



Comparison of passive and standard dosing of polycyclic aromatic hydrocarbons to the marine algae *Phaeodactylum tricornutum*

Witt, G.; Niehus, N. C.; Konopka, K.; Mayer, Philipp; Floeter, Jens

Published in:
SETAC Europe 25th Annual Meeting

Publication date:
2015

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):

Witt, G., Niehus, N. C., Konopka, K., Mayer, P., & Floeter, J. (2015). Comparison of passive and standard dosing of polycyclic aromatic hydrocarbons to the marine algae *Phaeodactylum tricornutum*. In SETAC Europe 25th Annual Meeting: Abstract Book Barcelona, Spain: SETAC.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

TU131 Comparison of passive and standard dosing of polycyclic aromatic hydrocarbons to the marine algae *Phaeodactylum*

tricornutum G. Witt, HAW Hamburg / Department of Environmental Engineering; N.C. Niehus, Hamburg University of Applied Sciences (HAW) / Department of Environmental Engineering; K. Konopka, Hamburg University of Applied Sciences HAW / Environmental Engineering; P. Mayer, Technical University of Denmark / Department of Environmental Engineering; C. Floeter, HAW Hamburg / Department of Environmental Engineering. Testing hydrophobic organic compounds (HOCs), like polycyclic aromatic hydrocarbons (PAHs), in aquatic toxicity tests is difficult due to compound losses through volatilization, sorption to the test vessel and culture medium constituents. This results in poorly defined exposure, the bioavailable concentration is reduced and concentration-effect-relation might be underestimated. Passive dosing can overcome these problems by the continual partitioning of HOCs from a dominating reservoir loaded in a biologically inert polymer such as silicone. This procedure provides defined and constant freely dissolved concentrations and eliminates spiking with cosolvents. Passive dosing using silicone O-rings as donor and PAHs as test substances (fluoranthene, naphthalene, phenanthrene, acenaphthene, fluorene, benzo[a]pyrene, anthracene and pyrene) were applied in the marine algal growth inhibition test with *Phaeodactylum tricornutum* (based on ISO EN 10253) in 24-well microtiter plates. The O-rings were loaded by partitioning from methanol solutions or suspensions of the respective PAHs (1), and these loaded O-rings were added to the wells in test media before the beginning of the test. Agitation of the plates was used to speed up the release from the O-rings. The toxicity of the individual PAHs was investigated at controlled concentrations up to their aqueous solubility in artificial seawater. The concentration-dependent growth inhibition of *Phaeodactylum tricornutum* was then compared for passive dosing and standard dosing according to the standard marine algae test procedure on microtiter plates. A comparison of the EC₅₀ values of passive dosing vs. EC₅₀ values of standard dosing showed an⁵⁰ underestimation of the effects⁵⁰ when using nominal standard dosing probably due to sorption, evaporation and limiting dissolution kinetics. Furthermore, passive dosing concentration-response curves were more reproducible and shifted towards lower concentrations. Results show that the response is clearly not only dependent on the potency of the compounds, but also on its supply, sorption and consumption during the assay. Passive dosing is a practical and economical way of improving the exposure of HOCs in aquatic toxicity or bioconcentration tests like the algae growth inhibition test. \n (1) K. E.C. Smith, N. Domb, R. Blust, P. Mayer (2010) Controlling and maintaining exposure of hydrophobic organic compounds in aquatic toxicity tests by passive dosing. Aquatic Toxicology 98, 15–24.