

## Activities

Ammonium salts are recovered from animal manure via stripping-scrubbing process and are considered a priority as RENURE products, showing the potential to substitute synthetic nitrogen fertilizers in crop production.

The produced ammonium salts were characterised for acidity (pH value), total nutrient content (nitrogen, phosphorus and potassium), and heavy metal contents (copper and zinc).

The agronomic performance of the recovered ammonium nitrate was tested on potato, maize and winter wheat over five field trials conducted in 2022 and 2023. Results were summarized in an infosheet. A demo event (field visit) and a workshop were organized at Inagro with approximately 30 participants (more than half being farmers) to share knowledge and help farmers prepare for the upcoming RENURE legislation and encouraging the correct use of ammonium salts.

## Further details



**Total budget:** € 75.000,00

**Total financed:** € 75.000,00

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**Flanders,** Belgium



**Inagro vzw**

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## RENURE

# Agronomic performance of manure-derived ammonium salts as RENURE fertilisers



## Objectives

There is a nutrient surplus from livestock industries in Flanders while additional nutrients are supplied in the form of synthetic fertilizer.

The OG RENURE aims to prepare agriculture and horticulture for the use of RENURE products, such as ammonium salts recovered from animal manure, with knowledge and experience regarding the application of ammonium salts in practice, identify any bottlenecks, and gain insight into the impact of the rollout of the RENURE criteria on Flemish agriculture.

*Outlook and main properties of the ammonium sulphate and ammonium nitrate recovered from animal manure*



Ammonium Sulfate

Ammonium Nitrate

	Ammonium sulphate	Ammonium nitrate
Nitrogen %	8%	10-15% (50/50 ammonium/nitrate ratio)
Sulphur %	9 (of 23% SO <sub>3</sub> )	0
Density (ton/m <sup>3</sup> )	1.2	1.15

## Results

Ammonium salts (including ammonium sulphate and ammonium nitrate) are recovered from animal manure through ammonia stripping and scrubbing process: the thin fraction of manure or digestate is atomized and the ammonia volatilizes under manipulation of temperature and/or pH.

This stripping gas, rich in ammonia, is sprayed with an acid in a second compartment, whereby the ammonia is precipitated into an ammonium salt.

Depending on the counter acid (nitric acid or sulfuric acid), ammonium nitrate or ammonium sulphate is produced respectively.

Ammonium nitrate only contains nitrogen (7.5-12% N) and at a higher concentration than ammonium sulphate which also contains high concentration of sulphur.

Both show a high potential to meet the RENURE criteria as fertilizer substitutes.

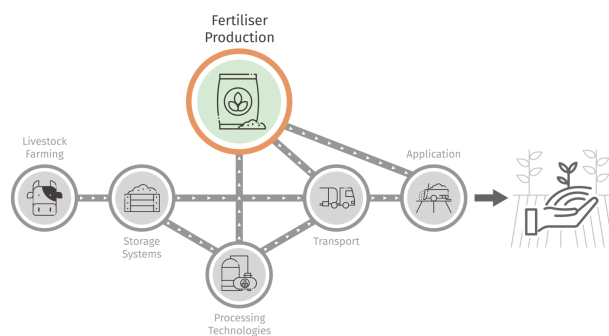
Results of the field tests also indicated that the recovered ammonium nitrate performs as well as synthetic fertilizers (urea and calcium ammonium nitrate) in terms of effectiveness and fertilizing value.

## Context

Due to rising fertilizer prices, it is becoming increasingly difficult and expensive for farmers to obtain sufficient fertilizer. Moreover, for geopolitical reasons it is appropriate to be more self-sufficient in that area.

### Location in the Nutri-Know value chain

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This stimulates the search for cheaper and sustainable alternatives, such as ammonium salts recovered from animal manure which are proposed under the RENURE criteria with potential to replace synthetic fertilisers, thus reducing the fertiliser costs while closing the N cycle within agriculture.

In the current Flemish context, the implementation of an ammonia stripper is only advantageous when processing pig manure, if a processing route is already present (biology and/or fermentation installation). The results showed that manure processing capacity must be at least approximately 20,000 tons of manure per year to achieve the desired economies of scale. The market value of the ammonium salts is highly dependent on current fertilizer prices, as well as on the fertilizer statute. After all, the ammonium salts will be more valuable when the RENURE legislation is in force and they can be used as fertilizer substitutes beyond the limits for animal manure.



# NUTRI•KNOW

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