Tecnoimpianti®

TWT EXPERIENCE

Customer	**DENTRO IL SOLE • Truccazzano (MILAN)**
Sector	**PRODUCTION OF LIQUID BIOMETHANE (LNG) FROM LIVESTOCK MATRIX.**
Plant	**CLOSED-LOOP AMMONIA STRIPPING AND AMMONIUM SULPHATE PRODUCTION.**

CONTEXT

The digestate leaving agricultural digesters producing biomethane is separated into a solid fraction and a liquid ammonia fraction. In the latter stream, **the ammonia present constitutes a limit for spreading on fields** (limit imposed by the Nitrates Directive as a nitrogen value of less than 170 kg/hectare).

PROBLEM STATEMENT

The customer's plant has a capacity of 150 m^3/day (6 m^3/h), with an ammonia content of 150-500 kg/d. The digestate undergoes a screening and a mechanical microfiltration process, then an ultrafiltration membrane treatment.

The objective of the installed facility was to **reduce the ammoniacal nitrogen content in the resulting liquid fraction and to produce an ammonium sulphate solution** at a concentration of 30-35% (above 6% nitrogen content) **to be reused in agriculture as a fertiliser**, all while paying close attention to air emissions and odours.

METHODOLOGICAL APPROACH

Conventional stripping systems have significant limitations due to the fouling caused by the liquid digestate as is. **Therefore, stripping equipment has been tested and engineered** to guarantee high efficiency even with very dirty, dense and encrusting liquids, optimising the management of the air treatment required for stripping.

PLANT

The plant consists of an ammonia stripping tower with reduced fouling and a following scrubber unit for ammonia separation and abatement.

All this is managed by an innovative stripping air recirculation system, without significant emissions.

TECHNOLOGY

The liquid solution to be treated, **which is rich in ammonia**, is fed into the stripping tower counter-current the ammonia-enriched gas stream.

The air is then washed in the second abatement tower (scrubber) with an acid solution that removes the ammonia, producing an ammonium sulphate solution.

The solution inside the scrubber tower is periodically discharged depending on the density inside the tower.

The proposed plant operates with complete recirculation of the gaseous flow so as to prevent the discharge of emissions, especially odorous emissions, into the atmosphere.

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INSTALLATION

The entire facility was installed in a dedicated area on a secured platform adjacent to the digester, complete with storage tanks for regents (sulphuric acid and soda) and the ammonium sulphate produced.

MONITORING

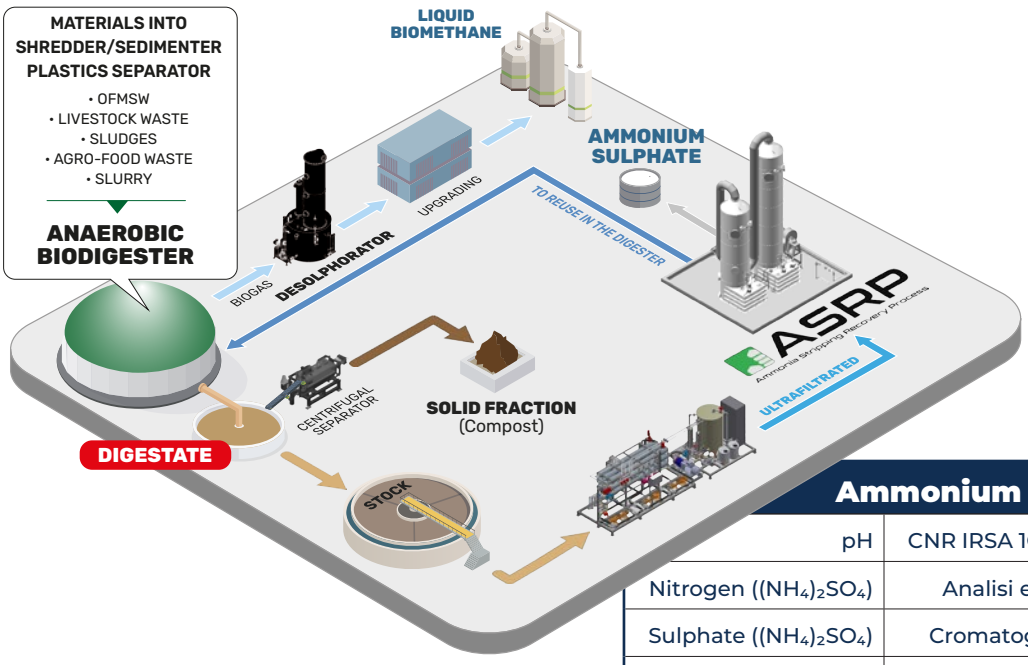
Tests were carried out on the effluent, **obtaining abatement yields in excess of 90%**. The density of the ammonium sulphate solution produced is checked in the field periodically, at predetermined times. The functionality of the plant is checked in real time by the remote operator, who monitors every parameter.

RESULTS • YIELD

The intervention proved to be decisive/effective in that the ammoniacal nitrogen content in the resulting liquid fraction was reduced**, resulting in a sulphate solution with a 6-7% nitrogen content, which was reused in agriculture as fertiliser.**

APPLICATIONS

All biomethane production plants with WET digesters (fed with OFMSW, livestock manure or biomass or mixed).



Ammonium Sulphate Analysis			
pH	CNR IRSA 1Q 64 Vol 3 1985		**6,56**
Nitrogen ($(NH_4)_2SO_4$)	Analisi elementare*	% p/p	**33,7**
Sulphate ($(NH_4)_2SO_4$)	Cromatografia ionica*	% p/p	**34,0**
Calcium (Ca)	EPA 6010C 2007*	% p/p	**0,01**
Magnesium (Mg)	EPA 6010C 2007*	% p/p	**n.d.- lower 0,01**
Sodium (Na)	EPA 6010C 2007*	% p/p	**n.d.- lower 0,01**
Potassium (K)	EPA 6010C 2007*	% p/p	**n.d.- lower 0,01**

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