



Accumulation of butyl- and phenyltin compounds in starfish and bivalves from the coastal environment of Korea

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Received 22 September 2003; accepted 30 June 2004

*Starfish are effective organisms for monitoring phenyltin contamination
in the marine environment.*

Abstract

Triphenyltin (TPT) and tributyltin (TBT) concentrations were determined in two starfish species (*Asteria pectinifera* and *Asterias amurensis*), bivalves (*Crassostrea gigas* or *Mytilus edulis*), and seawater samples from sites around the coasts of Korea. Both TPT and TBT concentrations in starfish ranged from 8 to 1560 ng/g and from <2 to 797 ng/g as Sn on a dry weight basis, respectively. TPT concentration accounted for 75.4% and 86.4% of total phenyltin concentration in *A. pectinifera* and *A. amurensis*, respectively, while monobutyltin, a degradation product of TBT, accounted for 86.3% and 57.2% of total butyltin, respectively. Triphenyltin concentrations in *A. pectinifera* were significantly correlated to water and bivalve TPT concentrations, which implies that dietary uptake of TPT from contaminated prey as well as direct uptake from surrounding water contribute to TPT body residues in the starfish. Starfish could be target organisms for monitoring TPT compound in the marine environment, due to their high accumulation and low degradation capacity towards TPT.

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Keywords: Starfish; Triphenyltin; Tributyltin; Accumulation; Bivalve

1. Introduction

Tributyltin (TBT) and, in some regions to a lesser extent, triphenyltin (TPT) compounds are used in paints to prevent submerged surfaces from biofouling. Both compounds are toxic chemicals because of their deleterious effects on non-target marine organisms (Fent, 1996). Many countries have placed restrictions

on the use of TBT and (or) TPT anti-foulants for ships less than 25 m in length since the 1980s due to their environmental effects. However, there are no such regulations in most of the Asian countries. In addition, the world's largest shipbuilding industries are in Korea, Japan and China. High concentrations of TBT and TPT have been found in Asian coastal environments (Kannan et al., 1995a; Tong et al., 1996; Hung et al., 1998; Shim et al., 1998; Hong et al., 2002; Sudaryanto et al., 2002). TPT has also been used as a fungicide and herbicide in various purposes (Blunden and Chapman, 1986) and has a comparable toxicity to TBT.

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