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PE-11 Comparative study of Tributyltin (TBT) Compounds and heavy metals between Tanzania and Okinawa, Japan

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Introduction

Organotin compounds (OTCs) and heavy metals belong to those chemicals most toxic to the aquatic organisms, which are mostly deliberately introduced into the aquatic system through anthropogenic activities. OTCs have been widely utilized in agriculture as fungicide and insecticides as well as in making marine antifouling paints. Tributyltin (TBT) compounds have been used most extensively as the main biocide in marine antifouling agents. Tributyltin (TBT), an active ingredient in antifouling paint formulations, is the most acute toxic chemical to the marine organisms especially molluscs. TBT concentrations of around 10^{-9} g/l cause calcification defects in adult oysters, and mortality of larvae, and sexual modification of gastropod (Michel, 1999). Recent finding shows that Organotin compounds might cause corals (*Acropora tenuis*) morphological abnormality (Watanabe et al., 2005). The aim of this study was to compare the levels and chemical characteristics of TBT and heavy metals between tropical and sub-tropical marine environments.

Sampling sites and methods

Samples were collected from June 22-26, 2004 and between 2002-2005 from coast of Tanzania and Okinawa respectively. Levels and degradation rate of tributyltin (TBT) were determined using Gas chromatography (FPD) HP 6890. Heavy metals were analyzed using AAS (Thermo Elemental Solaar 969).

Results

The levels of TBT in both locations appeared to reflect the activities taken at the sampling stations such as boating activities, marinas etc. The levels of TBT detected in Tanzanian coastal areas were very high compared Okinawa Island. Degradation rates behaved differently between tropical and subtropical environments.

Generally, the levels of analyzed heavy metals were relatively high in Okinawan samples than Tanzanian samples. Similar profiles were observed in a sequential extraction procedure in both areas. It revealed that about 50 % of Fe was found in immobile fraction (residual fraction) and other metals; Cd, Cu, Ni, Co, Zn, Pb, and Mn were mostly found in mobile fractions (non residual fractions) and thus can be easily remobilized and enter the food chain. This study is a preliminary documentation of Organotin compounds in marine ecosystem in East Africa as well as Okinawa. This suggests the importance of further detailed OTCs studies in Tanzania and Okinawa.

References

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