

Practice BBF n° 5

SCRUBBING OF STABLE AIR TO PRODUCE AMMONIUM SULPHATE

Introduction

Category: Good Practice (GP)

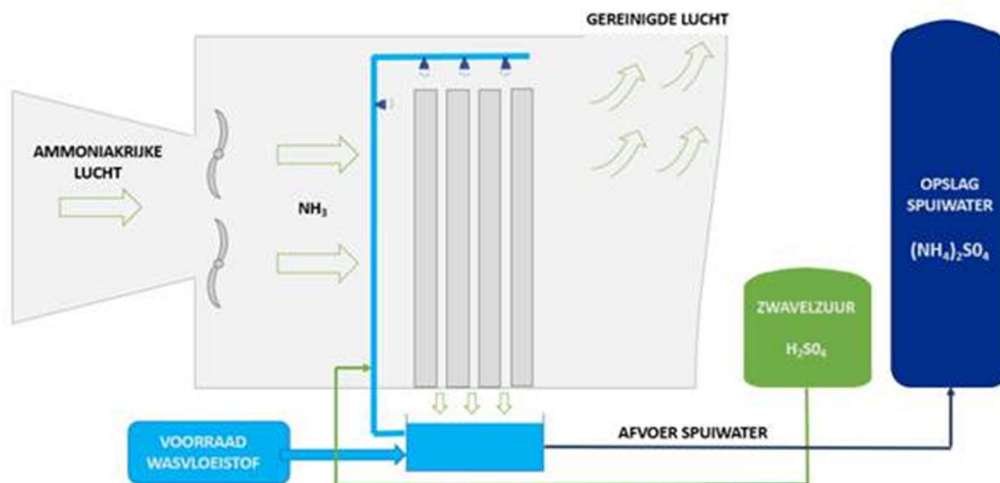
Practice identity card

#Bio-based fertilizers, food, GP, Belgium, air scrubbing, ammonium

#Air scrubbing systems recover ammonia from livestock housing and create a washwater

The washwater can be used as a recuperated fertilizer

Best applied close to roots and at the start of the growing season for nitrogen efficiency.



Short description

➔ Emissions of NH_3 from livestock housing and slurry storage represent a large part of the total NH_3 emissions from agricultural activities. Therefore chemical air scrubbing is used to reduce the ammonia and odor components in stable air. Water with added sulfuric acid is used to stream along the filter package. The acid washwater reacts with the ammonia in the stable air, producing ammonium sulphate which remains in the washwater. To optimally work the washwater needs to be removed regularly. This washwater can be used as a recuperated fertilizer and is recognized as a substitute for synthetic fertilizer. The resulting fertiliser is liquid and can be applied as any other liquid fertilizer through injection or through spraying followed by immediate ploughing. Applications where the fertiliser is brought as close as possible to the roots is ideal. This fertiliser is best applied at the

start of the growing season because the N in the product is present as ammonium and it still needs to be converted to nitrate before the plant can absorb it. This type of fertiliser is useful for any kind of crop, but in case a S containing counter acid is used in the production step the resulting fertiliser can be of particular interest for crops that also have a sulfur need such as cabbage crops, onions, celery, grains, sugar beets etc.

Implementation process

Which fertiliser type is considered as the standard in this region? Mineral fertilizer and/or pig manure

What was the on-farm issue/challenge/opportunity that led to the implementation of the practice? The need to reduce emissions from stable air.

How long did it take to implement the practice and which are the measures needed to monitor: Need for permits + regular monitoring + obligatory analyses on frequent basis.

Application process/mode

- **In which form is the BBF applied?** liquid
- **How is the BBF applied on the field?** band placement

Logistics

- **Storage safety risk:** substantial
- **Logistic aspects to consider:** The washwater has an acid PH and is thus corrosive, therefore storage tanks should be made from non-corrosive material. Also at all times it should be avoided that organic manure comes in contact with this water as toxic H₂S can be formed. People that manipulate the BBF should have a clear view on the potential chemical dangers when transporting/storing the BBF.
- **Skill/education level required for safe and effective application of the BBF?** rather low
- **Availability of the BBF in this region:** abundantly available
- **Availability of the BBF in the wider EU:** somewhat low

Agronomical traits

- **Is it a 'slow-release' fertiliser?** no
- **N-P-K composition of the BBF:** (4-8)-0-0
- **C:N ratio of the BBF:** 0:(4-8)
- **Expected availability of nitrogen (N) in the BBF:** similar
- **Expected availability of phosphorus (P) in the BBF:** lower
- **Expected availability of potassium (K) in the BBF:** lower
- **Can the BBF be applied to a multitude of cultivation techniques, or is the use limited to one or a few techniques?** Applicable to a multitude of cultivation techniques, although less suitable for foliar application.
- **Targeted crop categories:** food, feed, fibre, oil, ornamental, industrial
- **Influence on soil quality:** As the fertilizer had an acidic pH one should consider the buffer capacity of the soil + this type of fertilizer is also rich in S, this element has an optimum for fertilisation.
- **Soil types suitable for the BBF:** peaty, sandy, clay, loamy, chalky, silty

- **Expected effect on crop yield:** similar
- **Expected effect on crop yield variation:** similar
- **Expected effect on crop quality:** similar
- **Expected effect on crop quality variation:** similar
- **Which costs may increase upon using the BBF?** equipment, storage
- **Which costs may decrease upon using the BBF?** mineral or other types of fertilisers
- **Expected long-term/indirect benefits of using the BBF:** Total N is present in mineral form and can thus be a good replacement for synthetic fertilizers => closing the cycle.
- **Is the use as fertiliser the most valuable application of the material at hand?** yes, no other application

Administrative context

- **Does the use of the BBF qualify for subsidies?** No
- **Status of the legal framework that regulates the use of the BBF:** well-developed
- **Are there any policy barriers complicating the use of the BBF?** This product is recognized as mineral fertilizer and does not fall under the Nitrates Directive as animal manure when used. Important when mixed with animal manure it is again categorized as animal manure. However, this is strongly discouraged for the risk of H2S formation.
- **Does the BBF contain any hazardous substances, and if this is the case, which one(s)?** No
- **Is the use of the BBF compliant with EU organic farming practices?** No, as for the moment the BBF is considered to origin from intensive pig production
- **Is the use of the BBF supported by Eco-schemes?** No
- **Expected effect on the leaching of nutrients?**

The product only contains nitrogen, the product shows similar N leaching patterns as compared to classical fertilization

- **Are there any gaseous emissions to be considered upon using the BBF?** No
- **Greenhouse gas (GHG) reduction potential of the BBF:** substantial
- **Effects expected on the time occupation of the farmer upon using the BBF?** moderate increase
- **May the use of the BBF contribute to a better public image of agriculture?** Yes, as it could help in the image of agriculture, by contributing to a more circular economy (nutrient recuperation and avoiding mineral fertilizer use from fossil resources).
- **Any relevant information or remarks about the above can be added here:** The BBF is particularly useful for demanding crops

Contact

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Eu member state: Belgium

Find out more

Source of information: EMIS/VITO and Nutricycle Vlaanderen

Additional info/links:

<https://nutricycle.vlaanderen/wp-content/uploads/2021/08/Brochure-Ammoniumsulfaat.pdf.pdf>

UGhent Biobased Fertilizer: GP: Scrubbing of stable air to produce ammonium sulphate

Source: Nutricycle Vlaanderen, brochure ammonium sulphate