Slurry Storages with Low Methane Emission

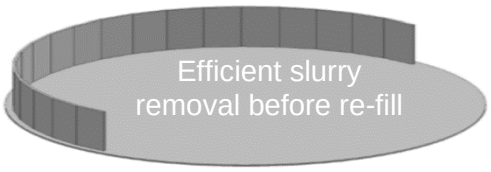
Lise B. Guldberg[1], Michael J. Hansen[1], Anders P. S. Adamsen[1], Anders Feilberg[1], Ali H. Vazifehkhoran[1], Yolanda M. L. Perschke[1], Pernille L. Kasper[2], Michael Holm[2], Lars Erik Nørgaard[2], Michael K. Rindom[2], Mikkel Kastensand[3], Peter F. Larsen[3]

[1]Aarhus University, Dept. Biol. Chem. Eng., [2]SEGES Innovation, [3]Landia A/S; [4]AgroGas ApS

Methane emitted from manure in animal houses and outside storage amount to ca. 20% of total GHG emission from Danish agriculture. Abatement technologies for storages and handling of slurry during storage represents a large potential to reduce methane emission from animal-based food production. This potential will increase when frequent flushing of slurry becomes more widespread in pig production with a larger part of the methane emission from the outside storage. Methane is produced by microbial degradation of organic matter in anoxic conditions in the slurry. When slurry storages are emptied, a rest (inoculum) is typically remaining, and when the storage is refilled, the new slurry will be inoculated with the methanogenic inoculum from the previous slurry batch. During storage, methanogen production can be inhibited by several strategies. Controlled oxidation is a new technology to reduce methane production by increasing the Oxidation Reduction Potential (ORP) to levels where methanogens are known to be inhibited, but without oxidation of organic matter in the slurry. Collection and flaring of produced methane and converting methane to CO2 with less GHG effect is also a technology being developed and tested.

The idea is to combine frequent flushing of slurry from pig houses with one of many potential abatement technologies targeted to reduce methane emission in the slurry storages:

1. Begin the storage period in March/April with an empty storage without methanogenic inoculum and *delay* methane production
2. *Inhibit* methane production by use of a treatment technology for slurry e.g. acidification, additives or controlled oxidation with a certain frequency during the storage period
3. Flaring of methane as an end-of-pipe technology *to remove* methane if other technologies is not desirable



Design of a slurry storage that can be efficiently emptied for inoculum slurry, controlled oxidation, a strategy for slurry tank acidification and a system with collection and flaring of methane are all technologies to reduce methane emission from slurry storages that will be developed and tested in the ongoing GUDP-project “Low Emission Slurry Storages (LESS)”.