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Publication date:
2014

Document version
Publisher's PDF, also known as Version of record

Citation for published version (APA):
Baral, K. R., Nguyen, Q. V., Petersen, S. O., & Bruun, S. (2014). *GHG emissions from slurry and digestates during storage and after field application*. Poster session presented at Energy and Environment for the Future, Copenhagen, Denmark.

GHG emissions from slurry and digestates during storage and after field application

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Introduction

Biogas is produced from liquid manure (slurry) and other biomasses. To a great extent the digestates are recycled to agricultural lands as a valuable fertilizer. The amount and composition of residual volatile solids (VS) is an important control of GHG emissions during storage and after field application.

Hypotheses

H₁: Methane emissions during storage can be predicted from VS characteristics and temperature.

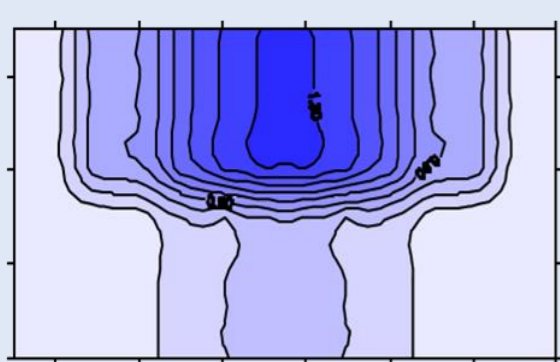
H₂: Nitrous oxide emissions from soil can be predicted from VS characteristics, N content, and soil water potential.

A Storage experiment

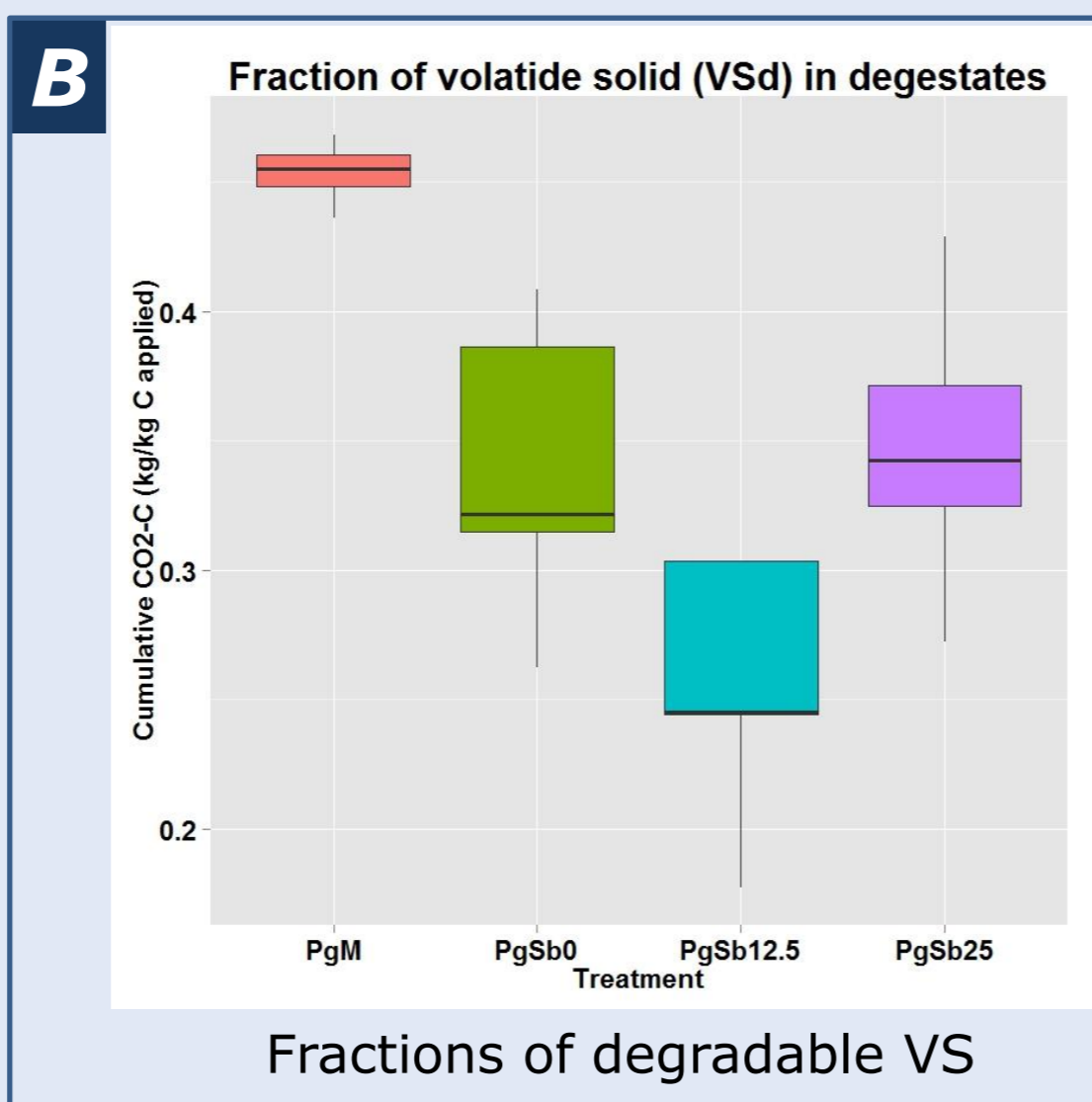


Store	8	7	6	5	4	3	2	1
Treatment	Maabj	FW+Cs	Cs	Ps	FW+Cs	Cs	Maabj	Ps
Slurry volume (m3)	4	1.3+2.7	4	4	1.3+2.7	4	4	4

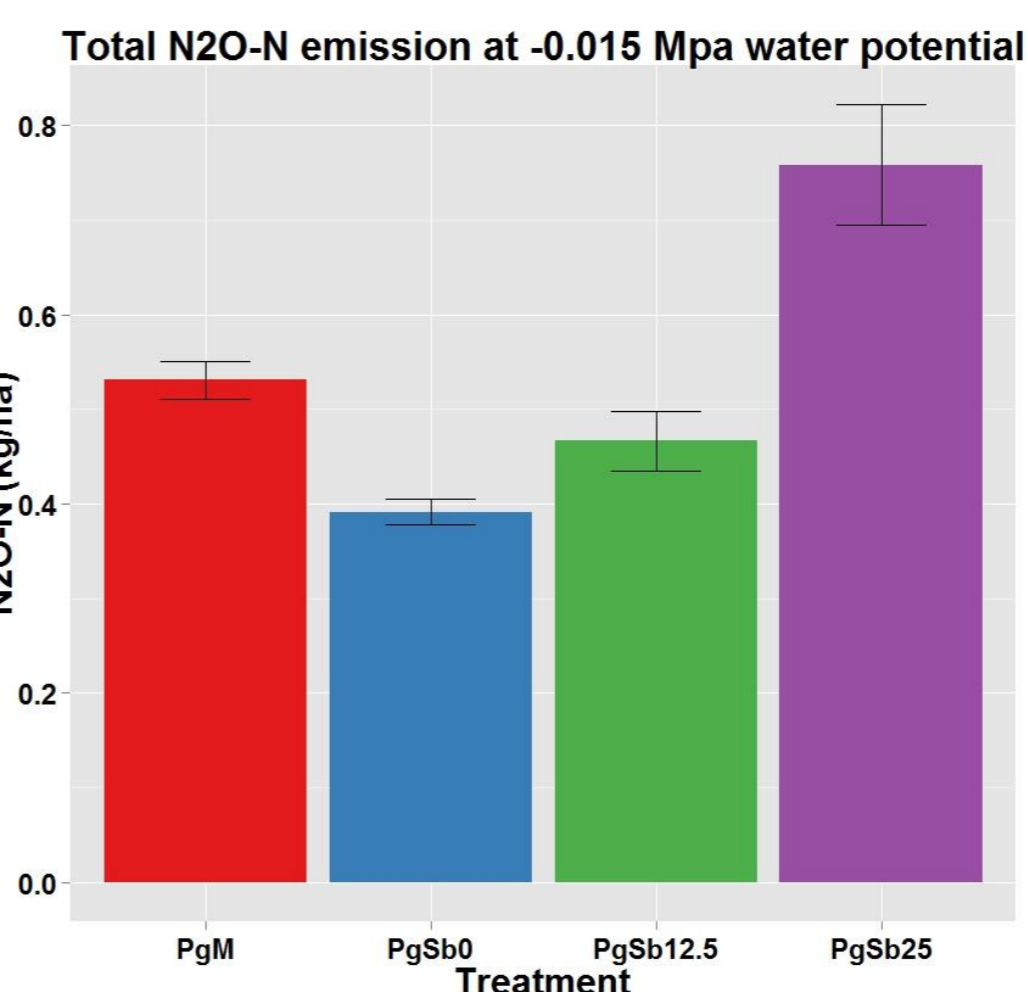
Maabj, Maabjerg digested, FW, fredericia waste water; Cs, Cattle slurry; Ps, pig slurry;



Redistribution in soil will depend on both digestate and soil properties



C



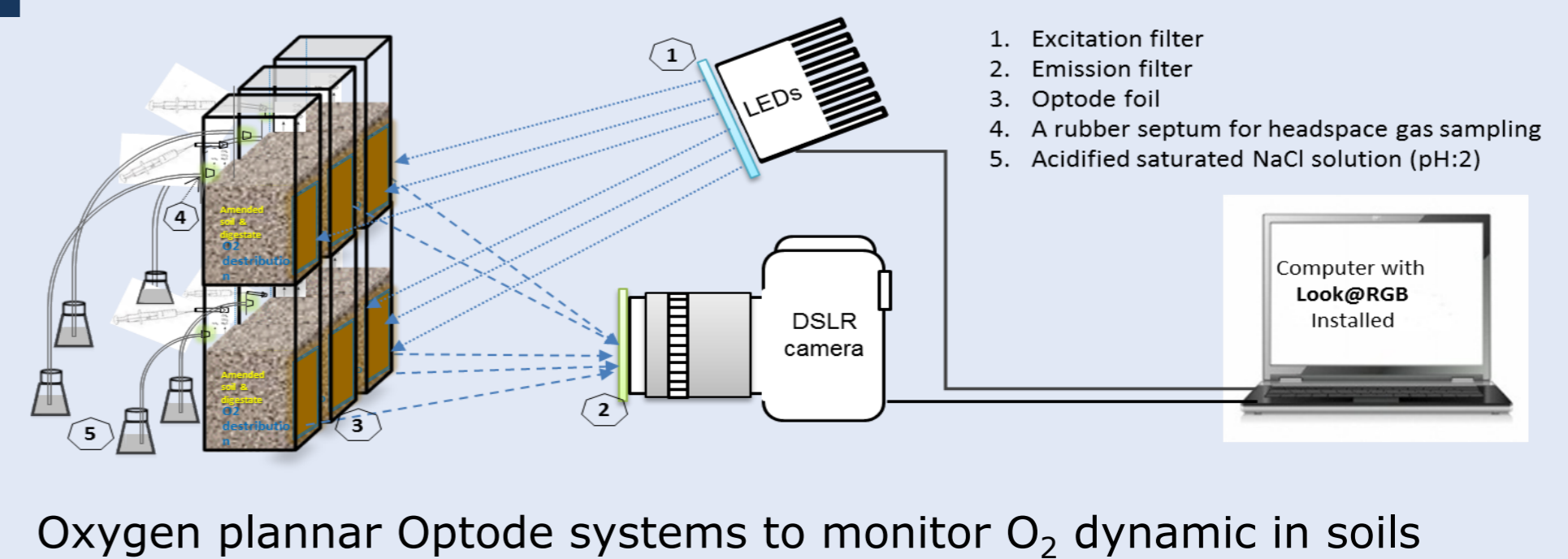
Treatments

- PgM=untreated pig slurry
- Sb=sugarbeet root pulp

Digestates:

- PgSb0 0% Sb
- PgSb12.5 12.5% Sb
- PgSb25 25% Sb

D



Conclusions

- Degradable VS can be estimated from respiratory response.
- The model for N₂O emissions is sensitive to VS composition.