

European Sustainable Nutrient Initiative, 20 September 2023, 09:00 - 17:30 CET FEB-VBO, Rue Ravenstein 4, 1000, Brussels (BE)

Preliminary Programme

- 09:00 - 09:30 Welcome and introduction to the ESNI Community by *Prof. Erik Meers, UGhent and Ana Robles Aguilar, BETA- UVIC*
- 09:30 - 10:30
- Paul Webb, *Head of the European Research Executive Agency, European Commission*
 - State of play on Fertilising Product Regulation in terms recycled nutrients, *Theodora Nikolakopoulou, DG GROW, European Commission*
 - Nutrients and their interaction with the environment, *Tue Rasmussen Fosdal, DG ENV, European Commission*
 - Nutrient (re)cycling in sustainable agriculture, *Luis Sanchez-Alvarez, DG AGRI, European Commission*
- 10:30 - 11:00 Nutri2Cycle and ReNu2Cycle: policy on bio-based fertilisers, *Prof. Erik Meers, UGent and Laura Van Scholl, NMI*

11:00 - 11:25 Project Pitches and Coffee Break

11:25 - 12:45 Parallel workshops: Session 1

Policy perspective

Towards a harmonized approach on sustainability assessment of nutrient recovery pathways: setting LCA methodological priorities

Organised by NOVAFERT

Technology

Technologies for nutrient recovery from wastewater

Co-organised by WALNUT and ULTIMATE

Stakeholders perspective

Profitability and market acceptance of bio-based fertilizers

Co-organised by FERTIMANURE and FERTICYCLE

12:45 - 13:45 Lunch and poster session

13:45 - 15:05 Parallel workshops: Session 2

Policy perspective

New bio-based fertilisers from secondary raw material upcycling – technical, commercial and regulatory implications

Co-organised by FERTICYCLE and FER-PLAY

Technology

Standardise algae circular products to market in agricultural applications

Co-organised by EU4Algae and SEMPRES-BIO

Stakeholders perspective

ReNu2Cycle: Closing the nutrient cycle to provide sustainable, bio-based fertilizer in NWE

Co-organised by ReNu2Cycle

15:05 - 15:20 Short break

15:20 - 16:40 Parallel workshop: Session 3

Policy perspective

Co-creation workshop towards optimizing nutrient flows and budgets in sustainable agriculture: mitigation measures, KPIs and modelling

Co-organised by NUTRIBUDGET and NUTRI2CYCLE

Technology

Bio-based fertilisers recovery from manure and fishery wastes: lessons learnt and future perspectives

Co-organised by FERTIMANURE and SEA2LAND

Stakeholders perspective

Bringing to market high-quality green, healthy food, feed and cosmetics from algae ... with a twist

Organised by ALGAEPROBANOS

16:40 - 17:20 Wrap up and Plenary Forum of ESNI, Prof. Erik Meers, UGhent and Ana Robles Aguilar, BETA- UVIC

17:20 Networking drink



in collaboration with:



European Sustainable Nutrient Initiative,

Parallel workshops

Parallel workshops: Session 1

Policy perspective

Towards a harmonised approach on sustainability assessment of nutrient recovery pathways: setting LCA methodological priorities

The workshop will address several methodological challenges encountered in the environmental assessment of BBFs, particularly when the objective involves comparing different systems. Some of the key considerations include selecting an appropriate functional unit, establishing a benchmark (baseline system), allocating impacts among co-products, modeling direct field emissions during the application stage and end-of-life phase of bio-based fertilisers (BBFs), accessing reliable and comprehensive life cycle data, accounting for the transfer of xenobiotics to soils or other environmental compartments, and considering changes in soil quality, among others.

Therefore, this working session seeks to prioritise these methodological choices and establish a roadmap for future work within the LCA community. By harmonising methodologies for evaluating BBFs, the workshop seeks to facilitate effective decision-making and establish consistent guidelines for assessing the environmental performance of biobased fertilisers.

Moderator: Nancy Peña, BETA-UVIC, Spain

Speakers:

- Fertilizers as part of the EU Product Environmental Footprint (PEF) framework, Ilkka Leinonen, Luke, Finland
- Methodological challenges for LCA studies of recycling fertilisers and their application in agriculture, *Thomas Nemecek, Agroscope, Switzerland*
- Biobased fertilizer use: ensuring consistency between the benefits and drawbacks, *Arnaud Helias, French National Institute for Agriculture, Food, and Environment INRAE · Department of Environment and Agronomy, France*
- Project approach: the vision of NOVAFERT by *Jorge Senan, BETA-UVIC* and FER-PLAY by *Hasler Iglesias Yáñez, CETENMA, Spain*

Technology

Technologies for nutrient recovery from wastewater

Wastewater is considered as a potentially important source of nutrients. In the workshop on 'technologies for nutrient recovery from wastewater' we will show recent developments in the field of nutrient recovery from different wastewater streams and the potential of applying novel technologies to reduce nutrient concentrations in effluent streams contributing to the implementation of circular processes in the water and agricultural domain. The workshop includes three presentations showing results from pilot scale experiments carried out in the framework of the EU funded WALNUT and ULTIMATE projects, as well as a discussion on the potential of nutrient recovery from wastewater streams.

Moderator: Prof.Erik Meers, UGENT, Belgium

Speakers:

- Water and Nutrient Recovery from Greenhouse Wastewater using Electrodialysis, *Joep van den Broeke, KRW - Water Research Institute, The Netherlands*
- Struvite crystallisation and ammonia stripping for nutrients recovery from distillery wastewater, *Celeste Gritti, Cranfield University, United Kingdom*
- Exploring the valorization potential of urban wastewater by the application of a 2-stage technology, *Lennert Dockx, Aquafin, Belgium*

Stakeholders perspective

Profitability and market acceptance of bio-based fertilizers

The "Profitability and market acceptance of bio-based fertilizers" session was designed to explore the economic aspects of bio-based fertilizers (BBFs) in modern agriculture through the presentation of results of two EU projects – FERTIMANURE and FERTICYCLE. As the world moves towards more sustainable practices, bio-based fertilisers (BBFs) offer a promising alternative to conventional synthetic fertilizers, contributing to improved soil health, reduced environmental impact and enhanced crop productivity. The successful introduction of such products relies on an approach that encompasses innovation, market research, collaboration and stakeholder engagement. A panel discussion is planned to provide a platform for experts to share their insights and opinions, while also fostering interactive dialogue with the audience to gather their valuable perspectives.

Moderator: Lies Bamelis, United Experts

Speakers:

- Bio-based fertilisers – market barriers and stakeholders attitude, *Tanja Ćuk, IPS Konzalting, Croatia*
- Exploring the adoption path of bio-based fertilisers: A combined approach of theory of planned behavior and Van Westendorp price sensitivity meter among farmers in the EU, *Egor Moshkin, United Experts, Belgium*
- **Panel session:**
 - Ana-Marija Špicnagel, *IPS Konzalting, Croatia*
 - Jeroen Buysse, *UGent, Belgium*
 - Niamh Power, *MTU, Ireland*

Parallel workshops: Session 2

Policy perspective

New bio-based fertilisers from secondary raw material upcycling – technical, commercial and regulatory implications

The workshop will tackle technical, commercial and regulatory implications for selected bio-based fertilisers from secondary raw materials: treated bio-waste, peat-free organo-mineral fertilisers, struvite from industrial and urban waste waters, solid fraction of digestate. We will also address the need for competence-building for researchers, producers, advisors and end-users of new bio-based fertilisers. At the end of the session, speakers will participate in a panel debate to engage with workshop participants in co-creation activities to help assess the situation that bio-based fertilisers' producers and end-users face nowadays.

Moderator: Mieke Decorte, European Biogas Association (EBA)

Speakers:

- Introduction to the FertiCycle Marie S. Curie Training Network, *Lars Stoumann Jensen, Professor, University of Copenhagen, Denmark*
- Introduction to the FER-PLAY project, *Hasler Iglesias Yáñez, CETENMA, Spain*
- Could treated bio-wastes be a sustainable solution to the worldwide need for phosphorous fertiliser, *Pietro Sica, PhD student, University of Copenhagen, Denmark*
- Designing novel peat-free organo-mineral fertilisers from recyclable bio-waste, *Tomas Sitzmann, PhD student, University of Turin, Italy*
- Technical and Commercial challenges for Struvite, *Wim Moerman, Nuresys, Belgium*
- Maximizing Sustainability: Digestate production in the biogas industry, *Marina Pasteris, European Biogas Association (EBA), Belgium*

Technology

Standardise algae circular products to market in agricultural applications

Bioremediation of wastewaters, be it industrially or domestic sourced, is a mature industrial sector, connected tight with utility services, operating globally for decades. Apart from utilities, effluent content can be used in production of energy, materials and sometimes agriculture products. Bioremediation technologies use biological methods such as bacterial fermentation, and more recently algae were used to clean wastewaters.

Bioremediation of wastewaters with algae has been proven at commercial scale (Aqualia, CLEANRAS) while many projects have demonstrated algae bioremediation in the past (SABANA, AllGas, ALG-AD, EnAlgae), while current projects are now applying more systems thinking (CIRCALGAE, LOCALITY, REALM, AlgaeProBanos).

Algae offers additional opportunities to replace conventional bacteria, and combine cleaning the waters (bioremediation) with product development from effluents. However, to commodify algae as an industry-relevant key resource for derisking for algae bioremediation technologies, and marketing low and middle added-value products and it is essential to:

- 1) reduce the production costs – both capital and operational, and
- 2) standardise product quality.

In the workshop with practitioners, we will analyse state of play and barriers of the sector – to explore potential and way forward.

Moderator: Marcella Fernandes de Souza, Ghent University, Belgium and Efthalia Arvaniti, SUBMARINER Network, Germany

Speakers:

- Robert Reinhardt, AlgEn, Slovenia
- Leen Bastiaens, VITO, Belgium
- Marie Lambert, Ghent University, Belgium

Stakeholders perspective

ReNu2Cycle: Closing the nutrient cycle to provide sustainable, bio-based fertilizer in NWE

ReNu2Cycle aims to reduce NWE dependency on fossil-based fertilizer imports with proven impacts on availability, price stability and ecological footprint by valorising recycled nutrients from municipal and industrial waste as well as the agricultural sector. The project will explore transregional nutrient supply-demand strategies in Flanders, Netherlands, Ireland, Saarland, Lower Saxony and Luxembourg, with regional specifications in a joint NWE transition environment.

The workshop, which is also the launching event of the project, will focus on the interconnection with stakeholders regionally and transnationally to solve technological, agro-economical and ecological challenges and enable widespread adoption of sustainable RDF solutions on farms across NWE.

Moderator: Wassilina Bugaeva, IZES, Germany

Speakers:

- Background, where does the project comes from; introducing ReNu2Cycle project, *Wassilina Bugaeva, IZES, Germany*
- How ReNu2Cycle interacts with stakeholders and the Living Lab concept, *Annmarie Ryan, University of Limerick, Ireland*
- Round table discussion on stakeholder input
 1. Recycled-Derived Fertilisers (RDFs) selection process;
 2. Participation in demonstrations;
 3. Adoption of RDF use.

Parallel workshops: Session 3

Policy perspective

Co-creation workshop towards optimizing nutrient flows and budgets in sustainable agriculture: mitigation measures, KPIs and modelling

The NutriBudget is a Horizon Europe project that aims to develop the prototype of a first-of-its-kind integrated nutrient management platform, called “NutriPlatform”, in various regions across Europe.

The NutriPlatform will operate as a decision-support tool for farmers, advisors and regional authorities. Before the end of the project the project aims that this prototype (as a stand-alone or integrated in the existing EC promoted FaST tool for nutrient management) will be tested and used by at least 40.000 farmers across Europe. First, the development of the NutriPlatform will be based on the algorithms of two advanced newly developed holistic NutriModels that quantify the impact of agronomic mitigation measures to optimise nutrient budget and flow across scales (from farm to Europe), across elements (C) and nutrients (N, P, K, S, Ca, Mg, Cu and Zn) and by looking at various agronomic and environmental targets.

Some of these models are based on the previous work of Horizon 2020 Nutri2Cycle, and will be further extended within the framework of NutriBudget project. The mitigation measures will be compiled in Mitigation Measures Catalogue, and will be derived from (I) existing knowledge and (II) new data from field experiments with innovative mitigation measures that connect animal and crop production via agro-processing industries in 5 pilot regions in 4 different climate regions in Europe. Secondly, these measures will be linked to relevant monitoring indicators, called “NutriKPIs”, for agronomic performance in different farming systems, nutrient emissions and impact on biodiversity.

Thereby, NutriBudget will contribute to systemically optimise nutrient management across different agricultural production systems and regions in the EU to reduce pollution due to the excessive use of nutrients and nutrient losses to the environment.

The NutriBudget co-creation workshop at ESNi aims to co-create with stakeholders the Mitigation Measures Catalogue, and present the current progress being made on NutriModels and NutriKPIs. Suggestions on the further development of the Catalogue, NutriModels and NutriKPIs, are highly welcomed by the stakeholders.

Moderator: Prof. Erik Meers, UGent, Belgium

Speakers:

- Introduction to the NutriBudget project and Mitigation Measures Catalogue, *Prof. Dr. Erik Meers, Ghent University*
- Optimizing nutrient flows – A modelling approach from EU to farm level, *Dr. Kevin Duan, Wageningen Research, The Netherlands*
- Identification thresholds for critical performance indicators to monitor environmental impacts of farming across the EU, *Dr. Gerard Ros, Wageningen University / Nutrient Management Institute (NMI), The Netherlands*

Bio-based fertilisers recovery from manure and fishery wastes: lessons learnt and future perspectives

This workshop will present and show results on different technological configurations to recover different bio-based fertilisers (BBFs) with high added value from agro-industrial by-products such as manure, fisheries or aquaculture wastes. Specifically, operational aspects of the technological approaches suggested in four different and successful biorefineries implemented at a pilot scale will be exposed, together with the lessons learnt during their operation.

Moderator: Laia Llenas Argelaguet, UVIC, Spain

Speakers:

- Practical case studies in Sea2Land: valorisation of fishery and aquaculture by-products into added value protein hydrolysates, potential of use a biostimulants :The Cantabric area case study, *Carlos Bald, AZTI, Spain*,
- Practical case studies in Sea2Land: valorisation of fishery and aquaculture by-products into added value protein hydrolysates, potential of use a biostimulants :the Atlantic area case study, *Clement Chastrette, CATAR, France*
- Practical case studies in FERTIMANURE: valorisation of animal manure into bio-based fertilisers: the Dutch pilot, *Kimo Van Dijk, WENR, The Netherlands*
- Practical case studies in FERTIMANURE: valorisation of animal manure into bio-based fertilisers: the Spanish pilot, *Nagore Guerra, BETA-UVIC, Spain*

Stakeholders perspective

Bringing to market high-quality green, healthy food, feed and cosmetics from algae ... with a twist

Algae are a vital group of aquatic photosynthetic organisms that when industrially produced, assimilate carbon and nutrients to produce “green” biomass feedstocks that can be used as a resource for various consumer products such as food, feed and cosmetics. Algal growth requires CO₂ and nutrients, and a promising aspect of microalgal cultivation is to combine it with waste streams which provide these nutrients. In the simplest form, this could be recycled nutrients from the downstream processing of the algal feedstock, or from more general sources such as industrial side streams or liquid digestate from biogas production or from agriculture. More efficient use of these waste streams would be a big step towards developing a circular bioeconomy. However, consumer acceptance is a key driver in product development. In this workshop we will unravel the dos and don'ts in marketing (micro)algae products produced also with recycled side-streams.

The AlgaeProBANOS workshop will take place as a moderated expert panel discussion, combined with an interactive involvement of algae. The results will be used by the AlgaeProBANOS project's work in product development and marketing microalgae products to food, feed and cosmetic applications.

Moderator: Efthalia Arvaniti, SUBMARINER Network, Germany

Speakers:

- BioSolutions for Decarbonization, *Reut Shavit, Algiecel, Denmark*
- Jonas de Cooman, *PROVIRON BE (Locality)*
- Valorisation of Algae in the modern food, *Jean Paul Cadoret, Algama FR (Red Wine project)*