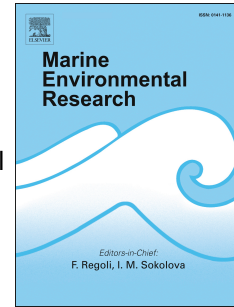


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1 Comparison of caged and native blue mussels (*Mytilus edulis* spp.) for 2 environmental monitoring of PAH, PCB and trace metals

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8 Abstract

9 Contaminant bioaccumulation was studied in blue mussels (*Mytilus edulis* spp.) using the harbor
10 waters of Kristiansand (Norway) as a case study. A suite of chemical contaminants (trace metals,
11 PAHs and PCBs) was analyzed in caged and native mussels as well as in passive samplers (Diffusive
12 Gradients in Thin films (DGT)-devices and silicone rubbers) placed alongside the mussels for
13 estimation of contaminant concentrations in water and uptake rates and bioaccumulation factors
14 (BAFs) in mussels during a six-months deployment period. Estimated logBAFs were in the ranges 2.3
15 - 5.5, 3.8 - 5.2 and 3.2 - 4.4 for metals, PCBs and PAHs, respectively. Contaminant levels in caged
16 mussels increased rapidly to stable levels for trace metals, whereas for hydrophobic organic
17 contaminants the increase was steady but slow and for many compounds did not reach the levels
18 observed in native mussels. Some key issues related to mussel caging design, such as mussel
19 deployment time and confounding influence from seasonal fluctuations, are discussed herein.

20 Keywords: blue mussels; biomonitoring; caging; contaminant bioaccumulation factors

22 1. Introduction

23 Blue mussels (*Mytilus* spp.) are widely used as sentinels in coastal pollution monitoring (mussel
24 watch) programs, mainly because their biological characteristics make them very suitable as
25 bioindicators for assessing the quality status of coastal waters (Farrington et al., 2016; Beyer et al., this
26 volume). Most often mussel watch studies involve collection of samples from natural blue mussel
27 populations, but the adoption of an active biomonitoring alternative by using transplanted blue mussel
28 has gained considerable popularity in ecotoxicology research and monitoring. Indeed, the
29 straightforwardness of using controlled deployments is one of the key advantages with blue mussels in

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