

## Field trials in Germany

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09.10.17 – 12.10.17

Riga



**Baltic Slurry Acidification**



EUROPEAN UNION

EUROPEAN  
REGIONAL  
DEVELOPMENT  
FUND



To evaluate slurry acidification on regional scale, experiments are conducted on:

- Micro-plot field scale (2017/2018)
- Large field scale (2017/2018)

Micro-plot pre-field trial 2016:

- Großbarkau



## Micro-plot field experiment (started in march 2016)

**Crop:** Permanent grassland (5 silage cuts)

**Soil type:** Haplic Luvisol (15% Clay, 61% Sand, 2.1% Corg (0-30 cm))

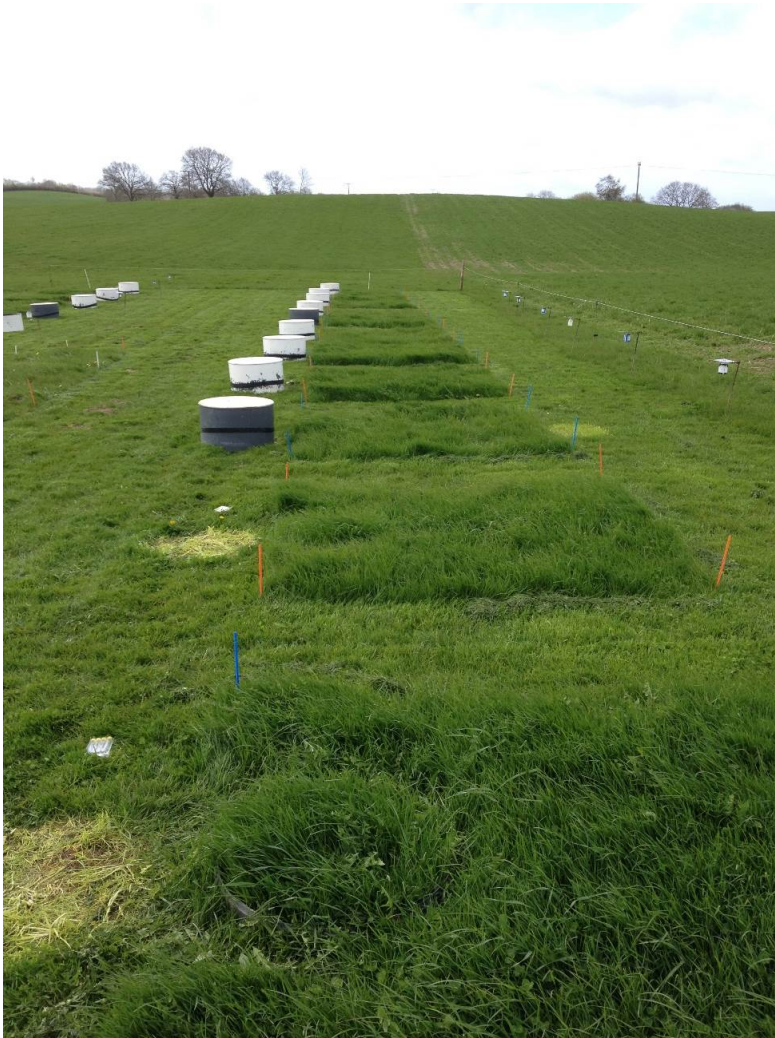
**Nitrogen:** 140 - 400 kg N per ha<sup>-1</sup> year<sup>-1</sup> (Shared out in four dressings)

**Experimental Design:** Randomized block experiment (n=4)

### Treatments:

- **Control** (0 kg N)
  - **Biogas Waste** (230 kg N)
  - **Biogas Waste + H<sub>2</sub>SO<sub>4</sub>** (230 kg N)
  - **Biogas Waste / CAN** (400 kg N)
  - **Biogas Waste + H<sub>2</sub>SO<sub>4</sub> / CAN** (400 kg N)
  - **CAN** (140, 280, 400 kg N)
  - **Urea** (400 kg N)
  - **Urea + Inhibitor** (400 kg N)
  - **Nitrate** (400 kg N)
- pH-Value of applied digestates: 8,8

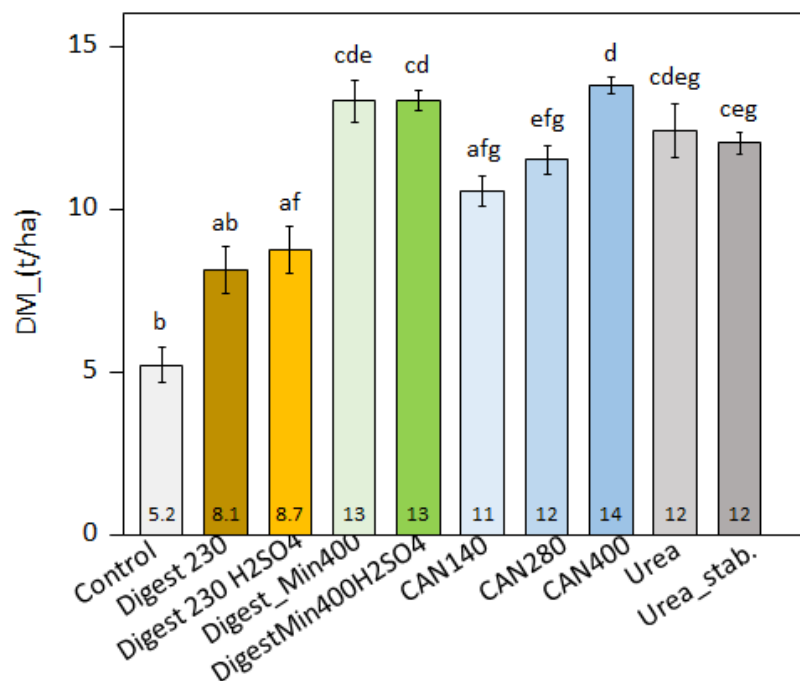
High pH-Value in biogas digestates favours NH<sub>3</sub>-losses



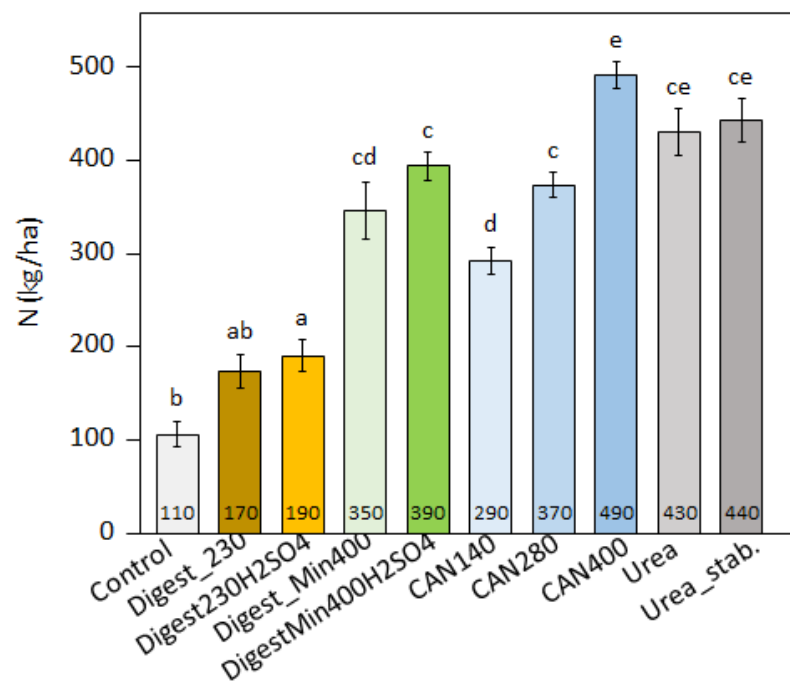
DM-Yield, N-Yield and forage quality, estimated for each silage cut

# Results 2016

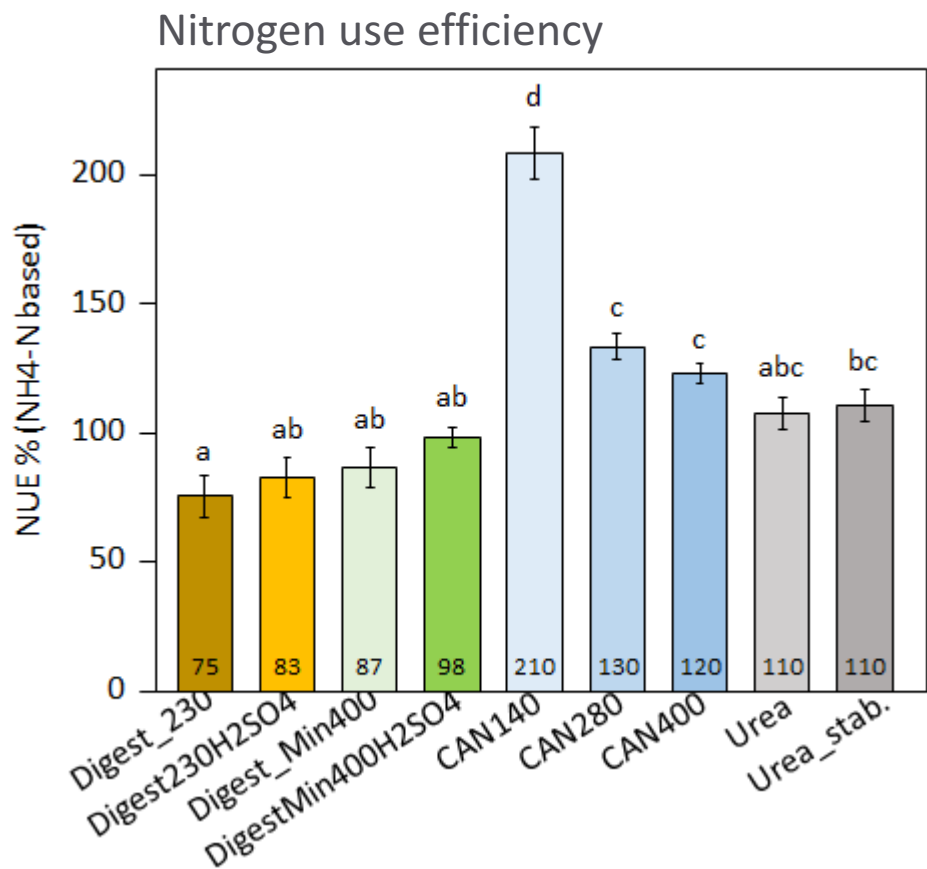
## Dry matter yield (5 silage cuts)



## Nitrogen yield

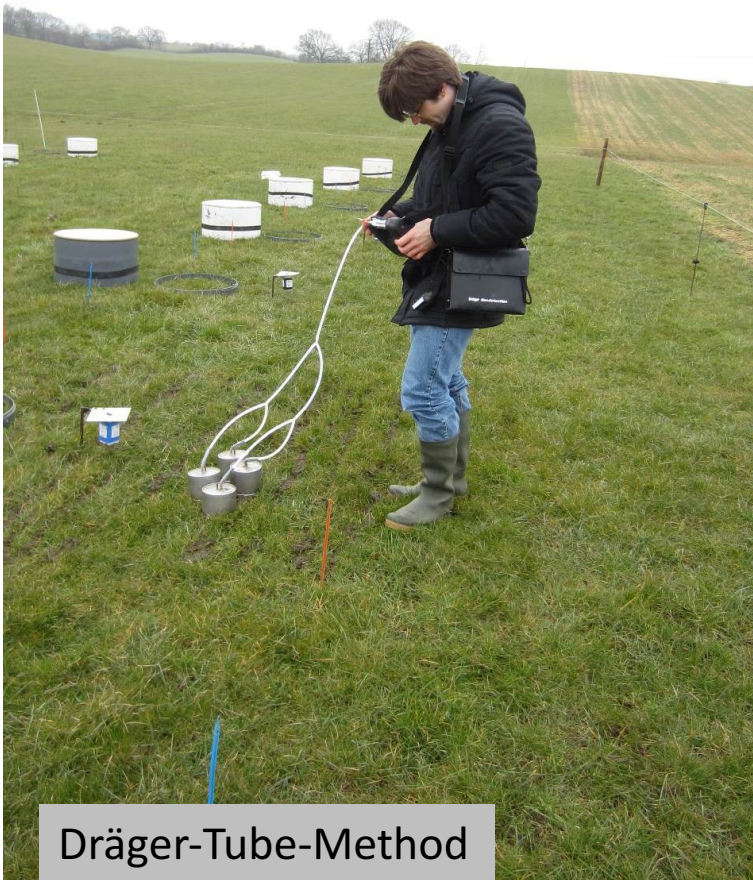


# Results 2016



# Ammonia emissions

- Ammonia measurements is quantified for >5 days after fertilizer application



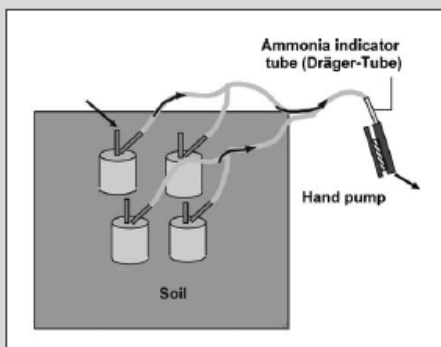
Dräger-Tube-Method



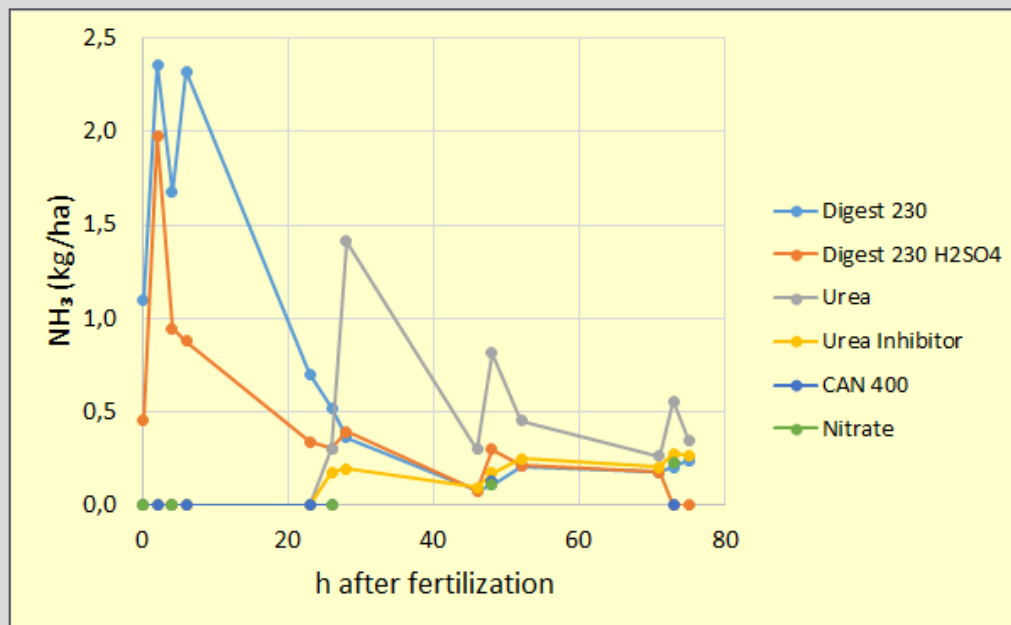
Passive-Sampler

# Results 2016

## NH<sub>3</sub> Emissions (2. fertilization) measured with Dräger-Tube Method (DTM)



Pacholski et al., 2006



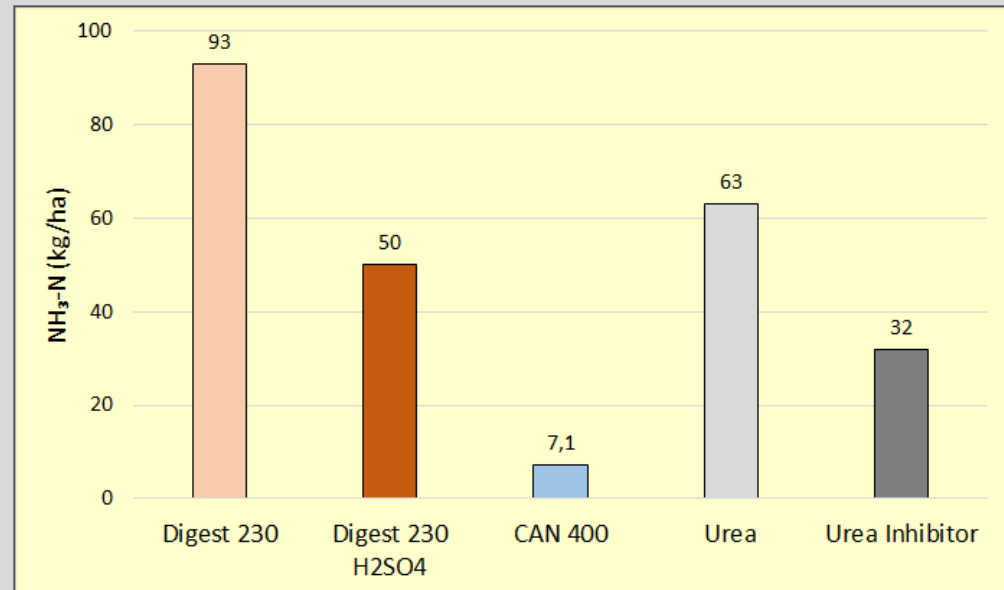


# Results 2016

## Cumulated $\text{NH}_3$ Emissions (4 fertilization/measuring periods)

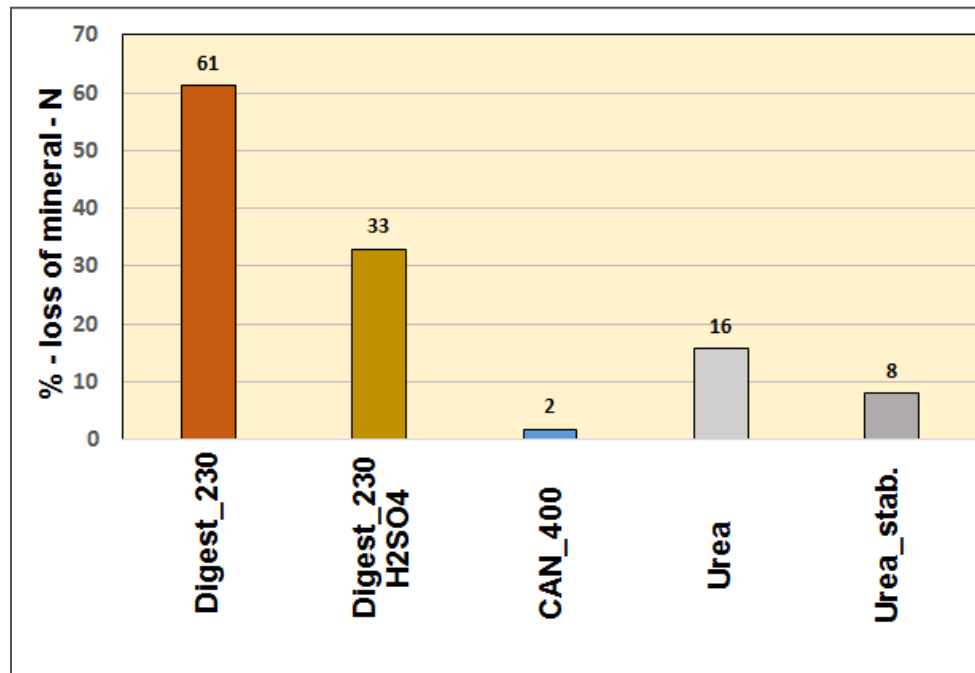


Usage of defoamer



# Results 2016

% - loss of mineral N



# Nitrous oxide emissions



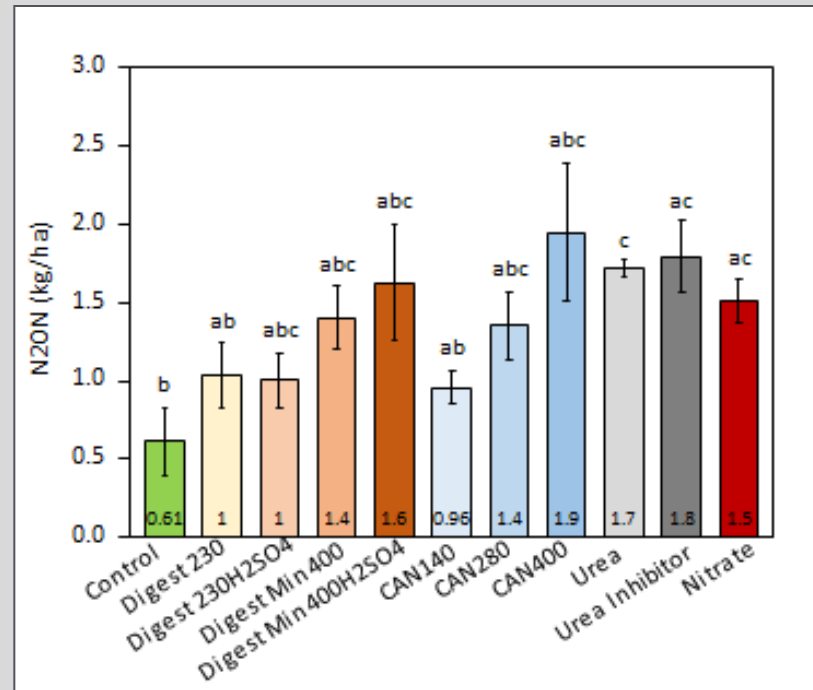
➤ Nitrous Oxide is measured in minimum once a week for 365 days

# Results 2016

## Cumulated N<sub>2</sub>O Emissions (15.03.16 - 08.11.16)



Dr. Frank Steinmann

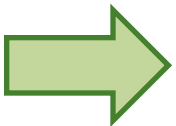


## Conclusions

– Results of a pre-field trial

### Due to an acidification of digestates:

- Strong reduction of ammonia emissions
- slightly higher DM- and nitrogen yields
- Increase of NUE about 10 %
- No higher nitrous oxide emissions in pure digestate treatment



BSA micro-plot field trials 2017/2018

# Micro-plot trials 2017

## Permanent grassland

Treatment (Permanent grassland)
Digestate 120
Digestate 240
Digestate 360
Digestate + H <sub>2</sub> SO <sub>4</sub> 120
Digestate + H <sub>2</sub> SO <sub>4</sub> 240
Digestate + H <sub>2</sub> SO <sub>4</sub> 360
CAN 120
CAN 240
CAN 360
Urea 120
Urea 240
Urea 360
Urea stab. 120
Urea stab. 240
Urea stab. 360
Control



## Winter wheat

Treatment (Winter Wheat)
Digestate 100
Digestate 200
Digestate 300
Digestate + H <sub>2</sub> SO <sub>4</sub> 100
Digestate + H <sub>2</sub> SO <sub>4</sub> 200
Digestate + H <sub>2</sub> SO <sub>4</sub> 300
CAN 100
CAN 200
CAN 300
Control

# Large-scale-experiments 2017 in collaboration with Blunk GmbH

15.06.2017



07.04.2017





Thank you for your attention