

New ESPP member	1
<i>Italpollina plant nutrition products joins ESPP</i>	1
Success stories	2
<i>Over 1000 Danish farmers are today using one or more modules of SyreN technology</i>	2
<i>Slurry acidification Baltic rollout</i>	2
<i>Recycling digestate nutrients in energy algae production.....</i>	3
Projects	3
<i>P-recovery from expired fire extinguishers</i>	3
<i>Lombardy Region leads Vanguard Initiative on biogas digestate and manure recycling ...</i>	3
Media & meetings	3
<i>AquaStrategy magazine on phosphate recovery</i>	3
<i>Soil Phosphorus Forum.....</i>	4
<i>SusChem sets P-recovery as innovation objective.....</i>	4
<i>UNIFA France: circular economy, nutrients, carbon and greenhouse emissions</i>	4
Science and news	4
<i>Portugal fined 3 million Euros for failing to treat sewage</i>	4
<i>Potential for P-recovery in China.....</i>	4
<i>P-stewardship could give China 20 more years P-rock reserves</i>	5
<i>Sustainable phosphorus options for Austria</i>	5
<i>50% P-recovery from Germany's sewage biosolids is feasible.....</i>	5
Events	5
ESPP Members.....	6

New ESPP member

Italpollina plant nutrition products joins ESPP

New ESPP member ITALPOLLINA SPA, Italy, is a leader in the production of naturally derived fertilizers and specialty plant nutrition products, with 40 years experience. The company's products are used in organic and conventional agriculture, and include fertilisers based on processed manure, biostimulants of vegetal origin and beneficial microbials. The company sells in more than 70 countries worldwide. Key principles are food and environment safety and optimal fertilisation efficiency, and so yield and quality, based on selection of raw materials, technologically advanced manufacturing processes and stringent internal controls. Luca BONINI, CEO, declares "Joining ESPP is an opportunity for us to develop our technologies, to create partnerships and to sustain the promotion of the recovery nutrients". Benoît PLANQUES, Regulatory Manager, will follow the activities of ESPP. www.italpollina.com



Success stories

Over 1000 Danish farmers are today using one or more modules of SyreN technology

BioCover's SyreN system is an innovative, modular, on-farm system for improved manure management using technologies integrated into farmers' existing slurry tankers. This reduces costs, enables mobility and makes use of slurry tankers during idle periods. SyreN offers five technologies: (1) manure acidification during application using sulphuric acid, reducing ammonia air emissions by up to 70% (2) dosing of additives to improve manure plant availability, soil properties or reduce odour (3) ammonia and N-stabiliser dosing, so improving N:P ratio and reducing N losses from soil (4) software / mobile phone system to optimise slurry application and (5) phosphorus recovery. The P-recovery module (SyreN+) firstly precipitates phosphate as struvite within the slurry tanker (leaving a low-P slurry liquor, which can be spread), then dissolves the struvite in the tanker using sulphuric acid (using the acidification equipment), giving a marketable and transportable NPS liquid fertiliser. BioCover SyreN has received the Baltic Manure Handling Award 2012, Agromek awards 2010, European Corporate CSR 2013 and US EPA Manure Nutrient Recovery Challenge 2016. BioCover is now looking for project or investor funding to adapt and implement SyreN in other countries, according to farmers' regional modes of operation and equipment, or to recover the struvite as a solid fertiliser product (SyreN Crustal).

BioCover www.biocover.dk Photo: slurry tanker equipped with SyreN



Slurry acidification Baltic rollout

A 5.4 million € EU [InterReg project](#) has been launched to roll-out manure slurry acidification in the Baltic States, following on from Denmark's experience (see SyreN above). The objective is to reduce ammonia emissions to air during slurry application, in order to cut greenhouse gas impacts to eutrophication (atmospheric deposition of N to the Baltic), as well as avoiding loss of valuable nitrogen nutrient for farmers. Over 1 000 farmers are already using one or more modules of SyreN technology for acidification during slurry spreading (see above). The InterReg project aims to enhance capacity of public authorities and farmers, through pilot installations, feasibility studies and environmental and economic assessments.

International seminar on slurry acidification to reduce ammonia emissions, 28 - 29 September 2016, Vejle, Denmark (nearby Billund Airport) www.conferencemanager.dk/acidification

Recycling digestate nutrients in energy algae production

The [KOTO company's AlgaeBioGas installation](#), Ljubljana, Slovenia, is featured as one of the European Biogas Association (EBA)'s six [Success Stories](#): anaerobic digestion of biodegradable municipal solid waste in European cities. The 13 000 m³/y feedstock anaerobic digesters, using mainly household food waste and food industry wastes, produce methane used for co-generation (4 GWh/y electricity and 2.8 GWh/y thermal energy). Part of the resulting digestate (0.5 m³/day) is used to feed a pilot-scale open raceway algae pond (30 m²), commissioned in 2014, ensuring biological treatment of the digestate and recycling nutrients into production of algae, which are then used as feedstock for further methane production, or for use in bioplastics or fertiliser production. The system is energy and greenhouse emission efficient, because exhaust gas from the methane-burning electricity co-generation is injected into the algae production pond, so using the waste heat and carbon dioxide in algae production, as well as reducing digestate odor. www.algebiogas.eu



Projects

P-recovery from expired fire extinguishers

The [PHOSave](#) project (Horizon 2020 SME Instrument), led by [PROPHOS](#) Chemicals will construct a pilot plant near Cromona, Lombardy, to recover and recycle phosphates from exhausted fire extinguishing powders. Halogenated chemicals in fire extinguishers have been largely replaced by phosphate based dry powders, because phosphate does not pose environmental or health issues and is effective in combating fire. Prophos Chemicals is Italy's only producer of dry fire extinguisher chemicals of all classes. Fire extinguishers have to be periodically emptied, overhauled, refilled and re-pressurised, to guarantee reliable performance in case of fire. The recovered phosphate will be recycled into the chemical industry or as fertilisers.

Lombardy Region leads Vanguard Initiative on biogas digestate and manure recycling

The Lombardy Region, Italy, has been selected to lead the Vanguard [BioEconomy](#) pilot project "Biogas beyond energy" (European Commission, Regional and Urban Policy). The project also involves Brandenburg (Germany), Baden-Württemberg (Germany), North-Rhein Westfalia (Germany), Navarra (Spain), Asturias (Spain), Skåne (Sweden), Emilia Romagna (Italy), Malopolska (Poland), and West Finland. The product will develop valorisation of different sources of organic raw materials as biogas plant inputs, in particular livestock manure, and transformation into value-added products including fuels, chemicals, energy and recycled nutrients. Lombardy Region press release [21/6/16](#)

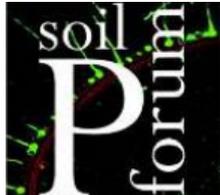
Media & meetings

AquaStrategy magazine on phosphate recovery

The new water sector publication Aqua Strategy, launched February this year, has published its third issue largely devoted to phosphate recovery and recycling from sewage. ESPP point to the Circular Economy as the key driver today for phosphorus stewardship, with aspects both of reducing European dependence on imports from a few regions, and opportunities for revival of rural areas and decentralised job creation. The EU Fertilisers Regulation revision is a key step forward, but the current proposals exclude the use of sewage-derived recycled nutrients. However, Member States will be able to authorise "national" fertilisers which are sewage biosolids based, such as the existing France compost standard. Ostara struvite recovery is presented as a success story, with now ACWA as technology licensee in the UK. Leon Korving, WETSUS, summarises new R&D challenges for phosphate recovery, in particular how to recover phosphorus from iron containing biosolids. AquaStrategy [June 2016](#).

Soil Phosphorus Forum

"Releasing forms of P that other forums can't reach!" is the slogan of the [Soil Phosphorus Forum](#) provides online information on publications, events, research projects concerning organic phosphorus in soil, fertilisers and soil phosphorus. The site includes an active discussion and exchange forum, information on phosphorus analysis methods. [@SoilPforum](#)



SusChem sets P-recovery as innovation objective

SusChem is the European Technology Platform for Sustainable Chemistry (created by between Cefic, DECHEMA, EuropaBio, GDCh, ESAB and RSC). SusChem's Strategic Innovation and Research Agenda (1/3/2015) refers to phosphorus under \$1.1 access to critical raw materials and 2.1 sustainable agriculture "There is a need for new and improved technologies for recovering and recycling these essential biological elements: phosphorus ... nitrogen and potassium". SusChem's five priority factsheets state (under priority: water): "Resource recovery ("circular economy"), development of novel highly selective and energy-efficient separation technologies to recover specific resources (e.g. phosphorous) from industry wastewater". SusChem is organising a project brokerage event, [Seville](#), 13th September.

SusChem brokerage event 13/9/2016 [Seville](#)

UNIFA France: circular economy, nutrients, carbon and greenhouse emissions

Jean-François Soussana, GIEC scientist and Scientific Director of INRA, opened the UNIFA (French fertiliser industry association) public workshop on the Circular Economy, Paris, 24th June. He explained that agriculture is a major contributor to global greenhouse emissions, with global emissions increasing despite reductions in emissions/kg production. But a 0.4%/year increase in world topsoil carbon stocks would compensate fossil fuel emissions. 0.2 kg N and 0.08 kg P are needed to stock 1 kg carbon. Challenges are measuring C effectively sequestered, and ensuring that C stays in soil. Australia pays farmers 11\$/tonne-CO₂ stored in soil. Chris Thornton, ESPP (European Sustainable Phosphorus Platform) emphasised the business opportunities of phosphorus stewardship, synergies with organic carbon circular economy and current progress on EU legislation. Didier Marteau, farmer and Aude county Chamber of Agriculture underlined the need for traceability of input materials in recycled nutrient and organic carbon products and the advantages of developing methanisation. Gilles Poidevin, UNIFA, concluded with the importance of different sectors working together to develop the bio circular economy and to enable synergies between soil carbon, soil fertility and farm economic productivity.

UNIFA www.unifa.org and ESPP presentation [slides](#) (in French)

Science and news

Portugal fined 3 million Euros for failing to treat sewage

The European Court has fined Portugal 3 million Euros, plus 8 000 €/day for failing to implement the Urban Waste Water Treatment Directive. The Directive required that all agglomerations of > 15 000 p.e. should have sewage collection and treatment by 2000. In 2009, the European Court identified 22 agglomerations not compliant. The new Court judgement concerns two agglomerations were still not compliant in 2014, with one now completed and one not planned for completion until 2019, nearly twenty years after the Directive deadline.

European Court of Justice [press release](#) 22/6/2016, judgement Case C-557/14

Potential for P-recovery in China

Phosphorus in municipal wastewater in China represents c. 5.5% of mineral fertiliser consumption. Data is presented on the number of operating sewage works in China, showing a doubling in capacity since 2005, and on the process treatments installed. Data on sludge treatment and disposal is not available, but estimates suggest that anaerobic digestion is not widely implemented and that 84% of sludge is not correctly managed. This study concludes that digestion then appropriate land application will be the main route for P-recycling, but with a need for strict control of land application to ensure biosolids quality and to avoid runoff and pollution. Struvite recovery is expected to develop in biological P-removal wastewater treatment plants. Proposed policies include: improving wastewater collection and P-removal, promoting anaerobic digestion and biological P-removal, developing legal and business framework.

"Phosphorus recovery from municipal and fertilizer wastewater: China's potential and perspective", J. Environ. Sci. (2016), K. Zhou Kuangxin.zhou@kompetenz-wasser.de, M. Barjenbruch, C. Kabbe, G. Inial, C. Remy <http://dx.doi.org/10.1016/j.jes.2016.04.010>

P-stewardship could give China 20 more years P-rock reserves

Phosphorus cycling in China over the last 4 centuries is studied, showing considerable increases in phosphorus use and high inefficiencies. Phosphorus in annual arable crop output increased from c. 0.4 million tonnes P/year (MtP) in the 1600's to 3.3 MtP in 2012. Average input to crop production is today estimated at 80 kgP/ha, more than twice crop uptake capacity 85% of this excess phosphorus input is estimated to be immobilised in soil as "legacy P". Phosphorus losses to China's surface waters have increased threefold, with freshwater aquaculture the largest source of phosphorus losses (90% of fish-feed P lost to water). However, only c. 20% of the total P lost to rivers reaches the ocean, as most is retained in inland and coastal sediments due to relatively flat terrain and dams. China's dietary P intake is estimated to be 30% lower than for the USA, but nonetheless higher than the Recommended Daily Allowance (RDA). The authors estimated that improved management of P in China (better use, recycling) could prolong the lifetime of China's phosphate rock reserves by 20 years.

"Intensification of phosphorus cycling in China since the 1600s", X. Liu, H. Sheng, S. Jiang, Z. Yuan, C. Zhang, J. Elser, *PNAS (Proceedings of the National Academy of Sciences of the USA)*, vol. 113, n° 10, [2016](#)

Sustainable phosphorus options for Austria

A combination of P-recycling from meat and bone meal, sewage sludge and compost could replace 70% of mineral phosphate fertiliser use in Austria. The study is based on a detailed 2013 national phosphorus flow analysis. An optimal strategy would reduce import dependency by nearly 90%, reduce losses to water bodies by nearly 30% and nearly avoid consumption of mineral P fertilisers. This optimal scenario includes recycling, reduction of meat consumption, improved crop P-efficiency, optimisation in other applications (gardens, industry), reduction of point source emissions and soil erosion.

"Supporting phosphorus management in Austria: Potential, priorities and limitations", O. Zoboli, M. Zessner, H. Rechberger, *Science of the Total Environment* 565(2016) 313-323 <http://dx.doi.org/10.1016/j.scitotenv.2016.04.171>

50% P-recovery from Germany's sewage biosolids is feasible

Scenarios are proposed to recover 50% of total phosphorus in Germany's sewage sludge biosolids. Economic and environmental impacts are assessed. Of c. 60 000 tP/year in German sewage sludge, around 25-30% are currently used in agriculture and this should remain an important part of nutrient recycling for high-quality biosolids. To efficiently recover P from the remaining sludge will require modification of logistics in sludge treatment, to ensure that sewage sludge goes to mono-incineration and is not mixed with low phosphorus wastes, in order to deliver sewage sludge incineration ash with a P content of around 8%. Technical processes are available to recover P from such ash. A scenario with 30% recovery of Germany's sewage biosolids P by technical processes from ash, and 20% continuing to be used in agriculture, resulting in a net positive impact for energy consumption and climate change emissions. "Phosphorrecycling aus Klärschlamm in Deutschland: eine Abschätzung von Kosten und Umweltauswirkungen" (Phosphorus recycling from sewage sludge in Germany : an estimate of costs and environmental impacts), F. Kraus, C. Kabbe, C. Remy, B. Lesjean, 10 pages (in German), *Korrespondenz Abwasser, Abfall* 2016 (63) Nr. 6 <http://dx.doi.org/10.3242/kae2016.06.004>

Events

Nutrient recycling 11th July Denver, USA

WEF/IWA Nutrient Removal and Recovery conference 11-14 July. Opening plenary session on P-recovery success stories presented by ESPP 11th July. Workshop on Nutrient Recovery at WWTPs 10th July <http://www.wef.org/Nutrient->



[WEFIWA](#)

- ❖ 30th June, Logrono (La Rioja) Spain, Struvite recovery workshop and **PHORWater LIFE+ pilot plant visit** <http://phorwater.eu>
- ❖ 14th July, Madrid, **PHORWater LIFE+ Spain struvite recovery and P-recovery regulation workshop** <http://phorwater.eu>
- ❖ 16-20 Aug, Kunming, Yunnan, China, 6th **Sustainable Phosphorus Summit** <http://sps.ythic.com/>
- ❖ 5-9 Sep, Lake District, UK, Germany, **International Organic Phosphorus Workshop** <http://www.soilpforum.com>

- ❖ 8-9 Sep, Varna, Black Sea, Bulgaria, **EcoPhos Technophos factory site visit**, new process now operational for P-recovery from ash and from low grade rock <http://www.technophos-grandopening.com/>
- ❖ 12-16 Sept, Rostock, Germany, **8th International Phosphorus Workshop (IPW8)**
<http://www.wissenschaftscampus-rostock.de/>
- ❖ 13 Sept. Brittany France, COOPERL international workshop on pig manure treatment and nutrient management - further details pending. With visit to SPACE International Livestock Trade Fair www.space.fr
- ❖ 27 Sept. London, CIWEM conference **New Developments in Sustainable Phosphorus Management: Taking the P out of Pollution** <http://www.ciwem.org/events/new-developments-in-sustainable-phosphorus-management-taking-the-p-out-of-pollution/>
- ❖ 28-29 Sept. Vejle (near Billund) Denmark, Denmark EPA International Seminar on Slurry Acidification
<http://www.conferencemanager.dk/acidification>
- ❖ 11-12 October, Manchester UK, European Waste Water Management Conference (EWMW)
<http://ewmconference.com/>
- ❖ 27-28 October, Malmö near Copenhagen, Nordic Phosphorus Conference <https://dakofa.com/conference/conference>
- ❖ 15-16 November, Edinburgh, Scotland, European Biosolids Conference <http://european-biosolids.com/>
- ❖ 13-15 March, Tampa, Florida, Phosphates 2017 <http://www.crugroup.com/events/phosphates/>

Registration information and full events listing:
<http://www.phosphorusplatform.eu/events/upcoming-events>

ESPP Members

