



## Technology for N recovery as enriched manure with in-field acidification system using sulphuric acid

**Keywords:** Acidification, emission, ammonia, sulphur, biodiversity protection

### Key facts:

- **Category of the technology:** environmental control
- **Input:** H<sub>2</sub>SO<sub>4</sub> – Sulphuric acid
- **Output product(s):** NH<sub>4</sub>, SO<sub>4</sub>
- **Available capacity:** +100.000 m<sup>3</sup>/y pr. system – 138 systems
- **Focusing geographical areas:** EU
- **Technology status:** TRL level 9
- **EC/MS Authority permits:** EU BAT status



### Summary of the technology:

Ammonia (gas) and ammonium (salt) are in a chemical equilibrium when dissolved in a liquid as slurry. By lowering the pH value, the equilibrium is displaced, and a larger part of the ammonia is to be found as ammonium that cannot evaporate from the slurry. The SyreN system automatically defines and lowers the pH of the slurry. It uses sulphuric acid to lower the pH, as this is 100% environmentally balanced product and the most concentrated and effective acid to lower the pH. The ammonia is thus transformed to ammonium and readily available to the plants after application, when the slurry penetrates the soil. Ammonium is the optimal N fertilizer available to plants and has a minimal loss to the environment as it has a positive charge and binds itself to soils and does not leach out. A VERA verification done by Århus University, has documented a 49 % ammonia emission reduction. In that trial, 2.5-liter sulphuric acid was used at a pH value of 7.8 and a lowering of the pH to 6.4. In praxis, a very large variation of acid consumption is to be expected, but on average, about 1 liter of acid is used with cow slurry and 1.5 liter with swine slurry. This represents a very good correlation between acid consumption and Sulphur.

### Competitive position and advantages:

- Addition to existing slurry application technology
- Profitable while extremely effective
- Improved organic fertilizer utilization rate reduces need for mineral fertilizers
- EU BAT standard
- Stops airborne eutrophication

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