

Odour Measurements in the SyreN Field Trial

English technical summary of the AgroTech presentation from August 2010

Purpose. This document summarises the odour measurements presented for the 2010 SyreN project. The work compared cattle slurry applied to grass by trailing hose, injection and SyreN in-field acidification. A separate treatment combined SyreN-treated slurry with ferrous sulphate.

Main conclusion. The trial did not demonstrate an odour reduction from SyreN acidification alone relative to untreated trailing-hose application. Injection reduced measured odour concentration. SyreN-treated slurry with added ferrous sulphate produced lower odour concentrations and results broadly comparable with injection. The ferrous-sulphate result concerns a separate treatment and must not be attributed to the standard SyreN configuration without additional conditions and documentation.

1 Trial objective and scope

The trial examined odour immediately after field application of cattle slurry to grass. It formed part of the SyreN development and verification work presented in 2010. The source material is a ten-slide AgroTech presentation entitled “Lugtresultater ved Syren-projektet (olfactometri)” [Odour results from the SyreN project (olfactometry)].

The presentation reports concentration measurements in air collected from static chambers. It does not provide a full field-scale odour emission factor expressed in OUE per animal per second or an annual value per animal place.

2 Experimental design

Item	Description
Test material	Cattle slurry applied to grass shortly after the first cut.
Test dates	2 June and 15 June 2010, approximately two weeks apart.
Principal treatments	Untreated slurry applied by trailing hose; slurry injection; SyreN in-field acidification.
Additional treatment	SyreN-treated slurry with ferrous sulphate, tested in two applications on the second test day.
Sampling system	Three static odour chambers were placed over the slurry immediately after application.
Odour sampling	Air was collected from each chamber seven minutes after the chambers had been placed.
Replication	All samples were collected in triplicate at the same interval after slurry application.
Odour analysis	Olfactometric analysis using an odour panel. Results were expressed as OUE m ⁻³ .
Supporting measurements	NH ₃ and H ₂ S in chamber air, selected individual odorous compounds, chamber-air temperature and grass-surface temperature.
Compound analysis	Individual odorous compounds were analysed by ATD GC-MS and PTR-MS on 15 June only.

A spreading problem on the first test day prevented determination of odour concentration for the SyreN plus ferrous-sulphate treatment. Two measurements of this treatment were therefore performed on the second test day.

3 Treatments and displayed pH values

Test day	Treatment	Displayed slurry pH
Day 1	Trailing hose	7.37
Day 1	Injection	7.35
Day 1	SyreN	6.44
Day 2	Trailing hose	7.8
Day 2	Injection	7.7
Day 2	SyreN	6.6
Day 2	SyreN plus ferrous sulphate, application A	7.9
Day 2	SyreN plus ferrous sulphate, application B	7.9

4 Results

4.1 Ammonia concentration

On both test days, the chamber-air ammonia concentration above SyreN-treated slurry and injected slurry was lower than above untreated slurry applied by trailing hose. This observation supports the ammonia-reduction mechanism of in-field acidification, but the odour-panel result must be assessed separately because total odour reflects several compounds and not ammonia alone.

4.2 Odour concentration on test day 1

The odour concentration above injected cattle slurry was significantly lower than above both trailing-hose-applied slurry and SyreN-treated slurry. The SyreN treatment and the untreated trailing-hose treatment belonged to the same statistical group and showed similar odour concentrations. The chart indicates approximately 900 OUE m⁻³ for both trailing hose and SyreN, compared with approximately 300 OUE m⁻³ for injection. These values are graphical approximations because the presentation does not provide a numerical results table.

4.3 Odour concentration on test day 2

Injection again produced a lower odour concentration than untreated trailing-hose application. SyreN acidification alone did not reduce odour relative to the trailing-hose reference and produced the highest mean value shown in the chart. The two SyreN plus ferrous-sulphate applications produced lower mean odour concentrations than the untreated trailing-hose and SyreN-only treatments. One ferrous-sulphate application was statistically grouped with injection, while the other had an intermediate statistical classification.

Treatment	Day 1 finding	Day 2 finding	Evidence interpretation
Trailing hose	High odour concentration	High odour concentration	Untreated reference
Injection	Significantly lower	Lower	Consistent odour reduction in this trial
SyreN	Similar to trailing hose	No reduction relative to trailing hose	No demonstrated odour benefit from acidification alone
SyreN plus ferrous	Not determined	Lower mean concentrations	Promising separate treatment; not

Treatment	Day 1 finding	Day 2 finding	Evidence interpretation
sulphate			equivalent to standard SyreN

5 Interpretation for regulatory documentation

The trial supports the following regulatory statements:

- SyreN in-field acidification reduced the measured ammonia concentration above the applied slurry.
- The same tests did not show a corresponding reduction in total olfactometric odour concentration for SyreN acidification alone.
- Injection reduced measured odour concentration under the conditions tested.
- Adding ferrous sulphate to SyreN-treated slurry reduced odour concentration and produced results broadly comparable with injection.
- Any odour-reduction claim for ferrous sulphate requires the additive, dose, mixing procedure and operating conditions to form part of the defined measure.

For the Flemish application, the prudent conclusion is that the 2010 study provides supporting odour documentation but does not establish a general odour-reduction percentage or an odour emission factor for the standard SyreN system. The application should therefore avoid claiming a quantified odour reduction for SyreN alone.

6 Limitations

- The source is a presentation and does not include a full scientific report, raw dataset or detailed statistical methods.
- The experiment comprised two test days, and the ferrous-sulphate treatment was available on only one day.
- Static-chamber concentrations measured shortly after application are not identical to field-scale odour emission rates.
- The source does not state an additive dose for ferrous sulphate in the displayed material.
- Approximate OUE values in this summary were read from charts and should not replace the original data.
- The study concerns cattle slurry applied to grass and should not be generalised to other slurry types or application conditions without further evidence.

7 Recommended application statement

Recommended wording: “Olfactometric field tests conducted in 2010 found no reduction in total odour concentration from SyreN acidification alone compared with untreated trailing-hose application. A separate SyreN treatment combined with ferrous sulphate produced lower odour concentrations, broadly comparable with injection. The available evidence does not support a general quantified odour-reduction factor for the standard SyreN system.”

8 Source

AgroTech. Lugtresultater ved Syren-projektet (olfactometri). Presentation prepared for the SyreN project meeting, August 2010. Ten slides. Original language: Danish.

This English summary preserves the conclusions and qualifications shown in the source presentation. The original presentation should accompany this summary as the underlying evidence document.