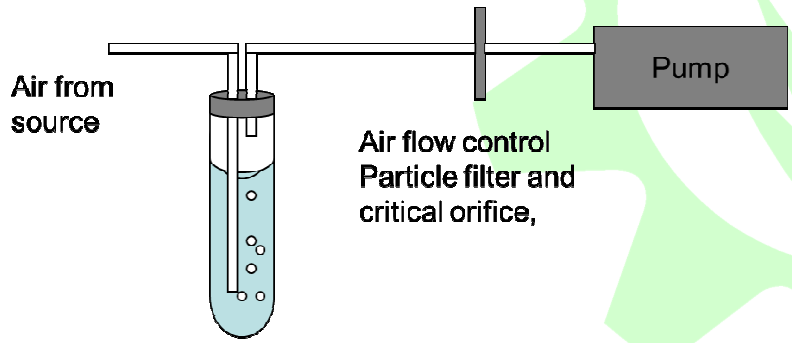
Aspects agreed on:

- Measuring technique:

  <u>Ammonia sampling:</u>

  - Passiv samplers and anemometer (IHF, Zinst)
  - Online instruments with heated tubes (windtunnel)

  or impinger (acid trap bubblers)
  = standard method other systems have to be tested against



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Aspects agreed on:

- Parameters for slurries used:
  - Range of NH_4- and dry matter content, range of application rates (20-30 m^3/ha)
- Duration of measurements:
  - 96 hours for slurries, 6 days for solid manures

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Aspects still under discussion:

- Number of replicates in time
  - At least measurement at two different temperatures
  - For grassland and crops:
    - Is there a need to define height of grass or crop?
    - type of crop ?

Aspect not covered:

- Odour emissions
  - No accepted sampling concept / measurement technique available at the moment

→ Will be added when available

Protocol for mineral fertilizers

- Required experimental setup differs from those for application of manures
- Other measurement techniques and sampling strategies might be suitable

→ Work on a separate protocol will be started, when that on application of manure is completed.

Wanted!!
Test – labs and joining countries

- please contact VERA secretariat if you can support applicants in conducting their measurements or your country would like to join the VERA-Initiative

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