Impact of cattle-slurry treatment by separation and acidification on gaseous emissions after soil application

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Background

- **Cattle-slurry treatment prior application to soil** → **increase the fertilizer value of slurry** and **minimize its environmental impact.**

- ❑ **Application of liquid fraction obtained by slurry separation**
- ❑ **Application of acidified slurry**

→ **Efficient to decrease NH_3 but what's about N_2O, CH_4 and CO_2 emissions?**

Objectives

Assess the efficiency of cattle slurry treatment by acidification and/or solid liquid separation to mitigate ammonia (NH_3) and greenhouse gases (GHG) emissions following application to soil.

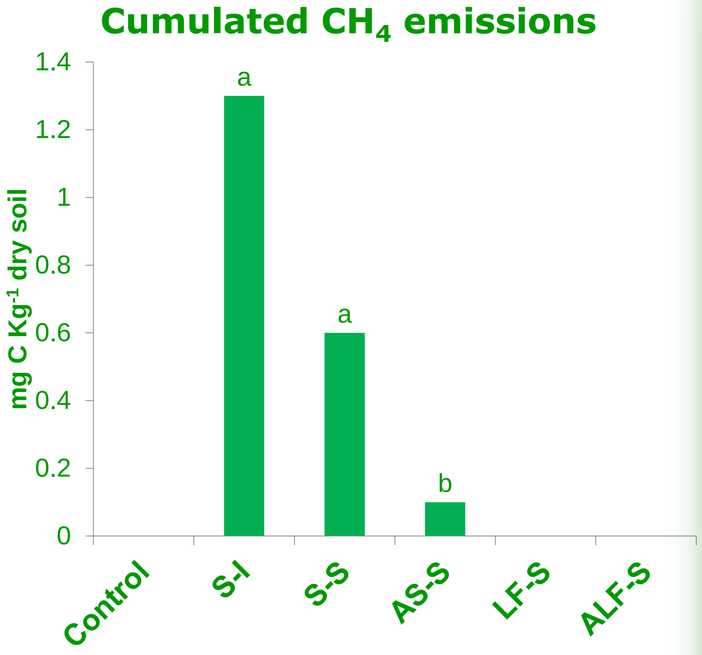
Laboratory Experiment

- ✓ Raw cattle slurry (S), S acidified at pH 5.5 (AS), liquid fraction obtained by centrifugation (LF) and acidified LF (pH 5.5) applied to a sandy loam soil (80 mg N kg^{-1} dry soil) and aerobically incubated during 92 days at 25 ºC in 2 L kilner jars;
- ✓ 2 independent incubations: one to follow NH_3 emissions using acid traps, one to follow GHG emissions using the closed chamber technique.

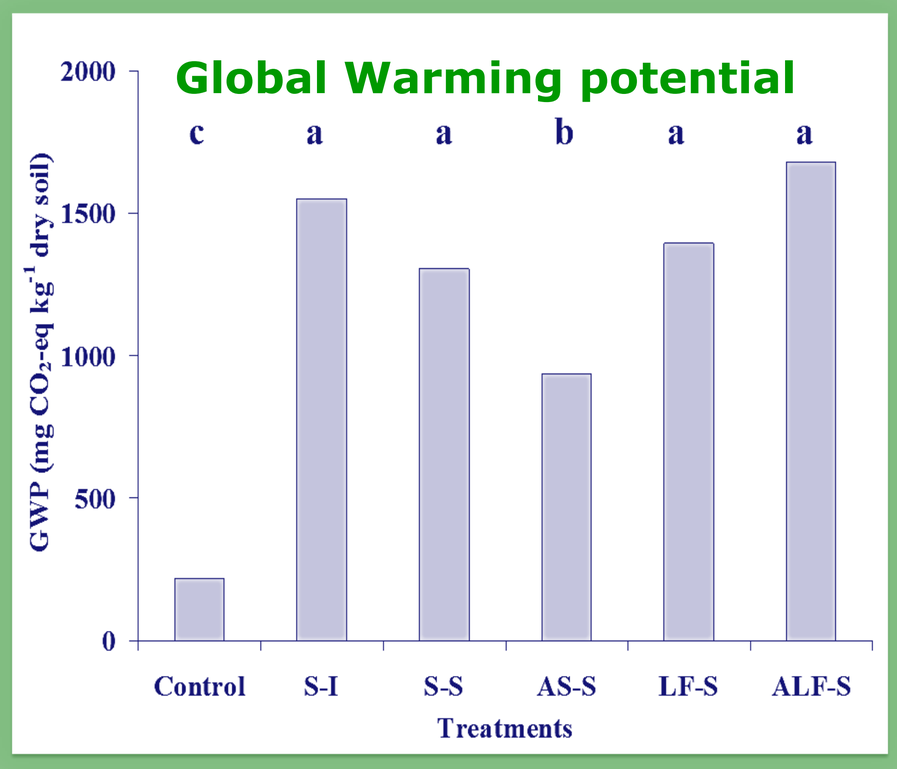
Treatments considered

1. Soil only (**Control**);
2. Band application of S followed by soil incorporation (**S-I**);
3. Band application of S (**S-S**);
4. Band application of AS (**AS-S**);
5. Band application of LF (**LF-S**);
6. Band application of ALF (**ALF-S**).

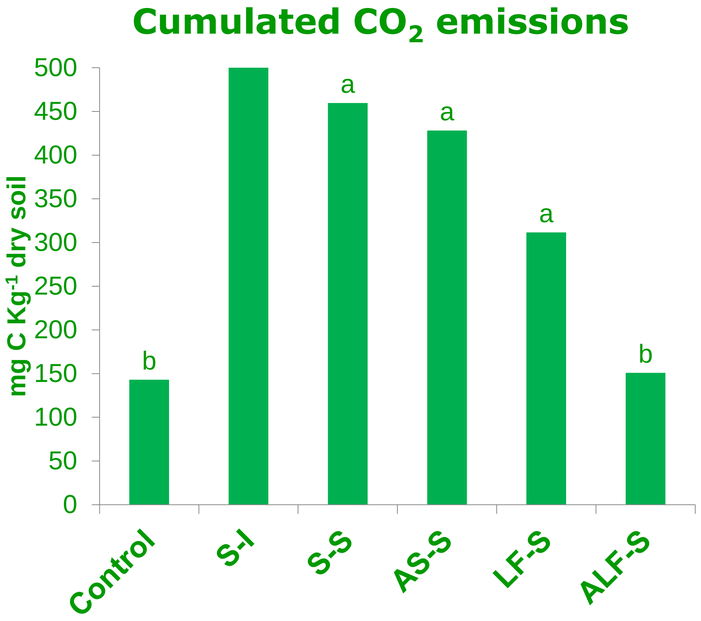
Cumulated CH_4 emissions



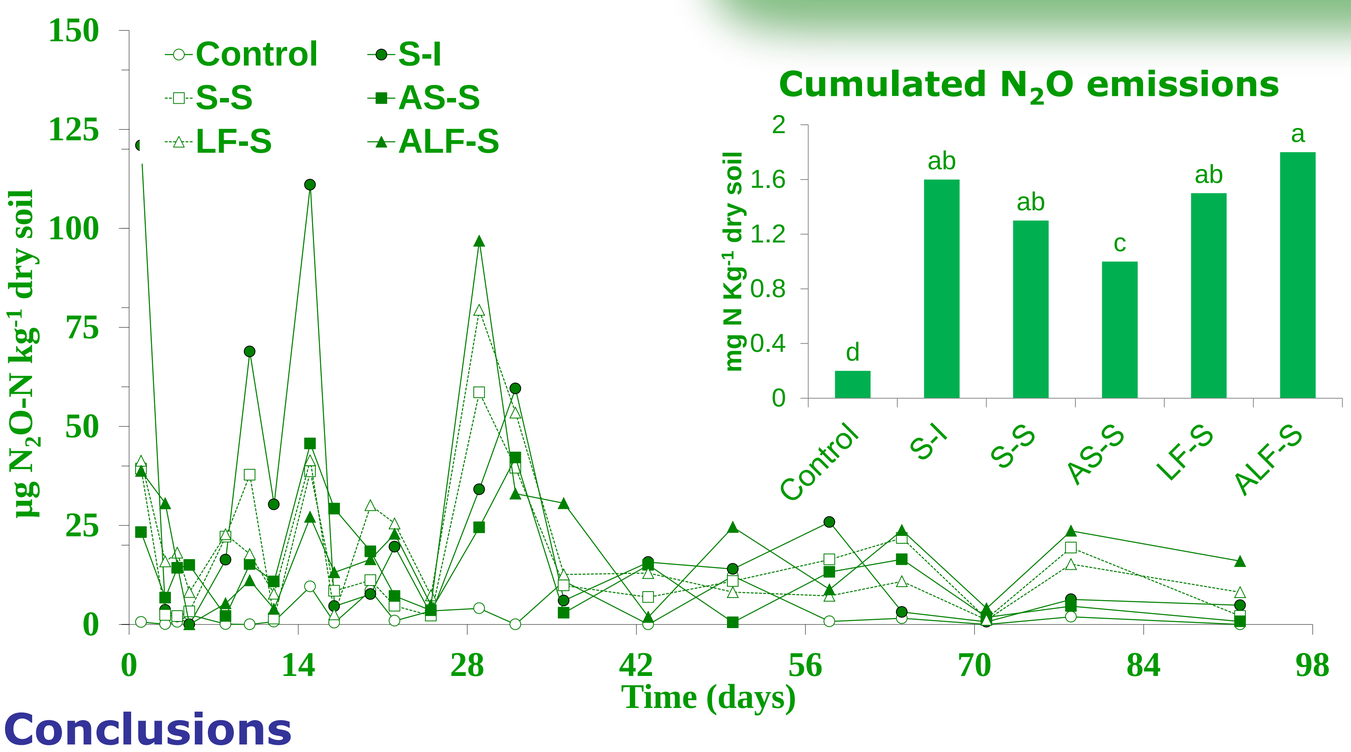
Global Warming potential



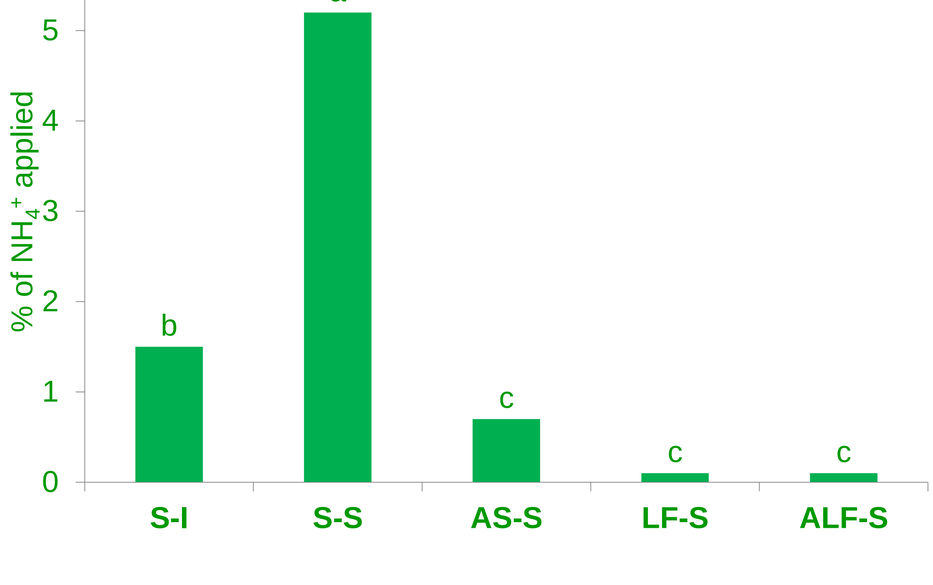
Cumulated CO_2 emissions



Cumulated N_2O emissions



Cumulated NH_3 emissions



Conclusions

- ➢ **Application of acidified slurry: good solution to decrease GWP relative to raw slurry (minimize NH_3, N_2O and CH_4 emissions);**
- ➢ **LF application: significant decrease of NH_3 emissions relative to S but has no impact on N_2O emissions. But acidification of LF has no positive impact on gaseous emissions.**

More information

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