SOFIE3: call for presentations & company showcases

3rd Summit of Organic and organo-mineral Fertiliser Industries in Europe

16-17 January 2024, Brussels Plaza & hybrid

SOFIE is the only industry meeting place for organic-carbon-based fertiliser producers, distributors, advisory, technology suppliers. The first SOFIE (2019) attracted 125 participants, with 230 for SOFIE2 (January 2023, *photo below*).

16-17 January 2024 Brussels & hybrid

Organic fertilisers SOFIEurope 3rd summit

SOFIE3 will cover:

- policy and market
- agronomic benefits, in particular field trials and case studies
- processing from divers input materials to consistent products for farmers
- application best practices, e.g. co-application with mineral fertilisers, biostimulants
- environment, carbon benefits, LCA, Circular Economy
- business models and product success stories

Short proposals for presentations, company showcases or posters should be sent by 15th October to info@phosphorusplatform.eu : see details HERE.

www.phosphorusplatform.eu/SOFIE2024

SOFIE3 is co-organised by ESPP, Eurofema and Fertilizers Europe, with support of the International Fertiliser Society.

Which recycled nutrients for Organic Farming ? and why ?

Monday 18th September 2023, 14h – 17h, online

Co-organised by IFOAM Europe and ESPP.

Participants: representatives of Organic Farming organisations from across Europe.

Recycled struvite and precipitated phosphates have been added into the list of authorised inputs as fertilisers in certified EU Organic Farming (ESPP eNews n°73). Certain other recycled nutrients are already authorised with conditions.

This meeting will discuss which further recycled nutrient products might be appropriate for certified Organic Farming, based on practical examples, and under what conditions they might be considered. Questions considered: solubility and plant availability of nutrients, origin of raw materials, chemicals used in recovery process and LCA, contaminants and safety. Examples will be: calcined phosphates, biochars, phosphate fertilisers from ashes, recovered ammonium sulphate, recovered nutrients from aquaculture and other marine wastes.

Full meeting agenda HERE. Registration: Eventbrite.

Looking for consultant for EFSA dossier

ESPP is looking for a regulatory consultant to prepare a dossier on Cat1 ABP ashes

The European Commission (DG SANTE) has indicated that it will request from EFSA (European Food Safety Agency) an Opinion on the safety of possible use of Cat1 ashes and derivates in fertilisers. EFSA are susceptible to consider that the Brown et al. studies (2000, 2004, see ESPP eNews n°73) suggest possible prion infectivity after combustion, even in the absence of residual organic carbon or protein. ESPP organised an online meeting of companies and experts on Cat1 ash safety (22nd May 2023), including two co-authors of these studies. This meeting concluded that there are today no practicable methods to reliably test ash samples to show absence of prion infectivity and no experimental evidence of elimination of infectivity by combustion under EU Industrial Emission Directive conditions. The meeting therefore proposed to develop a dossier of evidence to input to EFSA based on input material risk and on epidemiological data. ESPP is looking for a service provider to collect data and prepare a dossier to submit to EFSA, and also to support coordination with concerned companies and organisations.

See relevant background documents at www.phosphorusplatform.eu/regulatory

Full details of services requested HERE. To express interest, please contact ESPP info@phosphorusplatform.eu before 15th September 2023.

Research prizes and partner searches

1st German Phosphorus Platform DPP P-recycling thesis prize

1000 € prize for an undergraduate or master thesis, obtained in Germany, on phosphorus recovery.

***Submission deadline 1st September 2023**. "Förderpreis der Deutschen Phosphor-Plattform DPP" here.*

IFS 9th Brian Chambers crop nutrition research prize

The International Fertiliser Society prize (UK£ 1000 plus 2 x UK£ 500) rewards completed or advanced research (PhD / MSc level) susceptible to make a practical contribution to improving crop nutrition. Application form (one page) and information on previous prize winners is here

***Submission deadline: 30th September 2023.** IFS Brian Chambers International Award for Early Career Researchers in Crop Nutrition. HERE.*

Partners wanted for consortium for EU Horizon Europe proposal

German research institutes FBN and AWI are searching for European partners for a consortium for the Horizon Europe Call "Demonstrating how regions can operate within safe ecological and regional nitrogen and phosphorus boundaries" (HORIZON-CL6-2024-ZEROPOLLUTION-01-1), planned call opening date 17 October 2023. The project will explore material flow scenarios and management of nitrogen (N) and phosphorus (P) and develop measures to avoid unwanted losses, including recycling N and P from wastes and sewage sludge, improving N-binding in soils and plants. The consortium is looking for expertise in resource governance, circular economy, crop production, soil science, waste and environmental management, ecosystem modelling, and companies who have expertise in sewage sludge treatment and in recycled fertilisers or animal feed.

Research Institute for Farm Animal Biology (FBN) and Alfred-Wegener-Institute (AWI). Contacts: Michael Oster oster@fbn-dummerstorf.de and Cédric Meunier Cedric.Meunier@awi.de

Policy

EU Soil Health Directive proposal

Proposed Directive will specify descriptors for monitoring and assessing soil health (including soil P and N) to be implemented / defined nationally by "soil district", within a non-regulatory objective of achieving healthy soils by 2050 (as announced in the Commission document "EU Soil Strategy for 2030" 17/11/2021). The Directive is currently open for **public consultation to 18th September** and will go to European Parliament and Council (Member States) for decision.

The proposed Directive will install an EU-wide monitoring of soil health, and of soil artificialisation ("land take"). Outline parameters are specified, but thresholds will be defined (if not indicated) or can be adapted by Member States (MS), according to "soil districts", which MS must also define. This looks superficially similar to the functioning of the Water Framework Directive (WFD), but in fact is very different in that the WFD fixes legal obligations and deadlines for MS to achieve Good Quality Status / Potential for water bodies, whereas this proposed Directive only refers to the 2050 objective in the recitals. Also the WFD quality criteria, for different ecoregions / water body types, are fixed at the EU level, not by MS. Unlike the WFD, there is no provision for local governance to involve civil society and stakeholders in "soil districts". The proposed Directive also defines sustainable soil management principles, opens possibilities for certification schemes for healthy soils, and defines obligations concerning contaminated sites.

ESPP's input to the preparatory consultations underlined that soil health is key to protecting water quality by limiting nutrient loss, that climate change will accentuate nutrient pressures on soil health (accelerated nutrient mineralisation, increased soil erosion, both leading to nutrient losses) and that nutrient recycling can support soil health by return of organic carbon (organic fertilisers, composts, digestates, biosolids) subject to ensuring contaminant safety.

The proposal refers to the EU Green Deal (Farm-to-Fork and Biodiversity Strategies) aim to reduce nutrient losses by 50% without deterioration of soil fertility. Nutrients cycling is identified as a key aspect of healthy soils (Recitals 2). In the parameter thresholds in Annex I (Soil Descriptors for Health Soil Condition …), soil phosphorus and soil nitrogen are specified as two of the eleven criteria. Excess phosphorus must, for the whole EU (Annex I part A), have a maximum value set by the MS, such that this maximum is between 30 and 50 mg/kg (Annex II specifies measurement as extractable phosphorus by ISO 11263:1994 = Olsen-P). Excess nitrogen levels may also be defined by MS if causing "critical loss of ecosystem services" (art. 9.3, Annex I part C: total soil N, measurement by ISO 11261:1995 Kjeldahl N).

*Public consultation **open to 18th September 2023**. Possibility to input plain text comments (max. 4 000 characters) plus document.*
https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13350-Soil-health-protecting-sustainably-managing-and-restoring-EU-soils_en

Evaluation of EU Sewage Sludge Directive published

European Commission evaluation of 1986 Sewage Sludge Directive concludes that it should be maintained but should be updated to cover organic contaminants, microplastics, AMR and to better ensure application according to crop needs. The formal "Evaluation" is the first step towards a possible proposal to revise or recast the Directive. The evaluation is based on analysis of literature, Member States reporting, a public consultation, surveys, a stakeholder workshop and interviews (including with ESPP). The evaluation notes that of 7-8 Mt/y sewage sludge (dry matter) produced in the EU today*, c. 40% is valorised in agriculture plus 10% "composted" (ESPP comment: probably also then used in agriculture or for other soil improvement applications). Incineration of this sludge would cost an additional 390 – 490 M€/y (from Egle unpublished). Use of sewage sludge to substitute fertiliser nutrients can save farmers maybe 96 plus 44 €/tDS sludge (for N and P respectively). The evaluation notes that current Member States reporting does not enable to verify that crop nutrient needs are taken into account in sewage sludge application, whereas this is necessary to avoid risks of nutrient pollution. The evaluation concludes that the Directive aims to encourage the use of sewage sludge in agriculture whilst preventing negative environmental or health impacts, that it continues to have EU added value and to be relevant and supported by stakeholders, but that it should be reviewed to consider regulating organic contaminants (in particular PFAS, PAH), pathogens and antimicrobial resistance (AMR), pharmaceuticals and microplastics. It is underlined that sludge management choices relate to local situations, and that maintaining the flexibility of choice for sludge management is important.

*SWD(2023)158, 22nd May 2023, Evaluation of Council Directive 86/278/EEC on sewage sludge used in agriculture. HERE. * correct numbers are page 53, wrongly stated as 2-3 Mt/y in the Executive summary page 1.*

EU proposed food waste reduction targets and actions

Amendments to the EU Waste Framework Directive, as proposed by the European Commission, would fix targets to reduce food waste by 2030: -10% for food manufacture and processing, -30% for households. Member States must define Food Waste reduction programmes, including the following actions: behavioural change campaigns, actions to address supply chain inefficiencies, food donation systems, skills training, funding for SMEs and social economy actors. The proposed amendments to the Directive are currently open to public consultation to 4th September and will go to European Parliament and Council for decision.

*"Revision of EU Waste Framework", **public consultation open to 4th September 2023**. Possibility to input plain text comments (max. 4 000 characters) plus document. https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13225-Environmental-impact-of-waste-management-revision-of-EU-waste-framework_en*

International Chamber of Commerce flags need to address obstacles to circularity

ICC position says international waste transport regulations need modification to enable movement of secondary resources for recycling pilots and that quality of products should determine regulation, not origin of input materials. EasyMining (Ragn-Sells) Ash2Phos (recovery of phosphorus from sewage sludge ash) is one of four case studies: it took eight months to obtain permits from Denmark and Sweden to transport just one tonne of ash across the border for pilot trials. The Basel convention limits transboundary transport of waste for research to only 25 kg, inadequate to develop industrial pilot processes. ICC calls for consultation of business in improving waste international regulations, regulatory facilitation of storage of wastes containing resources to be recovered later when technologies have progressed, removal of barriers and creation of incentives for circularity and prioritisation of quality over origin (product quality should determine regulation of use, trade and transport, rather than origin). A presentation by Shunta Yamaguchi, OECD, at WCEF2023 identified as ways forward: clarification of definitions and classification of wastes and secondary raw materials, harmonisation and mutual acceptance of circular economy related standards, cross-border reverse supply chains, removing trade restrictions on waste trade whilst tackling illegal waste trade.

OECD publications on Trade, Resource Efficiency and Circular Economy.

World Circular Economy Forum (WCEF), 1st June 2023 How to remove hurdles on research waste shipments.

International Chamber of Commerce (ICC), 2023 Circular material flows for research and innovation

Draft of Guidance Document for EU FPR Technical Documentation

NMI has published a 69-page first draft of the future Guidance Document for elaboration of Technical Documentation for the EU Fertilising Products Regulation. The document includes an inventory of relevant documents (guidance documents for other EU regulations, documents of industry associations) and outlines the documents and information which are necessary for Conformity Assessment of EU fertilising products (CE-mark) as a function of different PFCs, CMCs, Conformity Assessment modules. A stakeholder workshop to discuss this Guidance is planned for 17th October 2023 for information: contact.

"Technical study on the elaboration of the technical documentation for the FPR" Inception report, NMI Netherlands, 17th May 2023, 1935.N.22a HERE. This Guidance Document is commissioned by the European Commission (see tender announced in ESPP eNews n°66) but this is not indicated in this draft.

Research

Phosphorus limitation could limit CO_2 uptake by 7.5% globally

Climate models predict an increase in net CO_2 fixing with increasing atmospheric CO_2 and increasing biological activity linked to temperature, but this could be reduced by phosphorus limitation, **not considered in current models**. This study used the CABLE (Community Atmosphere Biosphere Land Exchange model) including the global biogeochemical model (CASA-CNP) and meteorological inputs from GCP-TRENDY to estimate net CO_2 fixing with consideration of only C and N cycles, or also with P, under the climate "business as usual" scenario RCP8.5. This scenario implies a global temperature rise of 5.7°C and an increase in atmospheric CO_2 of +250% from today's levels. Phosphorus limitation is estimated to reduce net ecosystem biomass production (net carbon fixing) by 15% per year in China by 2060 (with a reduction in cumulated fixed carbon over the coming four decades of >11% for China), and by over 7.5% per year worldwide (cumulated >5%).

"Phosphorus Limitation on Carbon Sequestration in China under RCP8.5", J. Peng et al., Advances in Atmospheric Sciences 2023 DOI.

Filter media for phosphorus capture from domestic wastewaters

Filtration columns filled with different configurations of Rockfos® and Leca® material were tested on real domestic wastewater to assess phosphate capture during a two-year experiment. Biologically treated wastewater (~7 mg P/l, pH ~7) was filtered with mixtures of Rockfos® (a CaO and SiO_2-rich material produced from carbonate-siliceous rock) and Leca® (a light expanded clay aggregate material), with a total of 20 litres of filter material. Applied flow rates were 20 and 40 l/day, with a retention time of 12 and 6h, respectively. The combination of 90% Rockfos® with 10% Leca® was identified as optimal among the tested options, and high phosphate (PO_4) removal efficiency (~94%) was obtained for all columns tested at 20 l/day flow rate and 12 h retention time, reducing phosphorus to 0.4 mg P-PO_4/l in the effluent. Lower removal (~80%, ~1.70 mg P-PO_4/l) was obtained at 40 l/day inflow rate, due to reduced contact time. For these reasons, authors suggest to use 1 m^3 of these filter materials for 1 m^3/day of wastewater throughflow when designing P-removal systems. The filtration columns performed better during the first 250 days of testing, due to the high availability of reactive Ca^{2+} on grain surfaces. In the later stages of the test, removal efficiency decreased and was particularly low at inflowing temperature below 10°C, because of the slower chemical processes of phosphate precipitation in the filters. The alkaline characteristic of the filter material resulted in treated wastewater outflow initially at pH12 and still at pH9 after 300 days, which could be incompatible with discharge constraints. As indicated in Scope Newsletter n°138, challenges in implementation are the pH of the treated water, and selecting materials which can be recycled as a fertilising material after phosphorus uptake (plant availability of the phosphorus, low levels of contaminants).

"Long-term operating conditions for different sorption materials to capture phosphate from domestic wastewater" A. Jucherski et al., Sustainable Materials and Technologies 31, e00385 (2022), DOI. See also Gubernat et al. in Scope Newsletter n°138

Recirculating struvite for nitrogen removal

Lab and pilot tests of struvite redissolution using calcium hydroxide $Ca(OH)_2$ then sulphuric acid aim to enable application of struvite precipitation to remove ammonia from coal coking water with posssible ammonia recovery. Coking water contains organic compounds and ammonia nitrogen (TAN), and biological treatment often fails to achieve TAN discharge limits. Struvite precipitation is a robust route for TAN removal, but consumption of phosphorus and magnesium are cost prohibitive. Here a process to recycle the struvite back to soluble P and Mg compounds using low-cost chemicals (calcium hydroxide, sulphuric acid) was tested at the lab scale (30 g of struvite produced by precipitation from coking water) and then continuous pilot using coking water. The ammonia driven off could potentially be recovered. The struvite was first dissolved using calcium hydroxide solution, with aeration to drive off released ammonia. Increasing temperature, molar ratio (calcium hydroxide:ammonia) and aeration rate increased ammonia release efficiency, achieving 85% - 90% release at molar ratio 2:1, 35°C and gas-liquid ratio of 3500 (reaction time not specified). 9M sulphuric acid was then used to "activate" the struvite dissolution products by reducing pH to 2.5 - 3, resulting in soluble magnesium phosphate and precipitation of gypsum (calcium sulphate) – this is a comparable reaction to acid attack of phosphate rock. A pilot struvite reactor (20l hydraulic residence time 1 hour plus 40l settling zone 2 hours) was built and tested for continuous N removal from coking water and the precipitated struvite was dissolved – recirculated six times (seven uses). Results showed initial TAN removal from the coking water of nearly 90%, falling only slightly to around 85% by the 6^{th} recycle. Removal efficiency of 90% could be maintained by adding phosphate.

"Ammonia nitrogen removal from coking wastewater and high quality gypsum recovery by struvite recycling by using calcium hydroxide as decomposer", H. Huang et al. J. Environmental Management 292 (2021) 112712, DOI.

Nitrogen recycling

ESPP summary of nitrogen recovery perspectives in Fertilizer Focus

Leading fertiliser industry magazine publishes ESPP summary of work on N-recovery. ESPP notes that the few N-recycling installations operational today produce (dilute) aqueous ammonia salt solutions. These can be valorised regionally to farmers, but are not compatible with transport and reprocessing in the fertiliser industry (except in specific local circumstances). ESPP suggests to investigate feasibility of processes to recover ammonia as a compressed gas (e.g. via zeolites, geopolymers, ionic liquids), new routes to recover solid ammonium compounds and new processes to capture nitrogen from NO_x stripping (in combustion, industry). ESPP is looking for companies to co-fund a joint "blue sky" industrial feasibility study of such new N-recovery routes.

Fertilizer Focus (Argus Media), July/August 2023, free online https://www.argusmedia.com/en/fertilizer/fertilizer-focus

See also SCOPE Newsletter n° 145 (summary of ESPP's first N-recovery workshop) and n° 147 (summary of N-recovery science publications). Summary of WARM (White Ammonia Research Meeting) is underway.

Sewage sludge biochars as fertilisers

ESPP – EBI workshop at the Biochar Summit Helsingborg

Process to reconsider the exclusion of sewage sludge from EU Fertilising Products Regulation (FPR) "pyrolysis and gasification products" could start in 2023. EBI will coordinate data input on contaminant safety and agronomic value.

The Biochar Summit brought together several hundred industry and science participants. In this context, the ESPP-EBI joint workshop, with around fifty participants, welcomed European Commission and expert presentations on removal of organic contaminants in sewage sludge biochar processes, analysis methods and data availability and water industry interest for development of pyrolysis as a route for sewage sludge nutrient and carbon valorisation.

Christian Wieth, Aquagreen (Chair of EBI working group on sewage sludge carbonisation), opened the workshop, explaining the shared objective to collate evidence showing the contaminant safety, nutrient value to crops and carbon sequestration contribution of sewage sludge biochar, to support future acceptance of sewage sludge as an input to CE-Mark fertilisers (EU FPR CMC14, from which it is currently excluded).

Ana-Lucia Crisan, European Commission (DG GROW – Fertilisers), confirmed that at present sewage sludge is excluded as an input for European Fertilising Products Regulation (FPR) CMC14 "Pyrolysis and gasification materials", but that sewage sludge biochars can be used in agriculture in some Member States under national fertilisers regulations and/or under waste valorisation plans. CMC14 was adopted in 2021, as part of the "STRUBIAS" criteria, in parallel to the EU FPR. It is now integrated into the consolidated version of the FPR published here. These criteria were based on the JRC STRUBIAS report 2019, which concluded (page 136 onds.) that there was not sufficient evidence to prove the safety of organic contaminants in sewage sludge biochars, that is evidence of their elimination in the pyrolysis/gasification process. This report stated: "*the current proposal to exclude sewage sludge from the eligible input material list for CMC pyrolysis & gasification materials could possibly be revised once robust and extensive techno-scientific evidence underpins the safe use of (specific) pyrolysis & gasification materials derived from sewage sludge*". The current CMC14 criteria specify minimum processing conditions defined for input materials with low levels of contaminants (180°C for at least 2 seconds) and more demanding conditions would need to be specified where sewage sludge would be an input. Following the stakeholder consultation organised by DG GROW last year, sewage sludge as an input for CMC14 is included in the materials to be assessed for the European Commission (tender closed July 2023 HERE). This is expected to be a two-year study starting before end 2023. Stakeholders will be invited to input information on the safety, agronomic effectiveness, legal status, production and processing and potential for significant trade of sewage sludge pyrolysis / gasification materials. In particular, information on safety of organic contaminants in these materials should be more recent than, or otherwise not considered in, the 2019 JRC STRUBIAS report (see refence list of this report). If this study concludes that evidence now shows safety, agronomic value and trade potential as fertilising products of sewage sludge pyrolysis and gasification materials, with appropriate processing criteria, then CMC14 could be modified by Commission Delegated Act, after the relevant consultation procedures (maybe around one year additional time).

Christian Wieth, AquaGreen, noted that sewage sludge biochars are today used in agriculture under national fertilisers regulations in Sweden and under waste regulations in Denmark. They provide nutrients, improve soil water holding capacity and fix carbon. Sewage sludge biochar data from Pyreg, NGE and AquaGreen show that sewage sludge biochar typically meets the PFC contaminant criteria of the EU FPR, except possibly for zinc. Scientific literature indicates that dioxins, pharmaceuticals and pathogens are eliminated by pyrolysis at 500°C for 3 minutes, but there is not sufficient data concerning PFAS at 500°C. This could be addressed by requiring PFAS analysis and then exempting from further testing if no PFAS is found after three months. Furthermore, both Pyreg and AquaGreen have shown that PFAS is not detectable in the flue gas from their pyrolysis systems.

Helmut Gerber, Pyreg, summarised US EPA data showing that pharmaceuticals, PAH and dioxins are not found in sewage sludge biochars with pyrolysis at 500°C or higher, and PFAS is not found from around 600°C. A challenge however is that higher pyrolysis temperatures result in lower plant availability of the phosphorus in the biochar. Pyreg's sewage sludge biochar (pyrolysis @ 600°C) showed crop growth of around 90% compared to mineral phosphate fertiliser in field trials in Hessen, Germany (biochar from sewage works using iron/aluminium for P-removal, see SCOPE Newsletter n°144). The NAC solubility of the phosphorus in this biochar (78,7%) was very slightly below the 80% threshold specified for declaring phosphorus as a nutrient under the EU Fertilising Products Regulation (Annex III – PFC 1, 4b).

Gerard Cornelissen and Katinka Krahn, Norwegian Geotechnical Institute, summarised extensive laboratory studies into organic contaminants in biochars. Test methods generally used do not extract, or underestimate, organic contaminants in biochars because they are strongly bound into the biochar. This also means that the organic contaminants are not bioavailable in soil. Pyrolysis at c. >500°C generally ensures >99.9% removal of PCBs, PAHs, dioxins (load in input feed material / load in biochar). For dioxins, over 70% is usually eliminated, with the remainder mostly transferred to pyrolysis oils and very little to flue gases. However, in some cases, in particular at high temperatures (c. >800°C), dioxin toxicity may be increased by changes in congeners or modification to furans.

David Gustavsson, VA SYD and Sweden Water Research, presented the Swedish REVAQ sewage sludge quality certification scheme, which jointly engages the water industry, farmers, supermarkets, consumer associations and the Sweden EPA. A key benefit of REVAQ is that it has pushed reduction of contaminant inputs to sewage, from industry or household toxic chemicals. Around 50% of Sweden's sewage sludge is today REVAQ certified and is valorised in agriculture. However, there are concerns about organic contaminants and the water industry is looking at pyrolysis as a route to remove organic contaminants and reduce cadmium. Pyrolysis can be operated in smaller units than sewage sludge incineration, so reducing sludge transport and enabling flexibility, and offers benefits as a carbon sink with a potentially positive energy balance. VA SYD will soon be operating an AquaGreen pilot sewage sludge biochar plant (see SCOPE Newsletter n°144) to test pyrolysis of sewage sludges from different sewage works and to carry out field trials of sewage sludge biochars, in particular to assess phosphorus crop availability.

Richard Lancaster, Atkins Global Bioresources Director, emphasised that sewage sludge management is not a choice but a necessity, with significant growth in production worldwide as populations grow, standards of living increase and environmental standards tighten. If poorly managed, sewage sludge can cause pollution, odours, increase emissions and have significant carbon impacts, whilst missing opportunities to valorise resource value, for example nutrients. The water industry faces challenges to biosolids valorisation in agriculture, due to growing concerns with regard to micropollutant contamination, for example organic contaminants and microplastics. The water industry wants to keep open a range of possible sewage sludge management routes / pathways which enable adaptation to future policy and environments, resource recovery and advanced thermal conversion, using technologies such as pyrolysis, whereas incineration for example closes other options. To enable alternative strategies

there is a need to enhance understanding of deployment, explore output markets, refine regulations and gain a greater understanding on operating models / experience to support investment choices. Upstream reduction of contaminants at source is, however, the first priority.

Robert van Spingelen, ESPP President, closed the workshop, concluding that it is now necessary to collect data on elimination of organic contaminants (in particular PFAS, pharmaceuticals, microplastics) in sewage sludge pyrolysis and gasification processes, on analysis methods, and on levels of these contaminants in the resulting biochars, as well as data on phosphorus crop availability in sewage sludge biochars and on other agronomic benefits, including long-term carbon storage in soil. He underlined that the biochar industry also needs to propose consensus processing conditions and other criteria for possible inclusion of sewage sludge pyrolysis and gasification materials into CMC14 of the EU Fertilising Products Regulation. The European Biochar Industry Consortium indicated that they will centralise this data collection and make proposals.

ESPP – EBI workshop at the Biochar Summit, 14th June 2023 www.biochar-summit.eu

Stay informed

SCOPE Newsletter: www.phosphorusplatform.eu/SCOPEnewsletter eNews newsletter: www.phosphorusplatform.eu/eNewshome

If you do not already receive ESPP's SCOPE Newsletter and eNews (same emailing list), subscribe at www.phosphorusplatform.eu/subscribe

LinkedIn: https://www.linkedin.com/company/phosphorusplatform

Slideshare presentations: https://www.slideshare.net/phosphorusplatform - Twitter: @phosphorusESPP

YouTube https://www.youtube.com/user/phosphorusplatform

ESPP members