350 years of phosphorus

July 8, 2019 | Andri Bryner
Topics: Wastewater | Biodiversity | Ecosystems | Pollutants | Water & Development | Society | Climate Change & Energy | Organisation & Staff

Without phosphorus there would be no life; however, the mineable quantities are limited. The element was first described 350 years ago. This week, some 200 experts are meeting in Zurich to discuss the future of phosphorus.

The need for food, as well as the proportion of animal products, is increasing all over the world. Every category of food calls for more phosphorus, because without phosphorus, cells, plants and animals cannot function. Phosphate-containing minerals that are worth mining, however, are distributed unevenly: Morocco and the western Sahara, China, South Africa and Jordan own around 80% of the world's phosphorous. Europe is up to 90% dependent on imports from these countries.

At the same time, a large amount of phosphorus is lost all around the world through inefficient use and because waste materials and wastewater are not recycled. The element becomes an unwanted nutrient in rivers and lakes, often in quantities that threaten biodiversity and the functioning of ecosystems.

Searching for the philosopher's stone

The German alchemist Hennig Brand is credited with the discovery of phosphorus 350 years ago, in 1669. He heated urine and found, not the elusive philosopher's stone, but a whitish substance that glowed in the dark. Phosphorus means "carrier of light" in Greek and was the first element in the history of chemistry for which we know the name of the discoverer.

About 100 years later, the London metallurgist Sidney Thomas found out by chance that the slag from his production of steel enhanced plant growth. The first phosphorus fertilizer had been discovered, and

is still called Thomas phosphate in honour of its discoverer. Fertiliser without phosphorus has been unthinkable ever since. Some 160 million tons of phosphate are mined globally every year. How long the supplies will last is a topic for debate, but what is certain is that processing will become increasingly difficult and expensive, while the degree of purity of the end product will decrease.

200 experts from all over the world

Under the provocative title of “Putting phosphorus first”, some 200 experts, mostly researchers, are discussing this week how our society can utilise phosphorus more sustainably in the future, how phosphate-related problems should be tackled, and where gaps in our knowledge exist. The congress in Zurich has been organised by ETH Zurich, EPF Lausanne and the aquatic-research institute Eawag. Full programme

Media representatives can attend single lectures or the excursions free of charge. The morning of Friday 12 July is highly recommended for a number of presentations, including the keynote address by Christophe Lasseur, who is responsible for the completion of material cycles at the European Space Agency. We should be glad to arrange interviews with relevant participants at the event.
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Without phosphorus there is no growth.
(Photo: Agroscope, Gabriela Brändle, Urs Zihlmann; LANAT Andreas Chervet)

Large quantities of phosphorus are lost with refuse and wastewater. Even when it is removed

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to protect water bodies, at WTPs such as this one by Lake Thun, recycling does not yet ensure that regional resource cycles are completed.
(Photo: AWA Bern)

Funding / Cooperation

The IPW9 congress is sponsored by the Federal Office for the Environment (FOEN), the Federal Office for Agriculture (FOAG), the Swiss National Science Foundation, the World Food System Center (ETHZ), Eawag, EPF Lausanne, ETH Zurich, the Soil Science Society of Switzerland as well as several private firms.

Related Links

International Phosphorus Workshop 9

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