

4th European Sustainable Phosphorus Conference (ESPC4)

with Nutrient Recovery Technology Fair
and 5th European Phosphorus Research Meeting (PERM5)
20 – 22 June 2022, Vienna Austria - and online (hybrid)

Andaz Vienna Am Belvedere (Hyatt), Arsenalstrasse 10, Vienna, Austria.

v20/4/2022 Programme updates and registration <https://phosphorusplatform.eu/esp4>



ESPC4 – Day 1 - Monday 20th June 2022

9h00 – 10h15 – Plenary - Opening and keynotes – Climate, nutrients and eutrophication

- Climate, energy, agriculture: What has to be done about phosphorus and nutrients?
Franz Josef Radermacher, Research Institute for Applied Knowledge Processing (FAWn), Germany
- Interactions between climate change, phosphorus losses and eutrophication:
Wenfeng Liu, China Agricultural University.

10h15 – 11h00 – break – posters – stands - Tech Fair - networking

11h00 – 12h45– Plenary – EU, regional, national and city phosphorus policies

- What the Green Deal means for EU policies on nutrients
Virginijus Sinkevičius European Commissioner for Environment
- Perspectives for nutrient policy and action for the Baltic, **Lotta Ruokanen, HELCOM**
- Implementation of Germany's 2017 P-recycling regulation and of Switzerland's 2016 P-recycling regulation: **Sibylla Hardmeier, Swiss Federal Office for the Environment (BAFU): Overview of developments, case studies**
- Implementation of Germany's 2017 P-recycling regulation:
Andrea Roskosch, German Federal Environment Agency (UBA)
- Towards national phosphorus recycling policy in Austria: **Arabel Amann, Wien Energie**
- Case study Switzerland: **Leo Morf, AWEL Zürich**
- Vision for implementation of the German P-recovery obligation by a regional water operator:
Uli Paetzel, Emschergenossenschaft and Lippeverband
- Case study: Vienna City, **Florian Huber, Vienna City and Arabel Amann, Wien Energie**

14h15 – 15h45 – Parallel sessions

List of speakers for parallel session below

- ← **Nutrient recovery operating experience technology showcase**
(companies in ESPP-DPP-NNP Nutrient Recovery [Technology Catalogue](#))
Moderator/rapporteur: Karyn Georges, Isle Utilities & Bertrand Vallet, EurEau
- ← **Phosphorus recovery from ashes**
Moderator/rapporteur: Paulo Pavinato, University of São Paulo & TBD
- ← **Biochars and hydrothermal carbonisation**
Moderator/rapporteur: Céline Vaneckhaute, Université Laval, Québec, Canada & TBD

16h30 – 17h45 – Business perspectives for nutrient sustainability

- Ⓟ Reports from parallel sessions, questions and discussion
Business vision statements from nutrient sustainability leading companies
Jean-Christophe Ades, Kemira
Matt Kuzma, Ostara
Wim Moerman, NuReSy
José María Gómez Palacios, Biomasa Peninsular
Henk Aarts, N2 Applied
Hubert Halleux, Prayon
Marina Ettl, Yara
Matthias Staub, Veolia
Christian Guillaume, Sulzer Pumps
Leoni Boller, Ductor
Hanane Murchid, OCP
Andreas Orth, MO Group
- Ⓟ The fertilisers industry, phosphorus sustainability and the Green Deal
Jacob Hansen, Fertilizers Europe
- Ⓟ Market perspectives for phosphate fertilisers and other uses of phosphorus, and place of recycling:
Alberto Persona, Principal Analyst Fertecon/HIS

19h00 Evening networking event:

Vienna City Town Hall festivities hall (Rathaus Festsaal)

30'' by metro, 50'' by foot from Andaz hotel.

19h00 Pre-dinner drinks. 20h00 Conference dinner,
Viennese music interlude.

22h00 Big John Whitfield & The Vienna Soul Society



ESPC4 – Day 2 - Tuesday 21st June 2022

9h00 – 10h30 – Plenary - EU Policies

- Ⓟ Implementation of the nutrient loss reduction target set by the Green Deal Farm-to-Fork and Biodiversity Strategies: European Commission, DG Agriculture (tbc)
- Ⓟ Phosphorus and Organic Farming productivity, Green Deal targets for Organic Farming and perspectives for recycled nutrients
- Ⓟ Business vision statements from nutrient sustainability leading companies
- Ⓟ Update on EU water policies, **Michel Sponar, Deputy Head of Unit, Marine Water and Water Industry, European Commission DG Environment**

- P Industry innovation in phosphorus chemistry and sustainability perspectives: **Clariant**
- P Towards an integrated EU approach, the proposed INMAP (EU Integrated Nutrient Management Action Plan).
European Commission DG Environment

10h30 – 11h15 – break – posters – stands - Tech Fair - networking

11h15 – 12h45 – Parallel sessions

List of speakers for parallel session below

- ← **New fertilisers for nutrient sustainability**
Moderator/rapporteur: Alzbeta Klein, International Fertilizer Association & Hans Ingels, Head of Unit Bioeconomy – Chemicals – Cosmetics, European Commission DG GROW
- ← **Emerging nutrient recovery technologies**
Moderator/rapporteur: Erik Meers, University of Gent and Biorefine Cluster Europe & Ana Soares, Cranfield University, UK
- ← **Policies and regional actions for phosphorus sustainability**
Moderator/rapporteur: Lukas Egle, European Commission JRC (Joint Research Centre) & Geneviève Metson, Linköping University, Sweden

12h45 – 14h15 – lunch - posters – stands - Tech Fair - networking

14h15 – 15h30 – Plenary – Visions and Actions

- P Reports from parallel sessions, questions and discussion
 - P Vision statements from ESPC4 sponsors
Pär Larshans, Chief Sustainability Officer, Ragn-Sells Group / EasyMining
Wolfgang Hofmair, Borealis Group
- Experience and future objectives of the nutrient platforms in Europe and worldwide
- *Chris Thornton, European Sustainable Phosphorus Platform (ESPP)*
 - *Matt Scholz, Arizona State University US Sustainable Phosphorus Alliance*
 - *Jacob Jones, North Carolina State University, for STEPS (US National Science Foundation's new Convergence Research Center for Phosphorus Sustainability)*
 - *Eiji Yamasue, Ritsumeikan University, Japan Phosphorus Industry Development Organisation (PIDO)*
 - *Tabea Knickel, German Phosphorus Platform (DPP)*
 - *Nathalie Tijdink, Netherlands Nutrient Platform*

15h30 – 16h15 – break – posters – stands – Tech Fair - networking

16h00 – 17h00 – Plenary – Perspectives and Conclusions

- Perspectives for global nutrient management and 'Our Phosphorus Future'
Mahesh Pradhan, United Nations Environment.
- Horizon Europe Mission "Soil Health and Food"
- Panel discussion on perspectives for phosphorus sustainability policies

17h00 – ESPC4 Conference Closure

Tuesday evening social event:

TBC 19h00 – 22h00 The Third Woman – An immersive city adventure in Vienna's underground sewer system inspired by the classic movie "The Third Man", 21.06.2022, 19:00, only for registered attendees.

Wednesday 22nd June 2022

- P **Optional excursion:** Vienna municipal sewage treatment works, sewage sludge incinerator, urban vegetable farmers using waste heat from sludge incinerator. Max. 80 participants. **Same time as PERM5 morning sessions – you can attend either the sewage works excursion or PERM5 morning sessions.** Free.
- P **5th Phosphorus in Europe Research Meeting (PERM5):** 9h00 – 16h30, Andaz Vienna Am Belvedere (Hyatt). Programme <https://phosphorusplatform.eu/espc4> NOTE: additional registration fee required.
- P **Young scientists and R&D networks event:** 17h – 18h30 and Wednesday evening social.

Selected speakers for ESPC4 parallel sessions June 2022

Day 1: Monday, June 20th 2022, 14:15 – 15:45 CEST

Parallel Session #1:

Nutrient recovery operating experience technology showcase

*Limited to technologies presented in the ESPP-DPP-NNP Nutrient Recovery Technology Catalogue
Confirmed to date*

Marc Sonveaux, Prayon, Belgium

Leon Korving, Vivimag – WETSUS, The Netherlands & Bengt Hansen, Kemira – Sweden

Christian Kabbe, EasyMining (Ragn-Sells) – N, P, and K recovery technologies

ICL Fertilisers

Henk Aarts, N2 Applied: Plasma treatment of slurry and digestate, sustainable fertiliser from air and electricity

Arttu Laasonen, ENDEV nutrient recycling technologies

Parallel Session #2: P-recovery from ashes

Werner Preisig & Friedrich Studer, ERZO, Switzerland: The Leachphos-REALphos process

Beatrice Decker, MFPA Weimar, Germany: Resin-in-Pulp technology, an adapted holistic approach for nutrient and P-recycling from sewage sludge ashes (Abonocare)

Florian Benedikt, Technische Universität Wien, Austria: P-recycling from sewage sludge with fluidized bed incineration applying in-situ heavy metal removal

Theresa Sichler, BAM, Germany: European sewage sludge ash monitoring

Lasse Fabian Köhl, Fraunhofer IKTS, Germany: Decentralised phosphorus recycling from sewage sludge using dust firing and in-situ heavy metal separation (DreiSATS)

Laura Fiameni, University of Brescia and INSTM, Italy: Heavy metal stabilization in sewage sludge ash with poultry litter ash to enhance phosphorus recovery

Parallel Session #3: Biochars and hydrothermal carbonisation

Marc Buttman, TerraNova Energy, Germany: TerraNova@ultra - hydrochar from sludge, P-recovery and carbon sequestration

Helmut Gerber, Pyreg, Germany: Biochar from biosolids: the climate-positive alternative to conventional phosphorus fertilizer

Lisa Röver, Deutsches Biomasseforschungszentrum gGmbH, Germany: P-recycling via hydrothermal carbonization and the use of complexing agents and acids (Abonocare)

Raquel Zambrano Varela, TreaTech, Switzerland: Phosphorus recovery from hydrothermally treated sewage sludge. Closing the P cycle.

Clara Kopp, University of Copenhagen, Denmark: Activation of P-rich biochars and ashes to increase plant P availability

Maurizio Volpe, Carborem & Enna Kore University, Italy: Phosphorus Recovery from Digested Sludge Hydrochars Produced via Carborem C700 Continuous Hydrothermal Carbonisation Plant

Day 2: Tuesday, June 21st 2022, 11:15 – 12:45 CEST

Parallel Session #4: Emerging nutrient recovery technologies

Pim De Jager, Aquacare, Netherlands: BioPhree: next generation solution to remove and re-use phosphate in surface & effluent waters to ppb-level.

Adriana Romero Lestido, Cetaqua, Spain: Turning wastewater treatment plants into biorefineries: global value chain from bioresources to valuable products (LIFE Enrich)

Anders Øfsti, Hias How2O AS, Norway: Sustainable Phosphorus Removal with the Hias Process

Rubén Rodríguez-Alegre, LEITAT Technological Center & Universitat Politècnica de Catalunya, Spain: Innovative integration of membrane technologies for nutrient recovery from high organic load streams (FERTIMANURE)

Sabolc Pap, University of the Highlands and Islands, UK: New technology to recover phosphorus from wastewater within the Circular Economy: a Scottish case study (Phos4You)

Lidia Paredes, BETA Technological Centre (UVIC-UCC), Spain: Recovering nutrients from aquaculture industry by-products for the production of bio-based fertilizers (Sea2Land)

Sergio Lloret Salinas, EGEVESA, Spain: New urban wastewater treatment based on natural coagulants to avoid phosphorus pollution (LIFE Newest)

Parallel Session #5: Policies and regions for phosphorus sustainability

Katharine Heyl, Research Unit Sustainability and Climate Policy, University of Rostock, Germany: Sustainable phosphorus management under the future Common Agricultural Policy?

Francesco Avolio, HERA Spa, Italy: Feasibility and sustainability assessment of struvite recovery solutions in Bologna, WWTP Italy

Lisa Harseim, Albert-LudwigsUniversity of Freiburg, Germany: Cities revisited: Out-of-the-box governance of phosphorus flows in food

Fabian Kraus, Kompetenzzentrum Wasser Berlin, Germany: Mandatory P-recovery from sewage sludge (ash) in Germany – a multiple-goal conflict?

Esa Salminen, AFRY, Finland, Nutrient balance and handprint of the Finnish forest industry

Anna Muntwyler, European Commission JRC Ispra: Modelling phosphorus dynamics in European agricultural soils and assessing phosphorus policy goals

Sophia Schüller, FiW e.V. at RWTH Aachen University, Germany: The funding measure RePhoR - Regional Phosphorus Recycling

Parallel Session #6: New fertilisers for nutrient sustainability

Else Bünemann, FiBL, Switzerland: Bio-based fertilizers as efficient alternative phosphorus sources for closing nutrient cycles (Lex4Bio)

Farida Dechmi, Agrifood Research and Technology Centre of Aragon, Spain: Assessing phosphorus soil status and fertilisers management in the Ebro river intensive irrigated area (Spain)

Alicia Hernandez Mora, University of Natural Resources and Life Sciences Vienna (BOKU), Austria: Developing fertilizer compliance test methods for recycled P fertilizer products (Lex4Bio)

Julia Santolin, University of Antwerp, Belgium: Comparative consequential LCA: microbial fertilizers grown on potato wastewater, common organic fertilizers: and mineral fertilizers

Berta Singla, BETA Technological Centre (UCC-UVIC), Spain: Nutrient recovery from pig slurry – Production and agronomic quality assessment of added value bio-based fertilisers (Fertimanure)

Pauline Welikhe, Phospholutions Inc. / State College PA, USA: Corn Phosphorus Uptake and Yield Response to Reduced Phosphorus Rates Applied in Combination with RhizoSorb®

Kari Ylivainio, Natural Resources Institute Finland (Luke): Phosphorus losses from different soil types caused by bio-based fertilisers (Lex4Bio)

VIENNA
22 June
2022



Phosphorus
in Europe
Research
Meeting

9h00 – 16h30 CEST | Hybrid

Wednesday June 22nd, 2022

9h00 – 10h30 : Phosphorus recycling research & technology update

Housekeeping and meeting networking tools

Lapo Braconi, ETA Florence Renewable Energies

Welcome. Outcomes of PERMs 1-4. Meeting objectives and outputs

Ludwig Hermann, President, ESPP

Introducing the Nutrient Recycling Community: a platform to exchange knowledge and good practices between research projects dealing with nutrient recycling in EU.

Ana Robles Aguilar, Ghent University

Greenhouse gas emissions from digestate composting

Bente Foereid, NIBIO, Norway

Contributing to sustainable rural development and transition to a circular bioeconomy with a special focus on nutrient sustainability

Laia Llenas Argelaguet, BETA Technological Center (UVIC-UCC), Spain

Questions and discussion I

Phosphorus recovery technologies

Erik Meers, Ghent University and Biorefine Cluster Europe

LIFE projects: from R&D to pilot testing and implementation

Federico de Filippi, CINEA

Questions and discussion II

Vision Statements from ESPP R&D Members:

Simone Maccaferri, Alma Mater Studiorum – Università di Bologna, Italy

Adriana Romero Lestido, CETAQUA, Spain

10h45 – 12h15 : Parallel breakout sessions I

➤ **New and recycled phosphorus fertilisers**

Moderator: Leonardus Vergutz, Mohammed VI Polytechnic University, Morocco

Rapporteur: Bernard Wern, IZES, Germany

Assessment of P availability and efficiency of recycled P fertilizers - Recommendations for pot trial standardisation

Aleksandra Bogdan, Ghent University, Belgium

Efficacy of Actinobacteria-based biofertilizer to improve cereal plant growth under phosphate/potassium rocks fertilization

Kenza Boubekri, Mohammed VI Polytechnic University, Morocco

Effectiveness of a potential biofertilizer derived from new Phosphate solubilizing bacteria for sustainable agriculture production

Fatima Chouyia, Hassan II University, Morocco

Microbial phosphate solubilization: A potential alternative for increasing soil phosphorus sustainability

Wissal Elhassoufi, Mohammed VI Polytechnic University, Morocco

Assessment and comparative analysis of willingness-to-pay for bio-based fertilisers in the European Union

Egor Moshkin, Ghent University, Belgium

Reduced nitrous oxide emissions in a pot trial with novel organic NP(K)-char fertilizers

Carolyn-Monika Görres, Hochschule Geisenheim University, Germany

Phenotypic and genotypic screening of potato cultivars for phosphorus efficiency

Mousumi Hazarika, University Rostock, Germany

➤ **Iron – phosphorus interactions in phosphorus recycling (coordinated by WETSUS)**

Moderator: Leon Korving, Wetsus, Netherlands

Rapporteur: Bengt Hansen, Kemira, Finland

Biological and chemical drivers over P availability from different P forms: an incubation experiment

Ángel Velasco Sánchez, UniLaSalle Rouen, France

Insight into direct phosphorus release from simulated wastewater ferric sludge: influence of physiochemical factors

Aseel Al Nimer, Wilfrid Laurier University, Canada

The impact of P on Fe(III) catalyzed ferrihydrite transformation under oscillating redox condition

Xingyu Liu, University of Bayreuth, Germany

Potential of recycled vivianite as P and Fe fertilizer – from a mechanistic point of view

Rouven Metz, University of Vienna, Austria

Research on Fe-P interactions at Wetsus for P recovery

Thomas Prot, TU Delft, Netherlands

How phosphorus removal technologies in WWTP can impact the phosphorus recovery from sludge?

Marie-Line Daumer, INRAE, France

Summary of P-Trap results: concepts to reduce diffuse P input to surface waters

Sylvia Walter, Utrecht University, Netherlands

➤ **Nutrient recovery from dairy industry processing wastewaters (coordinated by REFLOW)**

Moderator: Jan-Philip Uhlemann, Wageningen University and Research, Netherlands

Rapporteur: Ipan Hidayat, BETA Technological Centre (UCC-UVIC), Spain

Multiple resource recovery from dairy processing waste. A circular economy approach for downstream valorization

Pablo Martin Binder, BETA Technological Centre (UCC-UVIC), Spain

Hydrothermal carbonization of surplus sludge from effluent treatment in various milk processing factories

Marzena Kwapinska, University of Limerick, Ireland

Safe Use of Dairy Processing Sludge and STRUBIAS Food System Fertilising Products in Agriculture

Wenxuan Shi, Teagasc, Ireland

Effects of dairy-processing-sludge (DPS) and derived hydrochar on greenhouse gas (GHG) emissions from maize field

Yihuai Hu, Aarhus University, Denmark

Hydrochar – a cheap efficient P-biofertilizer with low climate footprint

Sven Gjedde Sommer, Aarhus University, Denmark

LCA of multiple scenarios for dairy wastewater treatment and P-recovery processes

Marta Behjat, Chalmers University of Technology, Sweden

12h15 – 13h30: Lunch Break

Pending Confirmation of Speakers, Moderators and Rapporteurs

13h30 – 15h00 : Parallel breakout sessions II

➤ Phosphorus interactions in soils

Moderator: Victoria Barcala, Deltares, Netherlands

Rapporteur: Jakob Santner, University of Natural Resources and Life Sciences, Vienna (BOKU), Austria

Simulating long-term phosphorus, nitrogen, and carbon dynamics to advance nutrient assessment in dryland cropping

Bianca Das, University of Queensland, Australia

Soil phosphorus mining in agriculture – Impacts on P availability, crop yields and soil organic carbon stocks

Stefaan De Neve, Ghent University, Belgium

DOC Addition Increases Phosphate Adsorption in Mediterranean Soils

Yaniv Freiberg, Volcani Center, Israel

Soil phosphorus turnover in soils under long term P management

Olha Khomenko, Teagasc / University of Limerick, Ireland

Changes of phosphorus forms in soil as a function of different fertilizing strategies

Martin Kulhanek, Czech University of Life Sciences Prague, Czech Republic

The Effect of soil pH on phosphate solubility in soils

Klara Mrak, BOKU Vienna, Austria

Watershed Scale Field Demonstration of Novel Nano-enhanced Phosphorus Adsorptive Media – Non-point Source Applications

Ed Weinberg, ESSRE Consulting, USA

➤ Regional policies for nutrient stewardship

Moderator: TBD

Rapporteur: Kimo Van Dijk, Wageningen Environmental Research, Netherlands

A material flow model for the implementation of phosphorus recovery in a model region

Jan-Hendrik Ehm & Hiep Le, RWTH Aachen, Germany

Nutrient Content of Manures and Potential for Valorisation: Case Study of Monaghan and Tipperary, Ireland

Rosanna Kleeman, University College Dublin, Ireland

Impact and opportunities for the urban water cycle of the 'fully circular in 2050' target of the Netherlands - Circular Water 2050

Kees Roest, KWR Water Research Institute, Netherlands

Closing the loop of Phosphorus cycle in the Visegrad Group (V4) countries

Marzena Smol, Polish Academy of Sciences, Poland

Sustainable agriculture as a vehicle of corporate reputation: sustainability within the value chain of food and agricultural production as a core element of business strategy

Michael Stopford, Ca' Foscari University Venice, Italy

Mapping the availability of nutrient-rich side-streams – mission impossible?

Elina Tampio, Natural Resources Institute Finland (Luke), Finland

Technical and Economical Appraisal of Regional Concepts for Sewage Sludge Utilization and Phosphorus Recovery

Harald Weigand, THM Uni Giessen, Germany

➤ New technologies for nutrient recovery

Moderator: Matthias Zessner, TU-Wien, Austria

Rapporteur: TBD

Vacuum degasification/acidic-neutral absorption for nitrogen recovery from agricultural digestate

Johannes Koslowski, KWB, Germany

Technical comparison of phosphorus recovery technologies from wastewater

Hanna Kyllonen, VTT, Finland

A novel process for an efficient phosphorus utilization from cereal by-products in feed industry

Natalie Mayer, Hamburg University of Technology, Germany

Flashphos - Thermal behaviour of sewage sludge aiming at white phosphorus recovery

Sander Arnout, InsPyro, Belgium

Yellow phosphorus production from secondary phosphorus resources by carbothermic reduction

Huafang Yu, Tohoku University, Japan

Acid-induced phosphorus release from hydrothermally carbonized sewage sludge

Carla Perez, Umeå University, Sweden

NPHarvest – Calcium based P recovery process as a pre-treatment for N recovery

Raed Al-Juboori, Aalto University, Finland

15h00 – 16h30 : Perspectives for research and market uptake

Nutrient R&D objectives under Horizon Europe.

Katja Klasinc, European Commission DG RTD.

INTERREG R&D initiatives on nutrients

TBD

Market uptake activities for nutrient recovery innovation in EISMEA

TBD

Summaries of outcomes of each breakout sessions (research needs)

Sessions Rapporteurs

Questions and Discussion

Key take-aways from the day identified by experts:

TBD

Close

Poster Presentations on display during ESPC4 & PERM5

Reactive filter for phosphorus recovery on components of treated wastewater in a semi-pilot scale system
Anai Acevedo-Macias, Sci Tech Research Potosino Institute, Mexico

Perspectives and limitations of the inverted biological P-elimination for P-fertilizer production from sewage sludge
Annika Anders, THM Uni Giessen, Germany

Phosphorus balance, release rates and mechanisms in a eutrophic coupled - reservoir system
Karel As, Bayreuth University, Germany

Use of vivianite obtained from water purification as phosphorus fertilizer
Tolulope Ayeyemi, University of Seville, Spain

Degree of phosphorus saturation and Olsen extraction in Alentejo region soils
Rui Bajoucio, University of Trás-os-Montes and Alto Douro, Portugal

Effect of rain variability and water retention measures on phosphorus loads at the farm scale
Victoria Barcala, Deltares, Netherlands

Granular iron-based materials for phosphate removal from waters
Oleksandr Bolielyi, GEOS, Ukraine

Stimulating anaerobic phosphorus release from marine sediment by addition of volatile fatty acids
Ece Cakmak, Hacettepe University, Turkey

Recovery of phosphorus from real pulp mills effluents using magnetic nanomaterials
Celso Cardoso, University of Aveiro, Portugal

Iron coated sand filters for efficient P removal from agricultural drainage waters
Stefaan De Neve, Ghent University, Belgium

Sugarcane bagasse ash and its blends with triple-superphosphate reduce the dependency on rock phosphate
Vitalij Dombinov, Forschungszentrum Jülich GmbH, Germany

Sugarcane bagasse-based ashes as fertiliser for soybeans and the relevance of ash mineral composition on plant phosphorus availability
Vitalij Dombinov, Forschungszentrum Jülich GmbH, Germany

Slow-Release Fertilizers Based on Dispersed Struvite in Thermoplastic Starch Matrix
Stella Do Valle, Uni Sao Carlos, Brazil

Microbiological and practical aspects of removal phosphorus from waste water
Andrzej Dziuba, KREVOX Europejskie Centrum Ekologiczne, Poland

Quinoa agricultural waste recycling: Evaluation of agronomic and physicochemical quality of quinoa compost
Khadija El Hazzam, Mohammed VI Polytechnic University, Morocco

Structural Study on The Chemical Environment Surrounding Phosphorus in Ash Fractions Suitable for Nutrient Recovery
Sana Elbashir, Umeå University, Sweden

Strategies for optimizing the scalable microbial synthesis of vivianite
Lordina Eshun, Manchester University, United Kingdom

Nutrient recycling with dry toilets as sustainable solution for communal waste management and regional economies
Albrecht Fritze, Technische Universität Berlin, Germany

Biological phosphorus removal from potato processing industrial wastewater – High phosphorus load
Dorothee Goettert, University of Antwerpen, Belgium

Assessment of heavy metals from the mixture of phosphate industry by-products and sewage sludge
Yao Kohou Donatien Gueable, Mohammed VI Polytechnic University, Morocco

Egestabase – Navigating technologies for recovery and reuse of plant nutrients from human excreta and wastewater.
Robin Harder, Swedish University of Agricultural Sciences, Sweden

Novel hybrid membrane process coupled with freeze concentration for phosphorus recovery from cheese whey
Ipan Hidayat, BETA Technology Centre, Spain

Development and evaluation of innovative technologies for the phosphate removal and recovery
Jia-Qian Jiang, Glasgow Caledonian University, United Kingdom

Exploration of low energy flotation process to selectively separate purple phototrophic bacterial biomass from anaerobic digestate
Bailee Maija Johnson, McGill University, Canada

Hydrothermal Carbonization (HTC) of Dairy Waste: Effect of Temperature and Initial Acidity on the composition and quality of solid and liquid products

Nidal Khalaf, University of Limerick, Ireland

Production of a safe and nutrient-rich material from a mixture of human waste via pyrolysis
Malte Kraus & Kevin Friedrich, Björnson Beratende Ingenieure GmbH, Germany

High added value protein and minerals recovery and recycling from animal processing by-products
Maya Lacruz-Asaro, INESCOP, Spain

Nanofertilizer obtained by colloidal self-assembly of amphiphilic molecules for controlled release of phosphorus in soil
Luis Lightbourn, Lightbourn Research Institute, Mexico

Reduction kinetics of iron-rich by-products from drinking water treatment
Mingkai Ma, Utrecht University, Netherlands

Extraction Effects on Polyphosphate Ion Diffusion as Detected with Gel Electrophoresis and ³¹P-DOSY-NMR
Lori Manoukian, McGill University, Canada

Pilot scale Recovery of Calcium Phosphate from UASB effluent after elimination of Dissolved Inorganic Carbon
Boudewijn Meesschaert, KU Leuven, Belgium

Synthesis of struvite with compost slurry: analysis of the fertilizer potential for the circular economy
Rose Meira, Uni Federal do Oeste do Para, Brazil

Balancing multiple priorities for a circular phosphorus economy: spatial tools to help select processing locations
Geneviève Metson, Linköping University, Sweden

Nutrient pollution in Stockholm's water catchments: Systemically assessing its social, ecological, and technological determinants
Harrie Mort, Leeds University, United Kingdom

Effect of Fe addition on P retention in peaty freshwater sediment
Melanie Munch & Karel As, Utrecht University, Netherlands

Phosphate retention by Fe(III)- and Ca-phases formed upon oxygenation of anoxic groundwaters
Ville Nenonen, Eawag, Switzerland

Phosphorus recovery as struvite from hydrothermal carbonization liquor of chemically produced dairy sludge
Claver Numviyima, Politechnika Wroclawska, Poland

Phosphorus recovery from sewage treatment plant in Brazil through sorption and coagulation-flocculation
Camille Nunes Leite, University of São Paulo, Brazil

Effect of phosphogypsum on faba bean and its nutrients and heavy metals uptake
M'Barka Outbakat, Mohammed VI Polytechnic University, Morocco

Sewage sludge compost and wastewater nutrient sources in forage production of *Urochloa brizantha*
Paulo Pavinato, University of São Paulo, Brazil

Cover crops and phosphate sources influencing cash crops yield and soil P dynamics
Paulo Pavinato, University of São Paulo, Brazil

Novel green nanotechnology approach to manufacture nano-rock phosphate fertilizer for sustained release of macronutrients
Piumi Peiris, University of Sri Jayawardenapura, Sri Lanka

Purifying calcium phosphate fertilizers produced from human urine
Dyllon Randall, University of Cape Town, South Africa

Potential of waste-derived phosphate fertilisers for sugarcane production in a tropical soil
Henrique Raniro, University of Natural Resources and Life Sciences, Vienna (BOKU), Austria

Efficient nutrient recovery from urine: turning the entire waste stream into a product on-site
Frank Riechmann, Eawag, Switzerland

Functional phosphorous-containing cellulosic materials: an outlook of its chemistry and applications
Mohamed Hamid Salim, Mohammed VI Polytechnic University, Morocco

Removal of dissolved organic phosphorus from synthetic agro-industrial wastewater using ferric chloride
Ana Paula Nova, Universidad de la Republica, Uruguay

Recycled iron phosphates are not effective phosphorus fertilizers in the short term on lowland rice
Rochelle Joie Saracanlao, KU Leuven, Belgium

Calcium phosphate granulation from pig manure: Simultaneous phosphorus recovery and anaerobic digestion
Chris Schott, Wageningen University & Research, Netherlands

Investing in Phosphorus Fertilizer Recovery from Dairy Processing Wastewater
Jan-Philip Uhlemann, Wageningen University & Research, Netherlands

Phenotyping seedling vigor, root architecture, phosphorus uptake and use efficiency in rice genotypes contrasted in seed-P under low and high soil P
Hafeez Ur Rehman, University of Agriculture Faisalabad, Pakistan

Thermochemical equilibrium calculations of char formation during co-pyrolysis of municipal sewage sludge with straw
Naeimeh Vali, University of Borås, Sweden

Assessment framework for a sustainable use of P fertilizer from agronomic and environmental perspectives
Debby Van Rotterdam, Nutrient Management Institute, Netherlands

Phosphorus and food security in India: opportunities and barriers to recycling phosphorus from human sewage
Diorbhail Wentworth, University of Edinburgh, United Kingdom

FT-IR Based Inline Analysis of Phytic Acid During Enzymatic P-Adjustment in Monogastric Animal Feeding
Niklas Widderich, Hamburg University of Technology, Germany

Transformation of Soluble Phosphate within Manure to a Less Soluble Calcium Phosphate Solid
Sidney Omelon, McGill University, Canada