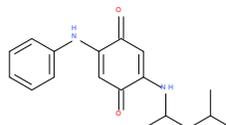




6PPD-quinone

6PPD is used as an additive in car tires to protect against embrittlement caused by ozone. Oxidation with ozone converts 6PPD to 6PPD-quinone. It can be dissolved out of tire abrasion and reach surface waters with discharged rainwater. There are indications of a toxic effect of 6PPD-quinone on coho salmon.¹

mass: 298.38 g/mol
CAS: -
C₁₈H₂₂N₂O₂



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

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

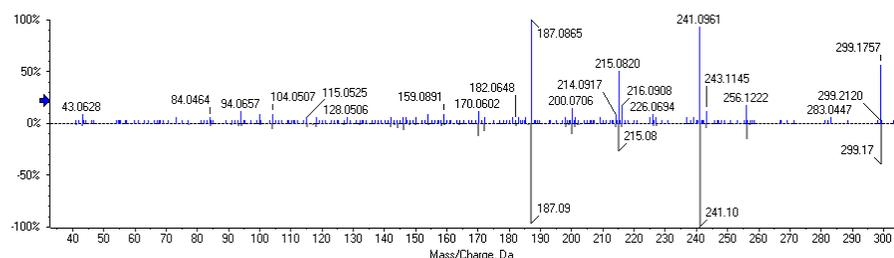


Figure 1: Comparison of fragment-ion-spectra, blue: sample Sieg near Menden, grey: reference substance

Analysis and occurrence

6PPD-quinone can be detected in positive mode with the existing measurement method. It was not detected in the rivers investigated so far (Rhine, Ruhr, Lippe and Ems), only sporadically in the Sieg.

Relevanz

For 6PPD-quinone there are no legally binding limit values for drinking water. Therefore, the general prevention value of 0.1 $\mu\text{g/L}$ is used for the assessment.

Because of the toxic properties and due to a lack of data on its substance properties, 6PPD-quinone is classified as potentially relevant for drinking water. Data on its behavior in drinking water treatment are not available.

From one study a LC50 for fish of 0.79 $\mu\text{g/L}$ after 24 hours is known. Further ecotoxicological data are not available. The high toxicity to coho salmon in the only study available so far indicates a possible high environmental relevance of the substance. Data on bioaccumulation potential and stability in the environment are not available.

Further procedure:

According to the current data, 6PPD-quinone does not seem to occur ubiquitously in surface waters. In a next step, specific investigations after rainfall events are scheduled. The focus will be on selected surface water samples and samples from rainwater retention basins.

+++Update+++

Rainwater retention basins near to a highway were sampled, the concentrations of 6PPD-quinone were between 0.02 and 0.03 $\mu\text{g/L}$. In addition, fresh rainwater from a highway drain was also investigated. Values of 1 $\mu\text{g/L}$ could be determined. Results from surface waters after rainwater runoff will follow.

¹ Tian et al. (2021): A ubiquitous tire rubber-derived chemical induces acute mortality in coho salmon, *Science* 371:6525, pp. 186-189. DOI: 10.1126/science.abd6951