

## TRAINING MATERIAL

### Title:

Ammonium sulphate from digestate by "Biogas Bree" process (ID: 274)

### Training:

#### What is the product?

Ammonia sulphate is a high NS containing liquid and transparent solution from chemical air scrubber.

#### Who is the vendor of the product/technology?

The producer/vendor is Biogas Bree (<https://biogasbree.be/>). Biogas Bree BV was founded in 2011. With an electrical capacity of 3,6 megawatts and a thermal capacity of 4,1 megawatts, Biogas Bree processes 85,000 tonnes of biomass per year, simultaneously providing 30,000 people or 7,500 families with green electricity.

#### Which other product/technologies are provided by the vendor?

Other digestate-derivatives currently produced are solid fraction (5.000 t/y) and liquid fraction digestate (45.000 t/y) – both non animal manure status – as well as animal manure-status dried digestate (1.500 t/y).

#### Which are the advantages of the product and the problems addressed?

Ammonia sulphate is a low priced, high value and efficient N and S fertiliser issued from a chemical air scrubber added on the digestate drying proces (or from pig stables). It is – in Flanders and other regions – considered as a mineral fertiliser, has no physical impurities and is free of pathogens, insect larvae and weed seeds. Although the EC of ammonium sulphate is high and the pH can be relatively low, both parameters do not reduce crop yield according to several field trials (e.g. [UNIR](#)). The main reason is that due to the high NS concentration in ammonium sulphate compared to animal manure only low amounts are applied. Due to a historical decrease of the acidification problems and acid rain, the space for S-fertilisation has increased again in recent years, especially since there are mainly sulphur shortages on Flemish fields and meadows. These shortages in the soil can in turn lead to too low N utilisation in the plant (and yellowing). The provision of sulphur in the fertilisation schedule is especially recommended for crops with a high sulphur requirement (e.g. cabbages, leek,..).

#### Which is the nutrient content of the product?

The nutrient content is on average 8% N% and 25% SO<sub>4</sub> with a 100% N nutrient availability and a pH between 4 and 6,5.

**Which equipment and methods can be used to apply the product?**

The ammonia sulphate can be used in arable land farming or greenhouses on crops such as grass, cabbage crops, lettuce, potato, onions, celery, leek, cereals, sugar beets, maize, etc. On arable land the products can be put together in the same concentrations as commodity fertilizers. This opens a broad market, as existing machinery can be used to spread these fertilizers e.g. classic sprinkler with nozzles. Alternatives are an optimised application through drag hoses or spoked wheel fertilization.

As drainage water is corrosive, the necessary machine components are made of corrosion-resistant materials. Mixing with the soil provides the advantage of minimal risk of crop damaging and volatilization of the product. Furthermore, the soil also has a buffer capacity to neutralize the potentially low pH of ammonium sulphate.

In order to make optimum use of its effect as a fertiliser, it is desirable to make the product very specifically available to the plant, either at the start of cultivation or in the form of additional fertilisation. In order to avoid any risk of crop 'burn' (seeds, plants, leaves) during the administration of ammonium sulphate, especially in windy and sunny weather, new specific application techniques are used (cfr above). Additionally one may choose to fertilise only during cool weather, during or just after rain.

**How to use the product?**

The application rate depends (in general & in particular in Flanders) on type of farm, region (N), soil (P), on crop, etc.. Even the month of the year and the cultivation of catch crops influence the possibility to apply.

As to ammonium sulphate, due to the decreasing sulphur deposition in the form of acid rain (linked to improved air quality), the provision of sulphur in the fertilisation schedule is recommended especially for crops with a high sulphur requirement (e.g. cabbages, leek,..). The sulphur content of ammonium sulphate is normally the limiting fertilization factor because an excess of S prevents the absorption of other minerals. Co-fertilisation with urea reduces the S content as the N content increases.

The most recent analysis values determine the maximum dose that can be used on agricultural land. One can always request an analysis report from the producer. It is strongly recommended to work also with a recent soil analysis. Based on soil type, the soil analysis results (N & S), the crop requirement, the corresponding fertilisation advice, etc. the correct dosage should be calculated. Commonly however the dosage often fluctuates between 750 and 1000 L/ha/y.

**Which are the authority permits and in which EU countries?**

In Flanders these ammonia fertilisers require no certification, derogation, nor manure transport documents. In Holland also they can, conditionally, be traded as mineral fertilisers. On a European level the Nitrates Directive defines this product as animal manure and not as mineral N fertiliser yet. Therefore the product has to fulfil requirements of animal manure. A European project Safemanure is ongoing to attempt validation EU-wide as a mineral fertiliser.

**How much does it cost?**

The ammonia sulphate fertiliser resulting from Biogas Bree digestate drying and exhaust air treatment is a competitively priced nitrogen fertilizer with a cost ranging roughly between 0€/t to 15€/t.



For more information: [https://nutriman.net/farmer-platform/product/id\\_274](https://nutriman.net/farmer-platform/product/id_274)