

ESPP dates for 2024		1
SOFIE3	1	
Standards & definitions for "Bio-Based" nutrients	2	
Targets for nutrient recovery under the Urban Waste Water Treatment Directive revision	2	
Policy		2
German Environment Ministers' conference calls for implementation of P-recovery	2	
EU-funded R&D into Circular Economy outcomes are mainly publications	3	
Proposed dental amalgam ban will reduce mercury levels in sewage and water bodies	3	
EU JRC Seville recruitment offers – Sustainable Industry	3	
Phosphorus recycling		3
Ostara's Crystal Green: first recovered struvite to obtain EU FPR CE-mark	3	
Further pilot trial announced for ViviMag® iron phosphate recovery	4	
EU funding for roll out of agronomic biostimulant recycled from human urine	4	
Safe use of recycled phosphates in animal feed	4	
Aquaculture, algae, fisheries		5
Legal status for nutrient recycling from fish manure, algae, seafood, aquaculture	5	
Review: nutrient recycling from fisheries and aquaculture	5	
Research		5
Sewage sludge treatment in Czech Republic and in Japan	5	
Netherlands wastewater nutrient recycling project KNAP	6	
Stay informed		6
ESPP members		6

ESPP dates for 2024

- 16-17 Jan. 2024: Brussels & online <u>SOFIE3</u> (Organic and Organo-Mineral Fertilisers) (with Eurofema, Fertilizers Europe, International Fertiliser Society and SILC)
- 18 Jan. 2024: Brussels & online "Bio-Based" nutrients standards & definitions
- 27-28 Feb. 2024: Warsaw CRU Phosphates 2024 ESPP panel on sustainable fertilisers
- 13-14 March 2024: Brussels & online ESPP workshops on Nutrient recycling policy
 - 13th March: policy tools to support market pull for recycled nutrients
 - 14th March: targets for nutrient recovery under the Urban Waste Water Treatment Directive revision
- 16-17 April 2024: Brussels & online <u>NERM</u> Nutrients in Europe Research Meeting (with Fertimanure, Lex4Bio, Walnut, Sea2Land, Rustica)
- 8-10 October 2024: Lleida, Spain <u>ESPC5</u> (5th European Sustainable Phosphorus Conference)

SOFIE3

3rd Summit of Organic and organo-mineral Fertiliser Industries in Europe.
16-17 January 2024, Brussels & hybrid. SOFIE is the only industry meeting place for organic-carbon-based fertiliser producers, distributors, advisory, technology suppliers. SOFIE1 (2019) attracted 125 participants, with 230 for SOFIE2 (2023). SOFIE 3 has an exceptional lineup of speakers for our upcoming conference, featuring key insights from esteemed organizations and industry leaders. Join us to



hear from the European Commission (DG AGRI and DG GROW), Notified Bodies like CerTrust and EFCI Register, alongside renowned companies such as Yara, ICL, and Fertilisers Europe. We'll also have insightful contributions from Eurofema, EBA, S&P/Fertecon, ADAS, Nutriënten Management Instituut, and IPS Konzalting.

The conference will be enriched by the participation of leading companies in the field, including Yara, K+S, Sede Environment, Culterra, Terramarine, Tessenderlo Group, Unimer, Den Ouden, Fertinagro, Ductor, DCM, Compo, Stiesdal, Biota Nutri, Darling Ingredients, Omya, Honkajoki, Labin, Ormin, Sappi, Agrana Starch, Green Circle, Centeon, AgriBioSource Europe, Alan SRL, The Waste Transformers, Steel Belt Systems, Sedron Technologies, and Sanitation360. This event promises to be a melting pot of ideas and innovations, shaping the future of our industry. Connect, collaborate, and be part of this transformative journey. Programme and registration www.phosphorusplatform.eu/SOFIE



Standards & definitions for "Bio-Based" nutrients

Brussels & hybrid, 18th January 2024 Defining "Bio-Based Fertilisers" and FPR "solely biological origin"

The term "Bio-Based Fertilisers" is today being widely used. For market transparency and policy making, it is important to have a clear and agreed definition of what is a "Bio-Based Fertiliser" and how to define the "Bio-Based" nutrient content of fertilising products. Also, the EU Fertilising Products Regulation 2019/2009 uses the term "of solely biological origin" for nutrients in criteria of several PFCs and there is today no clarity on how this should be interpreted. CEN and ISO methodologies for "Bio-based products: vocabulary" and for defining bio-based content are based on carbon radio-dating, and are not applicable to nutrients.



The meeting will take as starting point the working proposal HERE. Programme: http://phosphorusplatform.eu/BBF2024 Registration Eventbrite

Targets for nutrient recovery under the Urban Waste Water Treatment Directive revision

ESPP policy workshop to define proposals for possible regulatory targets for phosphorus and nitrogen reuse-recycling from sewage, Thursday 14th March 2024, Brussels & online.

The proposed UWWTD revision draft text (art. 20) states*: "The Commission is empowered to adopt delegated acts ... setting out the minimum reuse and recycling rates for phosphorus and nitrogen ...".

This meeting aims to develop consensus proposals for such "reuse and recycling rates", covering for example:

- > what are feasible "rates" for P and for N recovery?
- how should these "rates" be defined? ... as % of wwtp inflow? ... as % in sludge? ... as % in ash? ... as recovery of P or N down to a certain residual level (per p.e.)? ... other ...?
- > should the "rates" be different for wwtps of different size? different configuration? Before or after sludge energy valorisation / combustion?
- definition of "reuse and recycling"? ... Should this include treated sludge use in agriculture (biosolids to land). If so, under what conditions, e.g. quality / contaminants? plant nutrient availability? spreading according to crop nutrient requirements? CE or National fertiliser certification?
- should "reuse" and "recycling" be addressed differently depending on context: size of wastewater treatment works, regional context ...
- > should quality/functional requirements should be specified for recovered nutrient products?
- > other questions proposed by meeting participants.

13th March 2024: policy tools to support market pull for recycled nutrients

14th March: proposing UWWT Directive targets for P and N recovery, ESPP policy workshop

Both: Brussels & online. Registration is open www.phosphorusplatform.eu/nutrientevents2024

If you wish to present proposals, positions or evidence at the 14th March meeting: please send a brief outline of your proposed input by 21st January 2024 to info@phosphorusplatform.eu

Policy

German Environment Ministers' conference calls for implementation of P-recovery

Conference of German States (Land) of Environment Ministers reaffirms the importance of phosphorus recovery and expresses concern that little progress has been made towards the 2029 deadline fixed by German legislation. The Umweltministerkonferenz resolution 1st December 2023 underlines the importance of sustainable management of phosphorus and estimates that P in sewage could potentially substitute nearly half of Germany's P fertiliser consumption. However, six years after the entry into force of the German sewage sludge ordinance (AbfKlärV, 27th September 2017, see SCOPE Newsletter n°129) requiring phosphorus recovery from sewage, few P-recovery plants are identified and the 2029 implementation deadline may be widely not achieved. The resolution notes that obstacles include insufficient maturity of P-recovery technologies and lack of State regulations enabling passing of P-recovery costs on to wastewater fees. The Ministers call for an operator and stakeholder dialogue in 2024, with the German Phosphorus Platform, to identify obstacles to implementation and solutions, for modifications of regulations to allow passing on of costs and for State support for infrastructure. The Ministers also consider that the German Fertilisers Ordinance should be modified to facilitate the use of sewage-sludge derived phosphorus products in fertilisers when pollutants have been reduced.

^{*} The UWWTD Directive revision is currently under discussion by the European Parliament and Council European Parliament. European Parliament and Council. Both have finalised their positions on this Directive revision, see eNews n°80. Both maintain the principle of targets for phosphorus reuse and recycling, but Council proposed to delete nitrogen from this art. 20. It is expected that the finalised UWWTD Directive will be formally adopted early 2024.



Umweltministerkonferenz, 1 December 2023, Münster, agenda points TPO 20 and TOP 21 "Phosphor-Rückgewinnung aus Klärschlamm" https://www.umwelt.nrw.de/presse/detail/ergebnisse-der-101-umweltministerkonferenz-1701431976

EU-funded R&D into Circular Economy outcomes are mainly publications

Analysis of EU-funded Circular Economy R&D projects shows science publications are the main short-term outcome. Analysed projects completed more than one year earlier produced no direct methodologies and no market products. The study notes that Circular Economy R&D is funded under a wide range on EU programmes (Research Framework Programmes, Bio-based Industries Consortium, Bio-based Industries Joint Undertaking, LIFE, BlueInvest – maritime & aquaculture, Structural and Investment Funds, Recovery Plan for Europe, ...). The study identifies 38 projects funded under the EU R&D Framework Programmes FP7 or Horizon Europe, of which 12 had been completed more than one year earlier (6 responded to a questionnaire). The study conclusions state that EU R&D Framework projects are fulfilling their purpose because they are "increasingly societal challenges-driven and market oriented" but this is supported by conjecture or inference rather than evidence. Project participants are c. 44% companies (220) and c.38% research / universities with the remainder being public bodies (the distribution of subsidy funds between participants is not indicated and may be different): companies presumably expected to obtain some benefit from participation, be it subsidies, skills transfer, know-how or technology. The analysed studies completed more than a year ago resulted in no "direct methodologies and/or products for the market".

"On the societal impact of publicly funded Circular Bioeconomy research in Europe", A.S. Brandao et al., Research Evaluation, 2023, 00, 1–17 DOI.

Proposed dental amalgam ban will reduce mercury levels in sewage and water bodies

The European Commission has proposed to further restrict uses of mercury, with a complete ban of dental amalgam (use, manufacture) and further restrictions on certain types of lamps. Dental amalgam (containing mercury) was already banned for certain populations (children, pregnant and breast-feeding women) in 2017 (art. 10, Mercury Regulation 2017/852, see ESPP eNews n°6). The Commission now proposes (2023/0272 (COD)) to ban all use and manufacture of dental amalgam in Europe from 1st January 2025. Mercury free alternatives exist. Eureau, the EU water industry federation, welcomes the Commission proposal as contributing to reduce water pollution and facilitate the Circular Economy, indicating that over 40% of water bodies in Europe are not achieving Water Framework Directive "good status" because of mercury contamination. In Sweden, Norway and Denmark, where dental amalgam was banned two decades ago, mercury levels in sewage have fallen by 60%. The amalgam ban will also progressively reduce atmospheric mercury emissions from crematoria.

European Commission proposal for a Regulation "amending Regulation (EU) 2017/852 ... on mercury as regards dental amalgam and other mercury-added products subject to manufacturing, import and export restrictions", 14th July 2023, COM(2023) 395 final - 2023/0272 (COD). This proposal is currently with the European Parliament and Council for co-decision. Procedure file here.

EU JRC Seville recruitment offers – Sustainable Industry

The European Commission has opened recruitment for six project officers to work at JRC Seville on Industrial Emissions Directive BAT BREFs and in the new INCITE (EU Innovation Centre for Industrial Transformation & Emissions), 3 – 6 year contracts in the EIPPCB (European Integrated Pollution Prevention and Control Bureau). IED BAT BREFs cited include mining, livestock rearing, landfills, battery manufacture, iron-steel, cement, chemicals, paper, glass.

EU JRC recruitment open to 31st January 2024 http://recruitment.jrc.ec.europa.eu/?site=SVQ

Phosphorus recycling

Ostara's Crystal Green: first recovered struvite to obtain EU FPR CE-mark

Ostara has completed EU Fertilising Product Regulation (FPR) conformity assessment for its 100% recycled phosphate struvite (magnesium ammonium phosphate) recovered from municipal sewage in Madrid and in The Netherlands. This is the first time a recovered phosphate salt (CMC12) has obtained the EU FPR CE-mark. Ostara's struvite, marketed as Crystal Green, is pure struvite 5-28-0-16MgO fertiliser, which is considered to release nutrients according to crop requirements, independent of rainfall or irrigation, unlike conventional fertilisers. The FPR conformity assessment was undertaken for Ostara by Certrust (notified body). Ostara indicate that the EU FPR CE-mark now opens the way for Organic Farming certification. The EU Organic Farming Regulation (2023/121, January 2023, see ESPP eNews n°73) authorises use of recovered struvite and precipitated phosphate salts as fertilisers in Organic Farming, only if they "meet the requirements laid down in" the EU FPR.

"Ostara is proud to be the first company in the European Community to successfully pass the conformity assessment procedure of the EU fertilizing Product regulation for a 100% fully recovered struvite fertilizer", 6 December 2023.



Further pilot trial announced for ViviMag® iron phosphate recovery

Kemira and Royal Haskoning DHV have announced further trials of vivianite (iron(II) phosphate) magnetic recovery from municipal sewage sludge at Hoensbroek municipal sewage works (Waterschapsbedrijf Limburg WBL The Netherlands). The ViviMag process was initially developed by WETSUS and TU Delft and is today a Kemira patented technology. Anaerobic digestion of sewage sludge tends to reduce iron(III) phosphate to vivianite, which can be magnetically separated from sludge and recovered. A first manual 1 m³/h ViviMag pilot for magnetic separation of vivianite was operated at Nieuwveer; The Netherlands in 2019, then a 1 m³/h fully automated continuous pilot was built by Kemira. It was first operated by Veolia at Schönebeck, Germany (2022) with a digested sludge and a second trial then took place at VCS Søndersø, Denmark on a non-digested sludge in first half of 2023. This pilot installation has today been operated for a total of around 6 months with continuous operation for up to 7 days. The objective of the Kemira – Royal Haskoning DHV collaboration is to further test and assess the ViviMag technology at another WWTP in the Netherlands. This new trial has just started and will last at least 6 months. The vivianite may find a market as a niche fertiliser product in regions where soils suffer from iron deficiency, or research is underway to possibly develop a process to separate phosphorus in vivianite from iron, so enabling phosphorus recycling into mainstream phosphate fertilisers, and recycling of the iron for reuse in sewage phosphorus removal - Another option being explored is use of vivianite as a raw material to product lithium iron phosphate for use in batteries, if it can be shown that this is chemically efficient and that impurity levels are compatible with battery electronics specifications.

"Kemira and Royal HaskoningDHV to collaborate in award-winning phosphorus recovery technology", 12th December 2023.

EU funding for roll out of agronomic biostimulant recycled from human urine

Toopi Organics, a French startup, will receive 8.4 M€ EU funding to develop their Lactopi Start microbial biostimulant, produced by cultivating specific bacteria using separately collected human urine as substrate. In 2023, Toopi Organics collected and processed around 500 000 litres of urine from sites including motorway service stations, tourist attraction sites, city public toilets and music festivals and events. The funding is EU Horizon (European Innovation Council EIC Accelerator) with 2.4 M€ subsidy and 6 M capital. Over 100 field trials of the product will be carried out across six EU member states and Toopi Organics intends to open a full-scale production site near Bordeaux, France in 2025 (objective one million litres/year litres of product per year) followed by further sites in France and/or Belgium. The urine is filtered to remove pathogens and most organic contaminants. The processed urine is used as fermentation substrate to grow specific lactobacillus microorganisms and lactic acid, both of which act as biostimulants, enhancing crop nutrient uptake by solubilising phosphorus present in soil and improving and stimulating the plant root system. The resulting product does contain some nutrients, but does not claim fertilisation (nutrient supply) as a mode of action. It is applied at e.g. 25 litres/ha. The company indicates that the product meets the EU FPR (Fertilising Products Regulation) PFC 6(A) "Microbial plant biostimulant" criteria (stimulation effect on plant nutrition independent of product nutrient content, contaminant and pathogen limits) but cannot today be registered as an FPR CE-mark product because the cultivated lactic acid bacteria is not listed in CMC7. The product is authorised under national regulations in France, Belgium, Greece, Italy, Portugal and Spain.

"Toopi Organics décroche un financement de 8,4M€ pour développer la valorisation agricole de l'urine humaine en Europe", 14th November 2023 <u>here</u>.

Safe use of recycled phosphates in animal feed

EasyMining webinar with veterinary and agricultural experts suggests that calcium phosphates recovered from sewage sludge incineration ashes could be safely and effectively used in animal feed, if regulatory obstacles were lifted.

Beth Young, Epidemiologist, Swedish National Veterinary Institute (SVA), presented a risk assessment for pathogens for calcium phosphates recovered from sewage sludge incineration ash by EasyMining's Ash2Phos process. This recovered phosphorus has been shown to perform just as well as commercial phosphate feed additives, providing digestible phosphorus in trials with pigs and chickens (see SLU <u>animal feed trials study results</u>). The risk assessment considered probability of transmission of 'worst case' pathogens (prions for BSE – scrapie) in the stages: presence in sewage sludge, incineration of sludge, Ash2Phos ash processing. No data was found on prions in sewage sludge, two studies suggest that spiked prions survive in sludge, but low levels of prion infections in livestock and actions to reduce risks mean that the probability of prion presence in sewage is negligible. Probability that prions survive sewage sludge incineration is very low. The probability that prions survive the Ash2Phos process (acid, alkali, filtration, lime) is considered negligible. Overall the probability that bacteria, viruses or prions could be transmitted by the recovered phosphate is negligible, although there are knowledge gaps for prions.

Kerstin Sigfridson, Product Developer, Lantmännen, Swedish farmers' cooperative, with 18 000 farmers, providing 1 Mt/y of animal feed, that is around 50% of Swedish livestock. Lantmännen has ambitious sustainability and innovation objectives, including active work on livestock diets. Lantmännen considers that the use of recycled phosphates offers sustainability benefits and that the Ash2Phos recovered phosphate has shown the same digestibility as commercial phosphate feed additives (DCP) and is safe to use.

[&]quot;Wastewater: recover vivianite mineral, from lab to pilot scale - with Wetsus partner", 5th December 2023



Sara Stiernstörm. Product Manager, EasyMining, explained that the Ash2Phos recovered phosphate (RevoCaP precipitated calcium phosphate) offers CO_2 benefits and low contaminants compared to commercial feed phosphates and is fully soluble in citric acid (digestible). It contains around 35% Ca and 17% P. Ash2Phos can recover >90% of the phosphorus in ash, as well as recycling iron, aluminium and sand. Two full scale plants are today planned, both 30 000 t-ash/y, in Schkopau, Germany (with Gelsenwasser), commissioning planned 2027 and Helsingborg Sweden, planned 2028. However, there is today a major regulatory obstacle: the animal feed Regulation 767/2009 prohibits use of products from sewage sludge. This needs to be changed. EasyMining wishes to see: P-recycling from sewage to be made obligatory, sewage sludge incineration ash should be considered a safe starting point, product legislation should be based on quality not on input material origin, and incentives should support the use of clean and safe recycled materials.

Webinar "Safe use of recycled phosphate", 14th December 2023, organised by EasyMining (Ragn-Sells Group). Watch <u>here</u>. Webinar "Improving sustainability of livestock production", 3rd February 2022, watch <u>here</u>.

Aquaculture, algae, fisheries

Legal status for nutrient recycling from fish manure, algae, seafood, aquaculture

ESPP will meet the European Commission to discuss nutrient recycling from marine and aquaculture in week 3 of January 2024. We have prepared a draft table to summarise legal status and questions and welcome your input. This draft table covers different marine/aquaculture/algae materials under EU legislations: waste, fertilisers, animal by-products, Organic Farming, animal feed. Please send any input, comments or additions concerning nutrient and organics recycling from fish and marine product processing, aquaculture wastes and fish sludge, algae production, in particular where regulations are today unclear or are posing obstacles to the Circular Economy.

ESPP draft table on legal status of nutrient recycling from aquaculture and fisheries wastes and by-products, for comments. www.phosphorusplatform.eu/regulatory

Review: nutrient recycling from fisheries and aquaculture

Overview shows significant, increasing nutrient recycling potential from fish processing wastes and from aquaculture, but need to address regulatory obstacles and absences and to develop technologies adapted for different waste flows. Aquaculture production increased from 20 to 90 Mt/y worldwide over three decades to 2020, and today represents around half of world seafood and fish production. Processing waste can be 55 - 75 % of fish weight. Fish sludge, made up of water, fish feed, fish faeces and biomass from dead fish or other organisms, can represent c. 1.5 t sludge /t fish produced. Nutrient content of fish sludge varies widely, depending particularly on feed supply. Around 2/3 of P in fish feed is left in fish sludge not recovered in the fish. Solid fraction of fish sludge can contain e.g. 0.0015 – 0.03 % of P and N, so that nutrient recycling generally requires concentration. A number of studies are identified as showing effectiveness of fishery wastes or fertilising materials processed from them. Processed discussed for fishery processing wastes or fish sludge include anaerobic digestion, fermentation, composting, struvite recovery, thermal treatment and pyrolysis, emulsion (oil extraction and caking), drying, hydrolysis. Fish protein hydrolysates and chitin/chitosan from crustaceans are considered to be plant biostimulants as well as providing plant nutrients. Recycling is impacted by a range of EU regulations including Industrial Emissions Directive, waste regulations, Animal By-Products, food hygiene and health, fertilisers and Organic Farming. However, products derived from fishery wastes, by-products or aquaculture sludge are not yet included as a CMC category in the EU Fertilising Products Regulation 2019/1009. Attention should be paid to salinity.

"Nutrient recovery and recycling from fishery waste and by-products", EU Horizon 2020 Sea2Land project, J. Zhang et al., J. Environmental Management Volume 348, 15 December 2023, 119266 DOI.

Research

Sewage sludge treatment in Czech Republic and in Japan

Paper analyses sewage sludge valorisation routes and fate of sewage phosphorus in Czech Republic and in Japan. More than three quarters of Czech sewage sludge is applied to soil (use in agriculture, compost), 12% is co-incinerated and 7% still goes to landfill. In Japan only around 11% of sewage sludge is applied to soil, with most going to combustion (71% incineration, but also use as fuel in cement production and other thermal processing), with <1% going to landfill. Phosphorus content of sewage sludge in both countries (from literature) was 2.4 - 3.4 %P/DM, with higher P contents in digested sludge (this can be expected, because organic carbon is reduced in the digestion process). The paper estimates that in both countries, phosphorus in sewage could replace around 13 - 16% of mineral phosphate fertiliser use, but does not take into consideration the fact that three quarters of Czech sewage sludge phosphorus is today input to soils with land application, mostly after anaerobic digestion or composting.



The paper suggests that sewage sludge does not provide the same phosphorus effectiveness in crops as commercial fertilisers: two papers are cited to support this: Christiansen 2020 and Lemming 2017).

"P-recovery versus current sewage sludge treatment policy in the Czech Republic and Japan", M. Husek et al., 2023, Clean Technologies and Environmental Policy DOI.

Netherlands wastewater nutrient recycling project KNAP

New national project led by Wageningen University and Research will look at recycling of nutrients from sewage, separative sanitation, and agri-food wastewaters including dairy, brewery, sugar and potato industries. Focus is on producing recycled fertilisers for use in arable farming, feed crops cultivation, (circular) horticulture and organic farming. The 2023-2026 project involves Wageningen Environmental Research (WENR), KWR, LeAF, the Netherlands Nutrient Platform, as well as waste & water companies, agriculture and horticulture organisations, fertiliser industry, (recycling) technology suppliers and local and regional authorities. Objectives include implementation of nutrient recycling and valorisation cases, development of a quality system for recycled nutrient products from wastewaters, data on nutrient flows and losses, assessment of the agronomic value of recovered nutrient products and analysis of regulatory barriers.

Public-Private Collaboration (PPS) project "Closing the cycle of nutrients from wastewater and process water (KNAP)" website.

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