

Technology for N recovery as liquid fertilizer starting from liquid manure or biogas digestate with plasma manure processing system

N2 — Applied

Keywords: • nitrogen • sustainable • ammonia emission reduction

Key facts:

- **Category of the technology:** manure processing
- **Input:** liquid manure or liquid biogas digestates
- **Output product(s):** plasma treated liquid manure/biogas digestate
- **Available capacity:** 3.000 to 4.000 t/y per unit
- **Focusing geographical areas:** global
- **Technology status:** TRL level 7
- **EC/MS Authority permits:** EC



Summary of the technology:

N2 Applied has developed a manure processing technology to treat manure on the farm and turn it into an environmental-friendly organic fertilizer. The processing unit uses only electricity, preferably from renewable sources, to capture nitrogen from air adding it to manure. This eliminates the ammonia loss in storage and during field application and makes the otherwise lost nitrogen available for the plants. It is not only creating an economic benefit but it also makes livestock production more sustainable by contributing to solving both environmental and health issues related to emissions.

Nitrogen in the form of ammonia, is recycled on the farm and converted into nitrogen fertilizer. The mineral-N content from the input product is almost doubled. Assuming 4 kg Total-N/m³ with 2 kg NH₃-N, treatment will result in 6 kg Total-N/m³ with 4 kg mineral-N as ammonium nitrate. The plasma technology uses electricity to fixate nitrogen from air forming nitrogen oxides. In the absorption system, the nitrogen oxides are absorbed into the liquid and neutralize the liquid to a pH around 6. Combined with free ammonia the oxides react to form a stable ammonium nitrate fertilizer.

Competitive position and advantages:

- Reduce ammonia and GHG emissions from manure storage and field application
- High plant uptake of ammonium nitrate leads to up to 30% increased crop yield compared to untreated
- Save cost on chemical nitrogen fertilizer by substitution with high value treated organic-based fertilizer
- Plasma treated product does not smell like manure.

Why this technology best for solving nutrient recovery problems.

The N2 technology is unique in reducing ammonia and GHG emissions and at the same time producing nitrogen fertilizer locally by adding nitrogen directly from air. Reducing the pH stops the emission of ammonia and reduces the loss of nitrogen in the farm cycle. This closed-on-farm-nitrogen-cycle enables circular nutrient management and reduces the amount of chemical fertilizer that is needed.

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