DETRICON

ENVIRONMENTAL TECHNOLOGIES

FROM LAB SCALE TO MARKET INTRODUCTION

Detricon develops environmental technologies from lab scale to a market ready technology. The focus lies on the recovery of nutrients from waste streams such as manure and digestate, into (nitrogen-rich) circular resources for local use in agriculture and/or industry. Detricon is specialized in the recovery of ammonia nitrogen and its upgrading to a high-quality product.

INTRODUCTION

Wastewater containing high amounts of ammonia pose a problem for treatment :

- Industrial wastewater
- Liquid fraction digestate
- Liquid fraction manure
- Landfill leachate
- Other nitrogen rich streams ...

The most used treatment to reduce the ammonia load in these streams is **biological treatment**, converting valuable reduced nitrogen to nitrogen gas, by use of aeration and thus electricity (1-3 kWh/kg N). Some of this nitrogen leaves the system as N_2O (0,2 g N_2O/kg N), a strong greenhouse gas with 300 times the global warming potential of CO_2.

Another pathway is through the **anammox process** (**An**aerobic **Amm**onium **Ox**idation) and involves special bacteria that transform ammonium and nitrite in equal parts into nitrogen gas. This consumes less energy than a classical biological treatment but is known for showing difficulties in keeping the biomass stable.

Finally, the production of reduced nitrogen in the form of ammonium from nitrogen gas with the **Haber-Bosch process** is very energy-consuming (10-13 kWh/kg N).

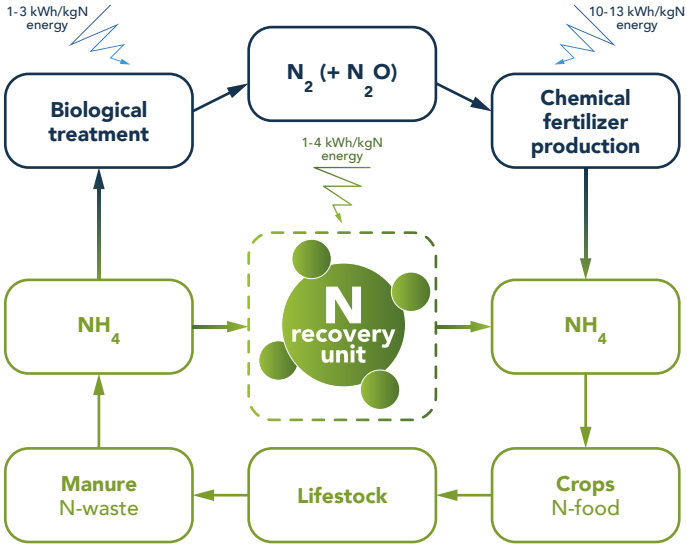
Detricon provides an alternative pathway, in which nitrogen is not destroyed, nor created, but **recovered**. This has many advantages:

Lower purification cost
- ▶ Save on OPEX and produce a valuable resource

Eliminate ammonia toxicity in digester
- ▶ Enhanced biogas production

Increase COD/N ratio
- ▶ Reduce need for post-treatment
- ▶ Reduce need for carbon source

Detricon aims at closing the nitrogen loop by recovering ammonia from these streams by a process of stripping and scrubbing with their Ammonia Mining Units (AMUs).



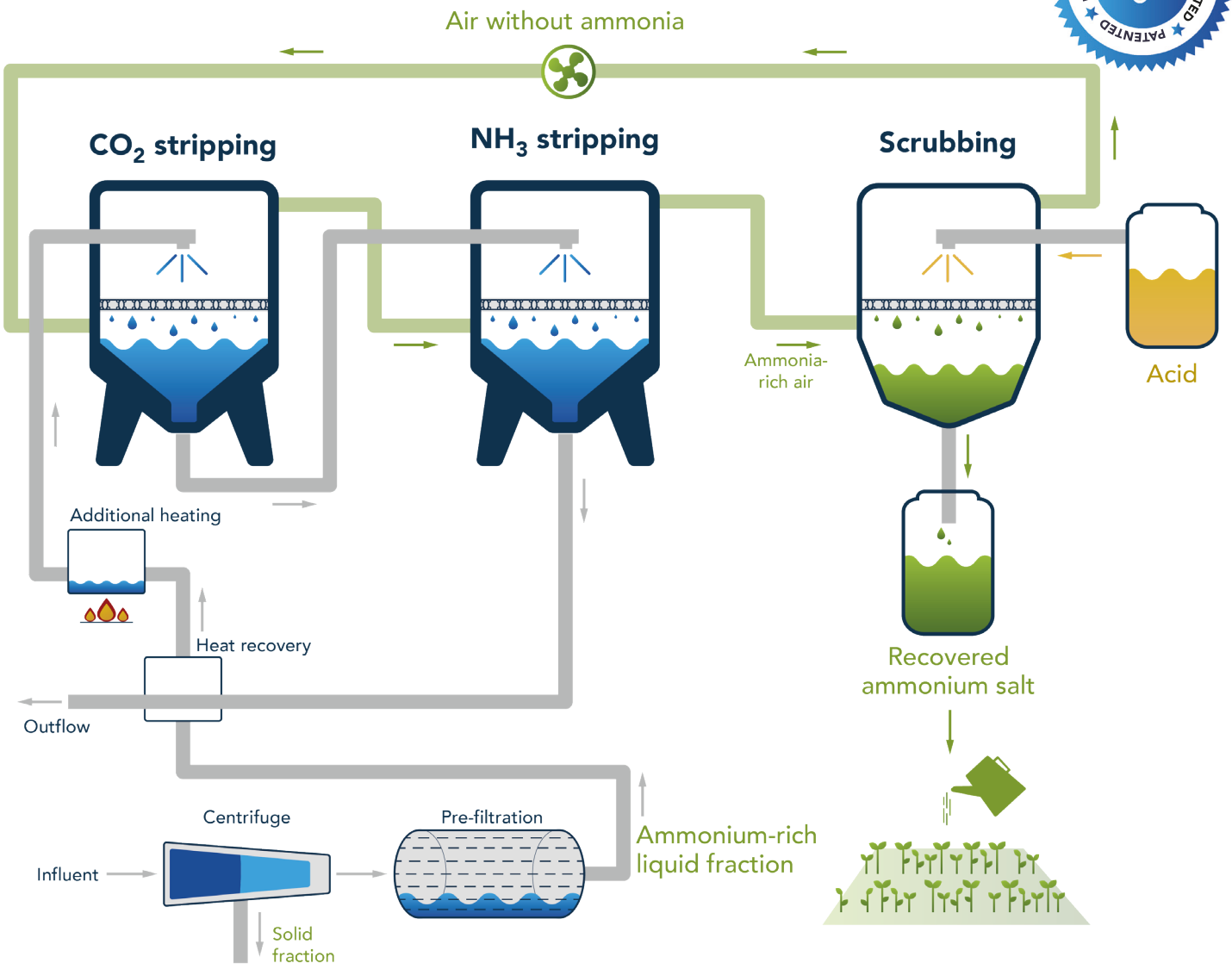
TECHNOLOGY

The Detricon Ammonia Mining Unit is a complete solution for reducing the ammonia load in wastewater while at the same time producing a valuable ammonium salt solution.

The Detricon process works with stripping and scrubbing in a semi-batch mode. The liquid stream is efficiently heated by the previously treated liquid in our unique heat exchanger, with a minimal heat loss of only 3°C. Through CO_2-stripping, the pH of the liquid stream can be increased to benefit the ammonia stripping efficiency, often eliminating the need of caustic dosing completely. NH_3-stripping evaporates the ammonia to the recirculated air, that is washed by the acid scrubber and recycled within the process. In the scrubber, ammonia binds with the acid to form an ammonia salt solution. Ammonia emissions from this technology are minimal.

FEATURES
- Low heat requirement
- No chemical pH adjustment needed
- Plug-and-play unit
- Modular
- High efficiency due to 2-stage process
- Online follow-up

PATENTED AMMONIA MINING UNIT



INNOVATION EU LIFE INFUSION

Successful nitrogen recovery starts with theoretical knowledge, technical expertise, and perseverance. Therefore, Detricon often works together in (European) projects or as part of a consortium to strengthen the impact of its technology. E.g., our Ammonia Mining Unit is part of LIFE INFUSION, a project focused on intensive treatment of waste effluents and its conversion into useful sustainable outputs (biogas, nutrients, water). Detricon's AMU treats the liquid fraction of municipal organic waste and landfill leachate to eliminate ammonia toxicity for the subsequent digester, while recovering fertilisers.

All the technology is fitted into an easily transportable container. The unit is then connected by the process connections at its side; a real plug-and-play technology!

PRODUCTS

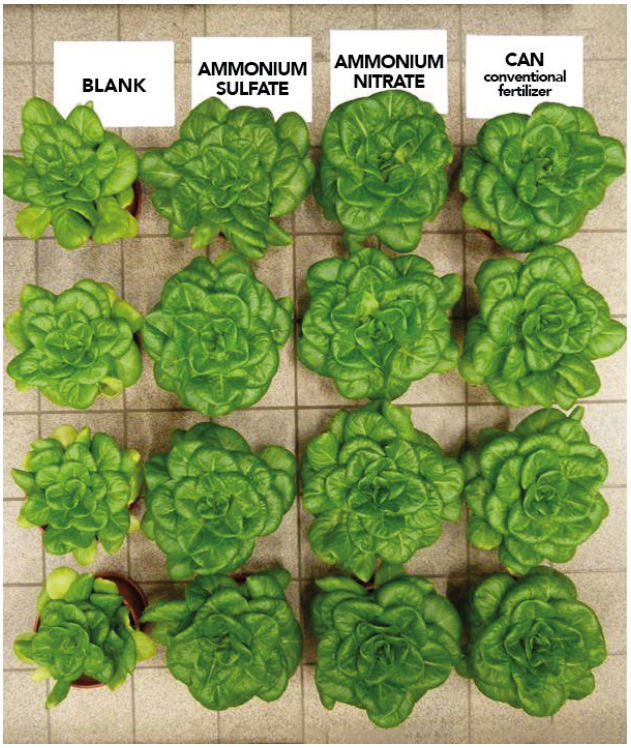
AMMONIUM SULFATE

- 40% liquid solution
- pH 5-7
- 8,5% N
- 100% mineral nitrogen
- 9,5% S (or 24% SO_3)
- a clear and technically pure solution
- odourless, light pink, free from organic particles
- specific weight 1,23 tons/m^3 (@ 20°C)

AMMONIUM NITRATE

- 52% liquid solution
- pH 5-7
- 18% N (50/50 ratio ammonia / nitrate)
- 100% mineral nitrogen
- 0% S
- a clear and technically pure solution
- odourless, light yellow, free from organic particles
- specific weight 1,25 tons/m^3 (@ 20°C)

Field trials* have shown equivalent crop yields, while nitrate residues tend to be lower when compared with conventional fertilizers.



*Performed on cauliflower, celery, corn, fennel, grass, leek, lettuce, potato and wheat.

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