Greenhouse gas and ammonia emission abatement by slurry treatment

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NH₃, CH₄ and N₂O emissions from the manure management continuum “storage” and “field application” were quantified in pilot scale slurry tanks. The effect of the following treatments was investigated: untreated slurry, mechanically separated slurry (emissions from the slurry and from composting of the separated solids), anaerobically digested slurry, slurry covered with a layer of chopped straw, slurry aeration. Emission rates were determined with a large open-dynamic chamber and with high resolution FTIR spectrometry. Measurements were carried out with dairy cattle and with pig slurry, and in winter and in summer. After storage, slurries were applied on grassland with band spreading techniques. Emissions were followed with the large open dynamic chamber (NH₃) and with closed chambers (N₂O and CH₄).

Ammonia emissions mainly occurred after field application. Promising mitigation options are low trajectory application techniques and proper timing of application. Anaerobic digestion is an effective means to reduce greenhouse gas emission. Straw cover and slurry aeration showed negative environmental effects and should not be implemented on commercial farms.