



**Workshop on  
Iron – phosphorus interactions and opportunities for  
phosphorus stewardship**  
13-14 July, 2020 (online)

## **Preparation**

Registration via [Eventbrite](#) – this event is free of charge

From Monday 6<sup>th</sup> July:

- speakers presentations will be online (slides or paper or recorded video presentation)
- discussion forum will be opened – possibility to ask questions (to speakers, to all participants) or post other information

## **Day 1 = Monday 13<sup>th</sup> July**

**14.00 Welcome. Workshop objectives and organisation** – ESPP and co-organisers (10 mins)

### **14.10-16.00 Session 1 – Iron phosphorus interactions in natural and engineered systems**

- Thilo Behrends – Challenges for trapping and recycling phosphorus from agricultural run-off: Introduction to the P-TRAP project (10 mins)  
*Additional input (2 mins / 2 slides maximum):*
  - Stefan Jansen, Deltares – Use of iron sand in agricultural drain systems to prevent P run-off
  - Hui Xu, Ghent University – Reducing P losses from drained agricultural fields using iron-coated sand filters
  - University of Copenhagen – Phosphate sorption to magnetic LDH particles
  - *Questions and discussion*
- Lena Heinrich, Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB) – Iron phosphate coupling in wastewater treatment plants and lake sediments (10 mins)
- Caroline Slomp, Utrecht University – Fe/P relationship in marine environments (10 mins)
  - *Questions and discussion*
- Jean-Christophe Ades, Kemira for INCOPA – Use of iron and aluminium coagulants in wastewater treatment: P- removal and challenges of P- recovery (10 mins)  
*Additional input (2 mins / 2 slides maximum):*
  - Derrick Emms, Sustainable Water Company tbc – Removal of PO<sub>4</sub> from wastewater effluent using ferric from mine water and water treatment stations
  - *Questions and discussion*
- William Schipper – Overview of industrial applications & markets for iron phosphates (10 mins)  
*Additional input (2 mins / 2 slides maximum):*
  - Hubert Halleux/Alexandre Wavreille, Prayon – Industrial applications of iron phosphate
  - *Questions and discussion*

**16.00 Wrap-up and close of Day 1**



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**Day 2 = Tuesday 14<sup>th</sup> July**

**10.00 Session 2 – Iron phosphate in agriculture**

- Bengt Hansen, Kemira – How iron in sewage biosolids and recovered fertiliser products impact crop P availability (10 min)  
*Additional input (2 mins / 2 slides maximum):*
  - Kees Langeveld, ICL for Fertilizers Europe – Impacts of iron on phosphate fertiliser performance and implications for phosphate recycling from sewage (2 min)
  - Cinta Cazador, Fertiberia – The specific case of recovered vivianite as fertilizer (2 min)
  - Antonio Delgado, University of Sevilla – Iron phosphate as fertiliser on Mediterranean soils (tentative title)
- Erik Smolders, Catholic University of Leuven – Iron in soil and plant phosphorus availability (10 min)
- Guy Kirk, Cranfield – How iron in soil impacts root P uptake and soil nutrient biochemistry (10 min)  
*Additional input (2 mins / 2 slides maximum):*
  - Ruben Sakrabani, Cranfield University – Role of P analytical methods and their implications for evaluating P availability in crops
  - Peter Leinweber, University of Rostock tbc- Phosphate mobilization from P-fixing soils: interactions with iron
- Jon Lloyd, University of Manchester – Impact of phosphorus on microbial iron oxides reduction (tentative title)
  - *Questions and discussion*

**12.30 LUNCH BREAK**

**13.30 Poster session**

*Virtual poster session with five PhD students from the H2020 [P-TRAP](#) project. 5 min presentations followed by 5 min questions, the session is finished with a short general discussion.*

- Victoria Barcala – Capturing phosphorus in drained agricultural area
- Lordina Eshun – Formation of vivianite in bioreactors
- Tolulope Ayeyemi – Suitability of P containing Fe phases as fertilizers
- Karel As – Lake restoration based on Fe addition
- Rouven Metz – Processes linking Fe and P cycles in natural environments

**14.30 BREAK**



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**15.00 Session 3 – Strategies for phosphorus release and recovery from iron phosphates**

- Marie-Line Daumer, INRAE Rennes – Biologic routes for release of phosphorus from iron or aluminium compounds in sewage sludges (10 min)
- Leon Korving, Wetsus and Philip Wilfert, IPP Kiel – Vivianite formation and recovery from sewage sludge using magnetic separation or sulphide release (15 min)

*Additional input (2 mins / 2 slides maximum):*

- Carlo Belloni, Wetsus – Improved recovery of phosphate through manipulation of iron phosphate chemistry using Mössbauer spectroscopy
- Sarah Bluteau, McGill University (Canada) – Phosphorus recovery from FeP with sodium sulphide in biosolids (Ottawa municipal WWTP)
- Helsinki Environmental Service (HSY) tbc – Recovery of phosphoric acid from tertiary sludge
- *Questions and discussion*
- Lisbeth Ottosen, DTU, Denmark – Separation of phosphorus from sewage sludge ash by electrolysis (10 min)
- Simon Kellmann, GEH Wasserchemie – Regeneration of phosphate-loaded granular ferric hydroxide and P-recovery from regeneration-solutions (10 min)
- Speaker from Japan tbc – Possible routes for recovery of phosphorus from iron and steel industry (10 min)
  - *Questions and discussion*

***Impact of iron on industrial P-recovery processes***

- Ludwig Hermann, Proman and ESPP President – overview of different process routes (5 min)  
*Flash presentations of different processes, with the emphasis on how iron impacts the process and whether the P-content bound to iron can be recovered (2 mins / 2 slides maximum):*
  - Jürgen Eschment, Parforce – Phosphoric acid recovery from phosphorus-containing materials
  - Ángel Galinda Carbajo, ZAR/Technicas Reunidas
  - Alfred Edlinger, Recophos/FlashPhos
  - Cristoph Ponak, University of Leoben – Desorption of P from Fe-containing liquid metal during reduction of sewage sludge ashes
  - Sonoda Ken-Ichi, Metawater tbc – Recovery of phosphorus bound to iron in sludge
  - Siegfried Klose, EuPhoRe – Recovery of phosphorus bound to iron in sludge

*Questions and discussion*

**17.00 Wrap-up and closure**