



Potential of bio-based fertilisers for achieving the goals set by the Farm to Fork strategy and effects for farmers and consumers

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LEX4BIO support for F2F strategy



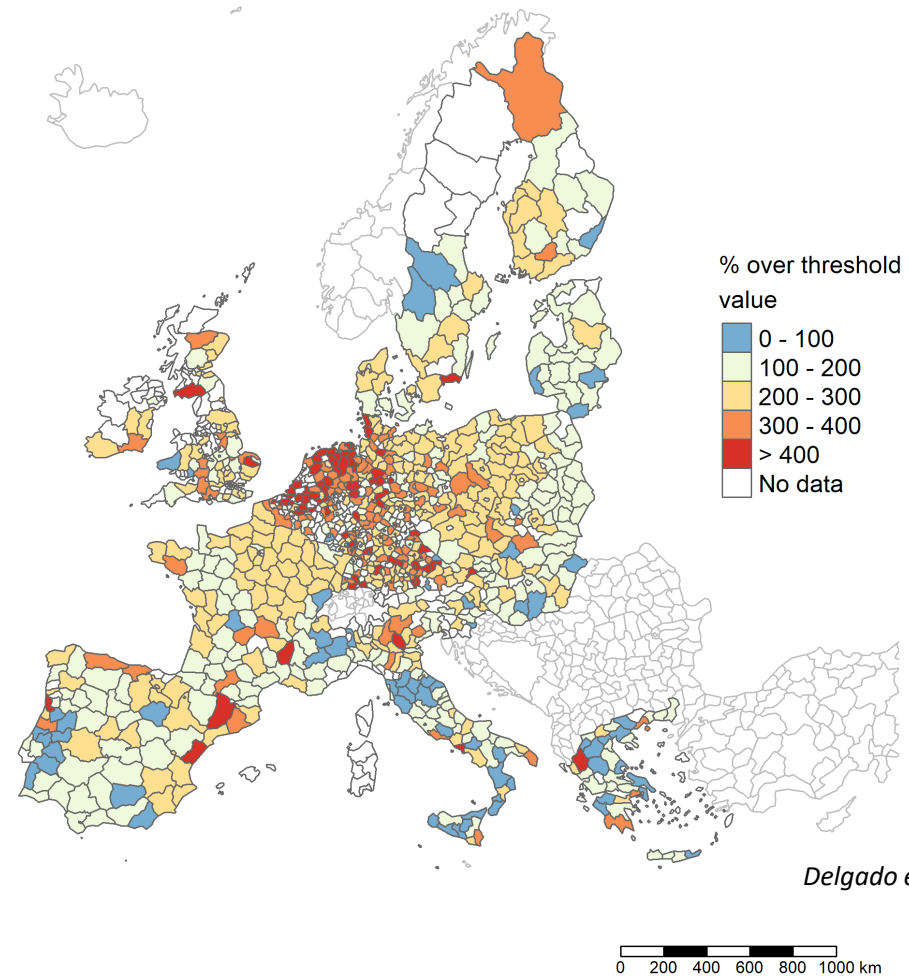
- F2F strategy aims to reduce nutrient losses by 50%, leading to 20% reduction in fertiliser use by the year 2030
 - Fertilisation needs to be optimised based on crop requirement (yield) under different climatic and soil conditions in the EU
- Intensive animal production and urbanisation concentrates nutrients (e.g. manures, sewage sludges) regionally
 - This can be seen as legacy phosphorus concentration in agricultural soils and nitrogen losses
 - Circular economy requires better utilization of nutrient-rich side-streams and turning them into a bio-based fertilisers (BBFs)
- LEX4BIO aims to optimise the use of BBFs while ensuring agronomic efficiency, food and feed safety, human health and environmental protection



Reducing phosphorus losses



- Knowledge of bioavailable phosphorus concentration in agricultural soils required for optimising P fertilisation
 - Currently several soil testing methods in the EU
- Properties of BBFs varies
 - Site specific BBFs taking into account climatic conditions and soil properties across Europe
- **Recommendations**: fertilisation needs to be adjusted according to crop requirement, taken into account different growing conditions

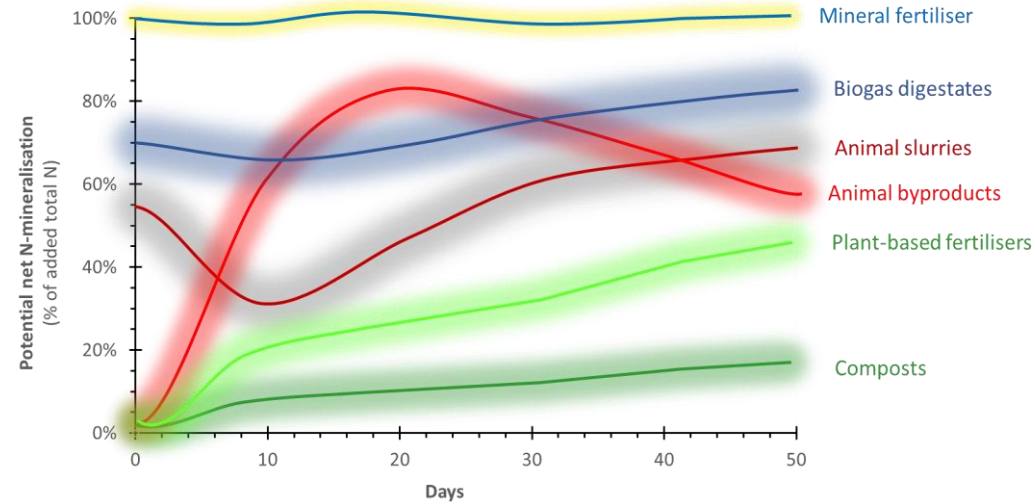


Reducing nitrogen losses

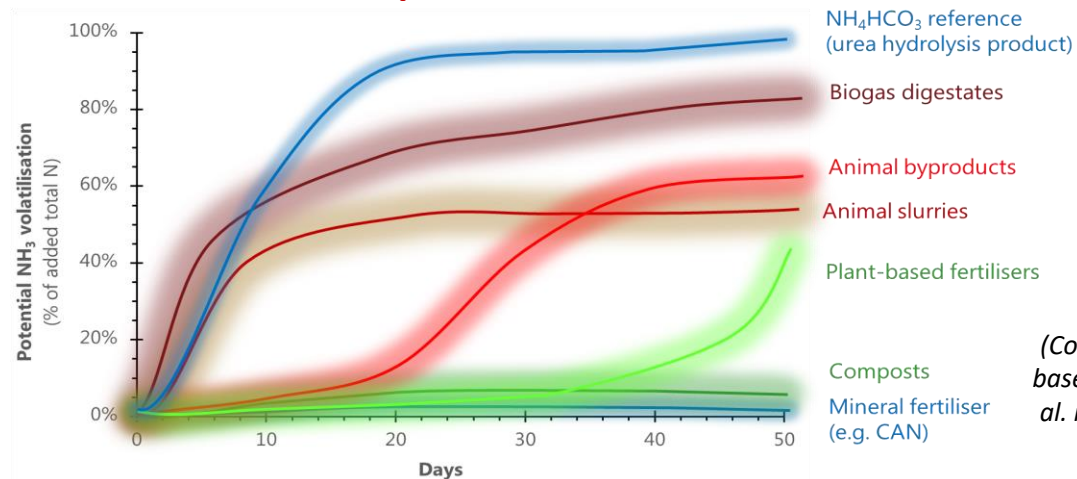


- Improving crop N utilisation efficiency and reducing losses from BBF depends on better characterization of BBFs and soil properties for adapting suitable BBF application methods
- **Recommendations:** N-BBFs with high ammonium content/ rapid N mineralisation should preferably be incorporated into the soil quickly to minimise risk of significant ammonia loss

Accumulated net nitrogen mineralisation



Accumulated potential ammonia volatilization



(Conceptual data from Jensen 2022, based on Agostini et al. and Larsen et al. in prep. – LEX4BIO results not yet finalised)

Compliance tests for BBFs



- Optimal BBF application rates requires knowledge about their agronomic efficiency and risks for environmental losses
- Agronomic efficiency varies among BBFs and nutrient/harmful heavy metal losses are also affected by the soil properties
- **Recommendations**: Compliance testing of BBF needs to indicate agronomic efficiency (i.e. N or P use efficiency) and potential environmental emissions (e.g. ammonia volatilisation or P leaching) of BBFs





- BBFs may provide a viable alternative source of plant nutrients and reduces dependency on mineral fertilisers
- Many BBFs provide reasonably high crop nutrient use efficiency, but nutrient availability/release pattern/loss risk varies more between BBFs than for mineral fertilisers, which in turn requires better compliance testing and also follow up of nutrient demand by the individual crop
- Determination of nutrient content of bulky BBFs (e.g. liquid/moist) before application allows more targeted use and minimises nutrient losses
- Some BBFs (especially liquid/moist) need different storage conditions than mineral fertilisers, to conserve BBFs quality and avoid environmental impacts
- Many solid/dry/pelletised BBFs can be applied with existing fertiliser spreaders, but liquid/moist BBFs may require alternative spreading equipments (e.g. more like for solid/liquid manure)



- BBFs provides alternative and often local fertilisers for farmers, and may ensure both better food security and a more circular economy
- Provided BBF fulfill EU and national criteria for application in certified organic production, they may contribute to an increased area cultivated in organic farming
- Many BBFs have similar or lower trace metal contents as mineral fertilisers and thus their use does not threaten food quality or soil metal accumulation – however, critical trace metals, other contaminants and other unwanted substances/organisms should be closely monitored and regulated



Thank you

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