Non Target – News #16

Landesamt für Natur,
Umwelt und Verbraucherschutz
Nordrhein-Westfalen

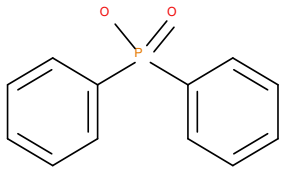
Diphenylphosphinic acid

Diphenylphosphinic acid is an organophosphinic acid species and an important starting material for the synthesis of organophosphorus compounds.

Molar mass:
218,188 g/mol

CAS:
1707-03-5

$C_{12}H_{11}O_2P$



The measurements of the LANUV meet the following necessary criteria for clear identification:

1) Match of the exact mass, ± 5 ppm
2) Match of the isotope pattern, min. 70 %
3) Match of a reference spectrum
4) Match of the retention time with the reference substance

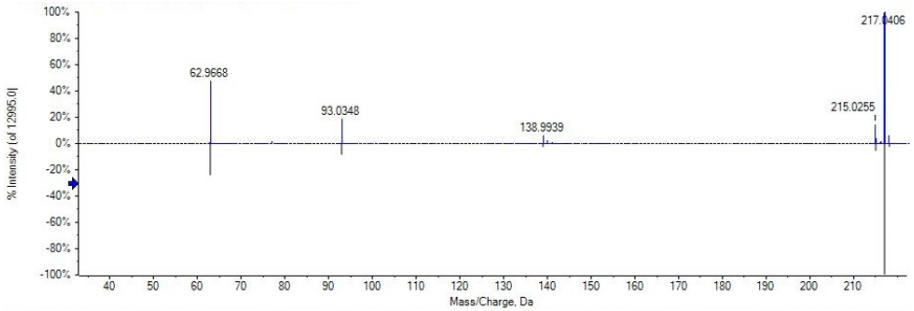


Figure 1: comparison of fragment-ion-spectra, blue: sample Sieg Menden, grey: reference substance

Analytics and occurrence

Diphenylphosphinic acid can be detected with the existing measurement method (LC-ESI-HRMS) in both modes. It could be detected with different intensity in all investigated surface waters (Rhine, Ruhr, Wupper, Erft, Lippe, Emscher and Sieg). In some samples the general prevention value of 0.1 µg/L is exceeded. In the river Sieg near Menden a maximum concentration of 14 µg/L could be observed in July 2022, which is not correlated to discharge. In all other water bodies the average concentration is < 0.1 µg/L.

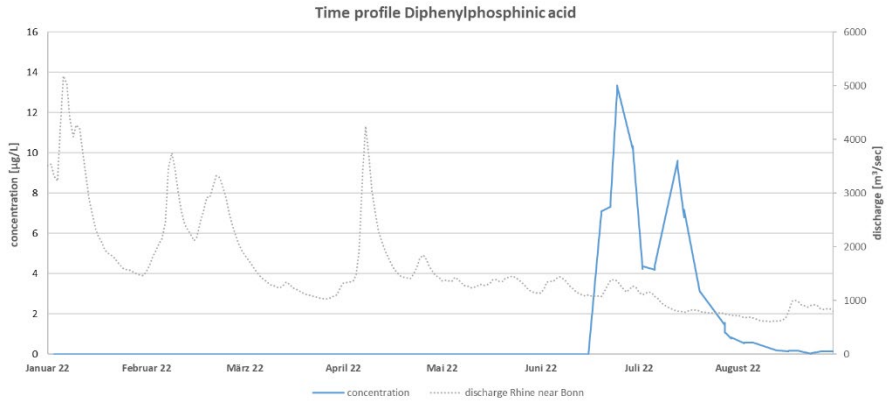


Figure 2: Time profile of Diphenylphosphinic acid in Sieg near Menden with the discharge of the Rhine near Bonn[1]

Relevance

For diphenylphosphinic acid there are no legally binding limits for drinking water. Therefore, the general prevention value of 0.1 µg/L is used for the assessment. To date, no data are available on the behavior of the substance in drinking water treatment. A modeled log P value indicates a low adsorption potential of the substance. Due to the lack of available data on

[1] Federal Waterways and Shipping Administration (WSV), provided by the Federal Institute of Hydrology (BfG). This applies to first, second and any subsequent use.

substance properties and toxicity, no assessment of the relevance of the substance to drinking water has been possible to date.

No ecotoxicological data are available for diphenylphosphinic acid. The modeled log P value does not indicate an increased bioaccumulation potential. Data for the evaluation of the persistence of diphenylphosphinic acid are not available.

Diphenylphosphinic acid is not classified as a hazardous substance under EU Regulation 1272/2008 (CLP Regulation). Diphenylphosphinic acid is notified to the European Chemicals Agency as harmful to eyes (Eye Irrit.2, H319), irritating to skin (Skin Irrit. 2, H315) and irritating to respiratory system (STOT SE 3, H335) with regard to human toxicological endpoints (self-classifications) [2].

Further procedure

Diphenylphosphinic acid occurs regularly in low concentrations in the Rhine, Ruhr, Wupper, Erft, Lippe and Emscher rivers. Higher concentrations have so far only been detected in the river Sieg in July 2022. The river Sieg will continue to be monitored; if concentrations are high again, additional monitoring sites along the Sieg will be sampled to identify a possible discharger. New results will be updated here.

[2] ECHA (2022). C&L-Inventory Database. Diphenylphosphinic acid. https://echa.europa.eu/de/information-on-chemicals/cl-inventory-database/-/discli/details/29289 (Stand 29.08.2022)