



## OTHER INDUSTRIAL TECHNOLOGIES, PROTECTING MAN AND ENVIRONMENT

Technology Offer

Ammonia removal from digested substrates and production of ammonium sulphate fertilizer by using exhaust heat of CHP without addition of alkali or acids

(08 DE 0957 0J33)



### Abstract

**A German SME has developed a procedure to remove ammonia from manure and digested substrates by heating it to 80°C under slightly reduced pressure. The evolving gas is absorbed by an aqueous solution of an absorbent to yield a highly concentrated solution of ammonium sulphate, a valuable fertiliser. No further chemicals have to be added. The company seeks for a commercial agreement with technical assistance with constructors and operators of biogas and sewage treatment plants, respectively.**

### Description

Ammonia, a gas with a pungent odour, is emitted by manure and fermentation residues of biogas plants, respectively. The reduction of ammonia emission

would both reduce to the air pollution and yield valuable nitrogen fertiliser.

A German SME has developed a procedure to remove ammonia from manure and fermentation residues by heating it to 80°C under slightly reduced pressure.

In this strip procedure, the ammonia-rich evolving gas is absorbed by an aqueous solution of an absorbent to yield a highly concentrated solution of ammonium sulphate, a valuable fertiliser. No steam nor further chemicals have to be added to expel the ammonia from the substrate and to neutralise the remainder after stripping, respectively. The ammonia free recycle gas is blown back to the strip reactor to be enriched in ammonia again. At least 70% of the ammonia is removed from the substrate within 2 hours by this procedure.

The energy consumption to reduce the pressure in the system is minor since the absorption of ammonia itself keeps the under pressure.

The technology combines low investment and running costs with benefits for human health and environment.

### Innovations and advantages of the offer

- No consumption of sodium hydroxide or other alkalis for stripping ammonia
- No neutralisation after stripping necessary
- Low working temperature, allowing for the use of industrial waste heat and heat from combined heat and power (CHP) plants
- No need for stripping steam, no need for separation of over distilled water
- No need for aggressive sulphuric acid to bind ammonia
- Low energy consumption of the primary evacuation pump, as the ammonia is continuously absorbed, thus keeping the under pressure in the system
- No need for expensive security measures for storage and dosing of aggressive chemicals
- No danger for human health and environment
- Significant reduction of the digested manure application area and reducing ammonia emissions
- Avoiding of a nitrogen inhibition in a digester by using ammonia enriched digested substrate as process water

### Current and Potential Domain of Application

- Treatment of sewage, organic waste and digested and fermentation residues with high nitrogen content
- Biogas plants in combination with bio ethanol production to generate a recycling process water
- Bio refineries with closed substrate cycles





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**For further information (including IPR status)**

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