BIO-BASED FERTILIZERS DERIVED FROM VARIOUS NUTRIENT-RICH SIDE STREAMS HAVE POTENTIAL TO EFFICIENTLY AND SAFELY REPLACE MINERAL FERTILIZERS

LEX4BIO RESULTS PUBLISHED

Food security in Europe is strongly related to reducing the continent's dependency on imported fossil fertilizers, the production of which harms the environment with the use of scarce non-renewable resources and high energy consumption. The extensive laboratory and field trial experiments conducted by LEX4BIO's soil scientists demonstrated that biobased fertilizers can be an attainable alternative to conventional mineral fertilizers and can contribute to reaching the ambitious goals of the EU Green Deal and Farm to Fork strategy as well as improve Europe's self-sufficiency in food production.

Nitrogen (N) and phosphorus (P) are vital nutrients for crop production and therefore evaluating their demand in Europe across varying soil and climatic conditions is considered a key output of LEX4BIO project and an essential enabler for the better utilization of BBFs from environmental and economic point of view.

The study of phosphorus is based on existing soil P database at the EU level and in relation to identifying P-responsive sites per different crops, phosphorus availability and fertilizer needs of European soils. Its underlying objective is to provide an efficient scheme for a more accurate estimate of P requirements by crop type, and subsequent better allocation of P resources and fertilizer rates. A central finding of the research is that the majority of European crop P demand can be covered with BBFs by optimizing the recycling of phosphorus from food processing, manure, wastewater, and municipal solid waste. This circular economy approach in the use of P fosters agricultural sustainability, food security, and environmental performance in the application of this resource.

"Biobased fertilizers' acceptance at large requires knowledge about their agronomic efficiency and potential effects on the environment, food safety and health across Europe."

LEX4BIO coordinator, senior scientist Kari Ylivainio from Natural Resources Institute Finland (Luke)

Gaseous nitrogen losses from fertilizers can cause both economic losses and environmental deterioration. The study on potential ammonia (NH_3) volatilization conducted in LEX4BIO includes 39 different BBFs, commercially available on the European market. The laboratory trials with five European soils showed significant variation in the potential ammonia losses, affected by the properties of the BBFs and soil characteristics, as the highest NH_3 volatilization comes from digestates, while the lowest occurs in the use of composts and struvites. An important outcome of the study is the evidence that the incorporation of

biobased fertilizers in soil, with the proper application methods, can greatly reduce ammonia volatilization.

Other interesting results to look out for

In the coming months the project will publish its report on drivers and barriers for replacing conventional fertilizers with bio-based alternatives for all stakeholders in the value chain, thus providing important insights into potential obstacles to the wide social acceptance of the new products. Overcoming impediments to a full-scale utilization of BBFs, across the whole spectrum of users, from consumers and farmers to fertilizer, and food and beverage producers, requires concerted action among numerous sectors and organizations, to include legislative changes. For this reason, it is crucial to have in place a thorough assessment of the opportunities and conditions for the BBFs to become valued and preferred standard in agriculture.

LEX4BIO proudly respects the 'as open as possible, as closed as necessary' principle in its communication and dissemination. All peer-reviewed scientific publications and other project results are accessible from LEX4BIO community on ZENODO.

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