Desalination and Water Treatment
www.deswater.com

25 (2011) 106–112
January

1944-3994 / 1944-3986
doi: 10.5004/dwt.2011.1753

Potentially toxic trace elements accumulating in marine sediment and bivalves in the outfall area of a desalination plant

Ming-Hsun Lin[a], Cheng-Haw Lee[a]*, Yung-Chang Lin[b], Kuo-Hsin Yang[c]

[a]*Department of Resources Engineering, Cheng-Kung University, Taiwan, No. 1, University Rd., Tainan City 701, Taiwan*
Tel. +886 (6) 2757575 ext 62833; Fax +886 (6) 2380421; email: leech@mail.ncku.edu.tw
[b]*Department of Electrical Engineering, Cheng-Shiu University, Taiwan, No. 840, Chengcing Rd., Niaosong Township, Kaohsiung County 833, Taiwan*
[c]*Depazrtment of Construction Engineering, National Taiwan University of Science and Technology, 43, Sec. 4, Keelung Rd., Taipei 106, Taiwan*

Received 12 January 2010; Accepted in revised form 20 May 2010

ABSTRACT

This study evaluated the environmental impact of seawater desalination effluent discharged into a water body by investigating potentially toxic trace elements in the outfall area of a desalination facility on the southeastern coast of the Penghu Island (Taiwan). Trace element concentrations are analyzed using various samples (sediment, water and bivalves). Copper, zinc and arsenic were detected in sediment samples in the outfall area and decreased progressively as one moved away from this area. A contour plotting technique was applied to assess and visualize trace element pollution point sources (inputs) in the study area. Trace element concentrations measured directly in the desalination plant effluent confirm analytical results. Bivalve samples such as oysters and clams were collected 50 m from the desalination coastal area. Trace element concentrations in bivalves varied randomly. A clear increasing tendency over time (bioaccumulation) was not observed. This study cannot support the use of trace element bioaccumulation as a bio-monitoring index for marine environments polluted by seawater desalination effluent. We recommend that investigations of bioaccumulation should be targeted close to pollution sources.

Keywords: Potentially toxic trace element; Desalination plant; Sediment; Bioaccumulation

* Corresponding author.