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ESPC4 and PERM5, Vienna, 20-22 June 2022

The 4th European Sustainable Phosphorus Conference (ESPC4) will be the biggest phosphorus stakeholder meeting globally for 4 years (since ESPC3 Helsinki, with 300 participants from 30 countries, see [SCOPE Newsletter n°127](#)).

ESPC4, Monday 20th and Tuesday 21st June 2022, will be followed by PERM5, the 5th Phosphorus in Europe Research Meeting, Wednesday 22nd June 2022 (summary of PERM4, June 2021, online, coming soon [here](#)).

ESPC4 was Covid-cancelled from 2020, and so in 2022 Vienna will offer the first major opportunity "after" - hopefully - the pandemic, for Europe and the world's phosphorus community to come together (industry, policy makers, scientists).

We know from past months that distance meetings can be effective whilst saving time and miles, and international travel may still be difficult in 2022, so **ESPC4 - PERM5 will be both physical and accessible online.**

For the 400 participants expected in Vienna, a strong accent will be on networking and meeting one-another, facilitated by time in the programme, space and rooms at the venue and use of an event app with a Chat function (integrating with the online Chat). This will enable direct personal contacts through discussion and questions and the possibility to make contact with and propose meetings with other participants in Vienna.

ESPC4 will particularly address:

- **The current major developments in EU policy on nutrients:** Green Deal target of 50% reduced nutrient losses by 2030, revision of wastewater and sludge Directives, Circular Economy Action Plan, Critical Raw Materials, Horizon Europe and the 'Soil Health and Food' Mission, the EU Integrated Nutrient Management Action Plan;
- **Update on full-scale roll-out of phosphorus recovery** as Germany's and Switzerland's P-recovery regulations move towards implementation;
- **Regional, city and national phosphorus sustainability initiatives**
- **Climate change and phosphorus management:** consequences of climate change on phosphorus losses and eutrophication, impacts of nutrients and eutrophication on greenhouse gas emissions

PERM5 will discuss EU funding perspectives and industry needs for nutrient management R&D, with the emphasis on discussion and networking (PERM5 will be also accessible online). PERM5 will be followed (tbc) by a get-to-know and social session for nutrient-related Marie Curie projects and other nutrient research and young scientist networks.

A new call for abstracts will be announced for ESPC4 in September and papers already accepted in 2020 will be reconsidered. ESPC4 and PERM5 webpage: <https://phosphorusplatform.eu/espc4>

Other events

Nutrient Platforms members' meeting: P-recovery implementation update

Tuesday 31st August, online. Webinar open to members of nutrient platforms only (ESPP, German Phosphorus Platform, Netherlands Nutrient Platform, Sustainable Phosphorus Alliance North America, plus BSAG, UKWIR) will give an update on nutrient project actions and nutrient platform projects under development, and will provide information on implementation of the German and Swiss phosphorus recovery regulations.

Tuesday 31st August, 16h-18h30 CEST (Paris- Brussels time) – registration information from the nutrient platforms.

DPP Forum (German Phosphorus Platform)

9th September Frankfurt-am-Main and online. Bringing recycled phosphates to the market. In German

Programme and registration [here](#).

Hamburg Wasser – EWA – VSA online workshop on P-recovery

21st September 10h30-13h00, online broadcast from the Remondis P-recovery plant, Hamburg, Germany: first full-scale operational experience of P-recovery in Hamburg, update on P-recovery in Switzerland, etc. The event is organised by Hamburg Wasser (city-owned municipal water company), with [EWA](#) (European Water Association, a water profession association with members across much of Europe) and input from [VSA](#) (Swiss Association of Water Protection Professionals)

Registration [here](#).

Phos4You Final Conference

22 – 23 September, Essen, Germany, and online, presentation of Phos4You (InterReg) project outcomes, presentations of trials of P-recovery technologies, regulatory developments, LCA aspects. With European Commission DG GROW and DG AGRI and InterReg Secretariat. Technologies presented will be: EuPhoRe, bioacidification & STRUVIA struvite, PULSE (Liège University), Parforce, Filtraflo (crab carapace P-adsorption), micro-algae.

Phos4You [website](#) for programme etc. Registration [here](#).

Call for papers

Nutrient Cycling in Agroecosystems - Special Issue “Use of 15N tracers to study nitrogen flows in agro-ecosystems: transformation, losses and plant uptake”. This special issue welcomes review and research papers, including modelling studies and short communications, on 15N tracer studies on nitrogen flows in agro-ecosystems. Guest editors: Clemens Scheer and Tobias Rütting. **Submissions close on 28 February 2022.**

<https://www.springer.com/journal/10705/updates/19175738>

Call for abstracts

24-25 November, ManuResource Conference, the International Conference on Manure Management and Valorisation, Hertogenbosch, Netherlands. The conference is offering (26th November) site visits to including [Eco-Energy](#) (manure anaerobic digestion) in Oirschot and [Ecoson](#) (manure and food waste to biofuels, methanisation and organic phosphate fertiliser pellets) in Son. **Abstract submission deadline: 1st September 2021**

<https://www.vcm-mestverwerking.be/en/manuresource/23023/call-for-abstracts>

Policy

EU workshop on End-of-Waste criteria

The European Commission (JRC) has announced a stakeholder workshop to discuss which materials streams should be on a priority list for definition of European End-of-Waste Criteria. ESPP submitted at the start of May 2021 a [joint letter](#), signed by over 120 companies and organisations, requesting that certain material streams recovered from waste water be considered for this priority list. (This does not concern recovered materials used in fertilising products, for which the EU Fertilising Products Regulation 2019/1009 provides a process for defining End-of-Waste status). Eureau, AquaPublica, ESPP and other organisations are now mandating an expert to provide further information on these material streams to support this request. The material streams suggested by JRC for discussion at this workshop include “biological materials” and it is not today clear whether materials from wastewater may be considered under this title.

*European Commission JRC stakeholder workshop “Scoping and developing further End-of-Waste (EoW) and By-Product (BP) criteria”, online, 14-15 September 2021. Participation of organisations selected by the European Commission only. To candidate to participate: contact jrc-end-of-waste@ec.europa.eu before 30th July 2021. **Twitter #EoW4WWStreams***

EU “Fit for 55” package proposes Carbon Border Tax on nitrogen fertilisers

European Commission proposes regulatory package to reduce greenhouse gas emissions by -55% to 2030, including actions on agriculture and land use, and a Carbon Border Adjustment Mechanism (CBAM) for nitrogen fertilisers. The Green Deal “Fit for 55” published ([14th July 2021](#)) is a detailed regulatory package, intending to “transform the economy” to reduce greenhouse gas emissions, including proposals on transports, including road and aviation fuel taxes and banning sales of greenhouse gas (GHG) emitting cars by 2035, energy efficiency and changes to the EU Emissions Trading System (ETS). The package includes a proposal to avoid ‘carbon leakage’ by putting a carbon price on imports of certain goods (Cross Border Adjustment Mechanism CBAM), starting with cement, iron and steel, aluminium, electricity and (nitrogen) fertilisers. The proposed CBAM Regulation ([Com\(2021\)564](#)) proposes the border carbon tax on N, N+P, N+K and NPK mineral/chemical fertilisers, noting that the “difference in emission intensities of EU and non-EU producers is particularly high for fertilisers”. Mineral phosphorus fertilisers are not concerned if not containing nitrogen. Fertilizers Europe has expressed support in principle for the CBAM on fertilisers: Jacob Hansen, Director General, [11th March 2021](#) “*Fertilizers Europe ... recognises that to raise EU’s ambition on climate while avoiding carbon leakage, the EU must put a carbon border measure in place to ensure an international level playing field*”.

The proposed Regulation on Climate-Neutral Land Use, Forestry and Agriculture ([COM\(2021\)504](#)) proposes to implement binding targets for Member States for net carbon removal in land use and aims to make food and biomass production climate neutral by 2035, in particular citing livestock and fertiliser use. The proposal indicates inclusion of greenhouse emissions related to “nitrogen leaching and run-off” but does not specify how such nitrogen losses are calculated to relate to greenhouse emissions.

Raw materials and nutrients are otherwise absent from the “Fit for 55” package, which addresses principally energy. This is coherent in that nutrients are strongly addressed elsewhere under the Green Deal Farm-to-Fork and Biodiversity packages, see SCOPE Newsletter [n°139](#).

NGOs are critical of the “Fit for 55” package, suggesting that it is insufficiently ambitious, criticising the absence of sector-specific emissions reduction targets, exclusion of heavy industry and agriculture from ETS and continuing subsidies to fossil fuels.

European Commission press release, 14th July 2021 IP_21_3541) “European Green Deal: Commission proposes transformation of EU economy and society to meet climate ambitions” https://ec.europa.eu/commission/presscorner/detail/en/ip_21_3541
Fertilizers Europe [press release](#), 11th March 2021
European Environment Bureau “EU’s ‘Fit for 55’ is unfit and unfair”, [14th July 2021](#).

French public health study calls for action on cadmium exposure

Wide media coverage points to “contamination of nearly the whole French population, including children, by heavy metals”, and says breakfast cereals are the main source of cadmium, because of phosphate fertilisers. The documents published by Public Health France are less directly accusatory, but do state that cadmium levels in the French population increased from 2006-2007 to 2014-2016 and are higher than in other European countries or North America. The official website states that breakfast cereals increase cadmium levels in children, with fish, shellfish and smoking being important other sources for adults. Nearly half the French population show cadmium levels higher than that recommended by the French national health and environment agency ANSES. The official study report (ESTEBAN) indicates that in 2019 this agency (ANSES) recommended to reduce population exposure to cadmium, in particular in mineral phosphate fertiliser and organic soil amendments such as sewage biosolids. The ESTEBAN report quotes [INERIS 2017](#) “reduction of cadmium in fertilisers seems to meet economic rather than technical obstacles”.

Nouvelle République 5/7/21 (article published widely across France) [here](#) and Le Monde [here](#).
SantéPubliqueFrance press release 1/7/2021 [here](#).
ESTEBAN (French national biosurveillance) report “Impregnation of the French population by cadmium”, July 2021 [here](#) and press release 1/7/2021 [here](#).

Consultation on draft standards on wastewater treatment data and P-removal

Proposed new EU (CEN) standards are published and open to comment, for wastewater treatment plants: chemical phosphorus precipitation and general data requirements. prEN 12255-13 covers “chemical treatment of wastewater by precipitation/flocculation for removal of phosphorus and suspended solids”. It defines terms such as “coagulant”, “tertiary treatment”, “precipitant”. The standard indicates that P_{-total} discharge limits “typically range from 2 mg/l down to 0.25 mg/l”. The standard provides guidance for design, chemical process options, selection of precipitation chemicals, storage – preparation and dosing of chemicals, mixing, control systems, reactor - sedimentation and filtration systems, and sludge production. prEN 12255-11 covers data necessary for planning, design, construction, compliance testing, etc. of wastewater treatment plants. Both standards are now published as drafts, and comments can be input via national standards organisations.

As usual for CEN standards, the draft texts are not freely available, and prices vary depending on different national standards body website. Texts of both standards can be purchased for a total of 9.75€ from the Estonia standards organisation www.evs.ee

ESPP input to EU consultation on urban wastewater treatment Directive

ESPP underlines the need to better protect nutrient ‘Sensitive Areas’, to integrate reuse and recovery of nutrients, and to address contaminants in sewage at source. ESPP welcomes the recognition that eutrophication remains a major challenge to be addressed, including storm overflows, agglomerations < 2 000 p.e. and “IAS” (autonomous wastewater treatment, septic tanks), and underlines that eutrophication problems will be accentuated by climate change (see [SCOPE Newsletter n°137](#)). ESPP suggests that nutrient recovery objectives should be integrated into the Urban Waste Water Treatment Directive, in line with the Circular Economy Action Plan, and that this should include both “recovery” and “reuse” of both phosphorus and nitrogen, underlining that sewage sludge should be managed to ensure safety (risks from contaminants, antibiotic resistance) and that sludge should be used in such a way that account is taken of crop nutrient requirements.

ESPP input to the public consultation on the revision of the Urban Waste water Treatment Directive [here](#).

The EU public consultation on the Urban Wastewater Treatment Directive is open until 21st July 2021 [HERE](#).

US Senate proposes agriculture carbon credit scheme

The draft Growing Climate Solutions Bill would (if passed by the House of Representatives and then enacted) establish a Certification Scheme for farms mitigating greenhouse gas emissions or capturing carbon. The objective is to ensure a recognised and transparent certification scheme, through USDA (US Department of Agriculture), thus facilitating farmer access to possible private carbon credit markets. The bi-partisan Bill was adopted by a large majority (92-8) on 24th June 2021 in the US Senate and must now go to the House of Representatives.

US Senate Growing Climate Solutions [Bill S.1251](#)

For information, Australia’s “Emissions Reduction Fund” ([ERF](#)) already includes vegetation management and agriculture

Eutrophication

Turkey’s Marmara coast hit by “sea snot”

Marine mucilage has covered the Marmara Sea, caused by nutrient inputs and accentuated by climate warming. The mucilage layer is up to 30m and is damaging tourism and fishing, killing fish and can harbour pathogens. “Sea snot”, or mucilage is a slimy, gelatinous material produced by marine algae in eutrophic conditions, and also affects the Aegean Sea off Greece. Mucilage caused major problems on Italy’s Adriatic Coast in the 1990’s, largely resolved when wastewater collection and nutrient removal was implemented. The mucilage event around Istanbul is thought to be the biggest ever recorded. By late June, Turkish sea cleaning teams operating at over 200 locations had already collected 6 000 tonnes of mucilage.

Mucilage kills fish, shellfish and sea stars, by starving the water of oxygen and by suffocating fish eggs which are usually close to the surface.

25 million people live around the Marmara Sea, including 15 million in the Istanbul area. Turkey’s Government has recognised that the problem is largely caused by untreated or inadequately treated sewage and has announced that all existing sewage works will be upgraded to advanced biological treatment (currently over half undergoes primary treatment only). The Government says that, after emergency inspections, over half of the 445 wastewater treatment plants discharging into the Marmara do not need upgrade but over 140 need revision, maintenance or complete rebuild. The Government’s emergency plan will also prevent ships from discharging wastewater into the Marmara Sea, create artificial wetlands and buffers, and support farmers who switch to modern irrigation systems and instigate zero waste policies. A fertiliser factory discharging into the Marmara has been temporarily closed. Scientists however note that the Danube and Dnieper rivers also carry large pollution and nutrient loads from upstream into the Marmara, and should be addressed.

“Ministry unveils action plan to tackle the sea snot problem in Marmara”, [7th June 2021](#)

“Authorities take concrete steps to save mucilage-covered Marmara Sea”, [15th June 2021](#)

“Environment and Urbanization Minister Murat Kurum attended the Mucilage Coordination Board Meeting”, [14th July 2021](#)

UNESCO says Great Barrier Reef in danger

A UNESCO report to its World Heritage Committee suggests that the Barrier Reef should be put on the list of site “in danger” because of climate change, water quality and land use. The main factor leading to deterioration of the Reef and recent massive coral bleaching events is water temperature increase, because of climate change, but water quality and land use are also cited, because of nutrients (in particular, dissolved organic nitrogen) and sediments. Australia has strongly criticised the proposed UNESCO decision, fearing impacts on tourism, despite its own 2019 5-year report downgrading the Reef from poor to very poor. NGOs and scientists say that Australia is failing on climate change, with its consistent refusal to commit to zero emissions by 2050. UNESCO first debated “in danger” status for the Reef in 2017, leading Australia to engage a 2 billion € action plan. This has been effective in reducing nutrients, but UNESCO says action is too slow and that climate change is not addressed.

UNESCO report [draft decision](#), World Heritage WHC/21/44.COM/7B.Add, 21st June 2021

“Unesco: Great Barrier Reef should be listed as ‘in danger’”, BBC News [22nd June 2021](#).

EU Fertilising Products Regulation

STRUBIAS criteria in publication process, translations proposed

The EU has made public finalised EU Fertilising Products Regulation STRUBIAS criteria (struvites and precipitated phosphates, ash based products, pyrolysis and biochars). Translations are also underway (comment possible). This is the final phase before formal adoption of these criteria, which will enable them to be applicable when the new Fertilising Products Regulation enters into implementation in July 2022. The EU has also published translations of the precipitated phosphates and ash-based materials criteria, and comment is possible on these (only on the correspondence of the translation to the English text, not on the criteria themselves).

Finalised criteria texts in English and (draft) translations

[Precipitated phosphate salts and derivatives](#)

[Thermal oxidation materials and derivatives](#)

[Pyrolysis and gasification materials](#)

Update on cadmium limits in Member States

Three further Member States have recently obtained derogations allowing to maintain lower national cadmium limits in EU fertilisers than those currently fixed by the EU Fertilising Products Regulation (FPR) when it enters into implementation in July 2022.

These new derogations maintain lower limits already existing in these countries: Denmark (COM decision [2020/1178](#)) = equivalent to 48 mgCd/kgP₂O₅, Hungary (COM decision [2020/1184](#)) = 20 mgCd/kgP₂O₅ and Slovak Republic (COM decision [2020/1205](#)) = 20 mgCd/kgP₂O₅. The FPR (art. 3.2) also maintains derogations for lower limits which had been previously been granted: Austria (COM decision [2006/D0349](#) = 75 mgCd/kgP₂O₅, but which will become irrelevant in July 2022 because higher than the FPR limit), Finland (COM decision [2006/D0348](#) = 50 mgCd/kgP₂O₅) and Sweden (COM decision [2012/D0719](#) = equivalent to 20 mgCd/kgP₂O₅). A derogation previously requested by the Czech Republic was never granted ([2006/D0390](#) = 50 mgCd/kgP₂O₅),

The FPR fixes a limit of 60 mgCd/kgP₂O₅ for phosphate fertilisers (organic and inorganic), with the provision that before July 2026 the European Commission will prepare a report assessing the feasibility of reducing this limit, taking into account evidence on cadmium exposure and environmental accumulation, etc.

Member States can also request to maintain existing lower limits for EU fertilisers sold on their territory (implemented through the derogations cited above) or fix new lower limits for EU fertilisers sold on their territory “based on new scientific evidence relating to the protection of the environment or the working environment on grounds of a problem specific to that Member State arising after the adoption of this Regulation”. The FPR maintains “optional harmonisation”, meaning that Member States can fix higher or lower cadmium limits, or have no cadmium limits, for “national” fertilisers (these are not regulated by the FPR).

P-recovery

P₄ project obtains EU funding

The EU (Horizon 2020) will provide nearly 12 M€ to the FlashPhos project, led by University of Stuttgart, to develop thermo-chemical production of P₄ (white phosphorus) from sewage sludge. FlashPhos is based on different technologies of project partners will develop and unify to best standards. The process will be integrated into existing industrial infrastructure (cement plants). Dewatered sewage sludge, or other organic wastes containing phosphorus, are dried and ground, then flash gasified at high temperatures with CaO (lime). The objective is to produce P₄ (elemental white phosphorus), a specific form of phosphorus of high value and which is itself an EU Critical Raw Material (see SCOPE Newsletter [n°136](#)), in the EU and for which Europe is dependent on a handful suppliers from outside Europe, and which is essential for e.g. electronics, food additives, catalysts and production of a wide range of strategic organic phosphorus chemicals (flame retardants, water treatment, lubricants etc). The FlashPhos process claims to also produce a cement material and a valorisable iron metal alloy (so recovering iron salts used in wastewater phosphorus removal). The FlashPhos project will construct and test a c. 2 tonnes/day dry matter input pilot plant. Partners include ESPP member [Italmatch](#) as well as cement industry, plant manufacturers and industrial planners and consultants.

FlashPhos [presentation](#) at ESPP's PERM4 meeting, 2nd June 2021.

Project [summary](#) on EU CORDIS website.

University of Stuttgart [press release](#) 7th June 2021.

Inventory of operating phosphorus recovery and /or recycling facilities

Christian Kabbe (P-REX Environment) has produced an updated list of full-scale P -recovery / -recycling installations, worldwide, in operation today or under construction at or downstream of wastewater treatment facilities. The list indicates nearly 120 installations, specifying the technology supplier, the location, operating since, the recovered phosphate material/product and the annual tonnage of product output.

Table online on ESPP's [website](#) (with permission).

Information on installations missing from this table, or corrections or updates are welcome: to info@phosphorusplatform.eu

Research

N and P inputs cause declines in invertebrates

A meta-analysis of over 200 nutrient enrichment studies shows that combined N+P inputs result in lower invertebrate numbers, concluding that nutrients may contribute to global invertebrate decline. The authors assessed 1 679 cases from 207 nutrient addition studies (screened from 7 348 identified by literature search). 88% of cases were temperate (12% tropical), 75% were terrestrial and 25% aquatic (of which nearly 90% freshwater).

N (and N+P) addition significantly reduced invertebrate abundance in terrestrial habitats (P input did not), whereas N+P (and probably P) significantly reduced abundance in aquatic habitats. Impacts were stronger in tropical than in temperate habitats. Results were robust for insects, zooplankton, arachnids, collembola and nematodes.

Results for invertebrate biomass were somewhat different and P significantly increased invertebrate biomass in aquatic habitats.

Results for invertebrate diversity showed no identifiable impacts, possibly because of insufficient study data.

The authors conclude that N+P inputs (together) consistently and significantly reduce invertebrate abundance both in terrestrial and aquatic environments, and suggest that anthropogenic nutrient enrichment may be a driver of the documented global invertebrate decline.

"Nitrogen and phosphorus enrichment cause declines in invertebrate populations: a global meta-analysis", M. Nessel et al., *Biological Reviews* 2021 *Biol. Rev.* (2021), <https://dx.doi.org/10.1111/brv.12771>

Sewerage piping leaks could cause 20% of wastewater P loads to the environment

A study in Germany suggests that sewerage exfiltration today may account for 10% and 17% of environmental N and P loads from municipal wastewaters, rising to 11% and 20% if sewer remediation work is not undertaken. The study is based on data from over 11 000 municipalities across Germany and uses a combination of modelling (MONERIS Modelling of Nutrient Emissions in River Systems), data on connected populations and estimated pollution loads, upscaling of results from ten leakage studies on 4 German cities, and expert opinion. The average national sewerage wastewater loss is estimated at 2% of inflow sewage. The results are for the whole German public sewerage pipe system (450 000 km of pipes) and also private pipes (e.g. from house to public sewer) which are estimated to total 1.1 million km. The authors note the increase of leakage with sewerage pipe age and suggest that 20% of Germany's public sewers are in need of rehabilitation of sewerage networks, especially those over 40 years old.

"Harmonized assessment of nutrient pollution from urban systems including losses from sewer exfiltration: a case study in Germany", H. H. Nguyen & M. Venohr, *Environmental Science and Pollution Research*, 2021 [DOI](#).

"Sewer leakage: first nationwide estimate of pollution leaking from urban systems, Germany", European Commission 'Science for Environment Policy', issue 564, 6th July 2021, [here](#).

See also Ascott et al. in [SCOPE Newsletter n°119](#) – estimate that 1 200 tP/y leak from drinking water pipes into the environment in England + Wales.

Societal cost-benefit of P reductions to Lake Champlain, Vermont

A study estimates economic benefits of reducing lake phosphorus inputs, concluding that costs outweigh benefits over 35 years but benefits outweigh costs by 2100, but notes that some benefits are not accounted. The study considers the Missiquoi Bay within Lake Champlain on the Vermont – Quebec border and estimates benefits of improved water quality resulting from reduced P inputs, under different scenarios, including considering climate change impacts. Benefits estimated economically include property value (based on transaction values), tourism revenue and risk of ALS (amyotrophic lateral sclerosis) caused by cyanobacteria algae. P load reduction corresponding to the current TDML limit fixed by the EPA (64% reduction) is modelled, but also reductions from 0% to 100%. If no action is taken (0% P load reduction) property sales are expected to decline by US\$ 180 000 per year, tourism spending by \$ 414 000 / year and ALS health impacts to increase annually by \$ 90 000 / year. Cost of P-abatement is based on Vermont Agency of Administration (AoA) 2016-2019 data of 934 US\$/kgP. Estimated benefit / cost ratio is around 0.4 (cost 2.5x higher than benefit) for the TDML P load reduction. The authors note that this is comparable to benefit / cost ratios estimated for other policies to reduce water pollution in the US and that, in this study, benefits are underestimated because they are calculated only for Vermont and not for the Quebec shore of

the lake, do not include recreational fishing, non-ASL health benefits and non-use values of water quality, and are based on “revealed preference” values which are generally lower than “stated preference” approaches.

“Quantifying the social benefits and costs of reducing phosphorus pollution under climate change”, J. Gourevitch et al., *Journal of Environmental Management* 293 (2021) 112838 [DOI](#).

US dietary phosphorus intake increasing

Analysis of US national nutrition survey data 1988-2016 shows increased total dietary P intake (to 1.4 gP/person/day adult average) but decreased P intake from food additives (11% of total dietary P). The study uses NHANES (National Health and Nutrition Examination Survey) data, comparing 1988-1994 to 2015-2016. Dietary phosphorus intakes were estimated by comparing NHANES data on what people ate, to food data bases indicating phosphorus content of different foods. For “added” phosphorus (P in phosphorus food additives), levels in different food types were calculated based on numbers from food phosphate manufacturers (IFAC), taking the average of the numbers given by IFAC as minimum and maximum levels of phosphorus food additives in different foodstuffs (differences between these two numbers were small), then multiplying by the % of products in different food categories estimated to contain P additives according to the Innova Market Insights database. Average adult total dietary P intake increased from 1.3 to 1.4 gP/person/day whereas “added” P intake decreased from 0.18 to 0.16 gP/day. The five largest contributors to natural P intake were: cheese, pizza, chicken pieces, low-fat milk and eggs. Nearly 50% of dietary intake of “added” P was from cheese (phosphorus food additives are used in processed soft cheese), soft drinks, cakes – buns – biscuits. The apparent decrease in phosphorus food additive intake may be due to lower consumption of processed foods or demand for foods without additives, or may be due to inaccurate P values in food data bases.

“Trends in Total, Added, and Natural Phosphorus Intake in Adult Americans, NHANES 1988–1994 to NHANES 2015–2016”, K. and L. Fulgoni and Victor L. Fulgoni III, *Nutrients* 2021, 13, 2249 [DOI](#).
The study was funded by the food phosphate additive manufacturers, [IFAC](#) (International Food Additives Council).

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