Presence of persistent organochlorine pesticides in estuaries of the subtropical Mexican Pacific

M.L. Robledo-Marenco*
Laboratorio de Contaminación y Toxicología,
Centro Multidisciplinario de Investigación Científica (CEMIC)
Universidad Autónoma de Nayarit,
Ciudad de la Cultura, Amado Nervo s/n,
Tepic Nayarit, 63190, México
E-mail: lorom@nayar.uan.mx E-mail: leo74_mx@yahoo.com
*Corresponding author

A.V. Botello
Laboratorio de Contaminación Marina,
Instituto de Ciencias del Mar y Limnología,
Universidad Nacional Autónoma de México,
Apdo. Postal 70-310, México DF 04510, México
E-mail: Vazquez-Botello@icmnl.unam.mx

C.A. Romero-Bañuelos
Laboratorio de Contaminación y Toxicología
Centro Multidisciplinario de Investigación Científica (CEMIC),
Universidad Autónoma de Nayarit, Ciudad de la Cultura,
Amado Nervo s/n, Tepic Nayarit, 63190, México
E-mail: alberto@nayar.uan.mx

G. Díaz-González
Departamento de Producción Agrícola y Animal,
Universidad Autónoma Metropolitana,
Campus Xochimilco, México DF 04960, México
E-mail: gdiaz@correo.xoc.mx

Abstract: A set of 40 samples of sediments and shrimps (*Litopenaeus* spp.) from two estuaries in the subtropical Mexican Pacific (San Blas, Nayarit) was analysed to determine the levels of organochlorine pesticides (OCPs). These pesticides have been widely used and dispersed in the study area, either for agriculture crops or control of malaria. For sediments of both estuaries (Pozo Rey and San Cristóbal), the results show that the most frequent compounds were the HCH isomers, endosulfan and DDT group. The shrimp’s tissues follow the same pattern of pesticide distribution. The HCH isomers being the most frequent compounds, they demonstrated their broad use. The concentration of OCPs detected in this study area was lower than those previously reported in other wetlands from the Mexican Pacific. All OCPs identified in this work are banned by the Mexican legislation, with their consequent risks to the environment and the public health.

Copyright © 2006 Inderscience Enterprises Ltd.
Presence of persistent organochlorine pesticides in estuaries

Keywords: organochlorine pesticides; sediments; shrimps; estuaries.


Biographical notes: Maria de Lourdes Robledo Mareno received her PhD in biology at the Universidad Valencia, Spain. At the moment she is the person in charge of the Laboratory of Pollution and Toxicology of CEMIC. She has handled many projects including impact of agrochemical in the state of Nayarit, and diagnosis and monitoring of the quality of the water and its influence in the zone of wetlands of the Municipality of San Blas Nayarit, México.

Alfonso Vázquez Rotello received his PhD in marine sciences at the Universidad Autónoma México. At the moment he is the person in charge of the Laboratory of Marine Pollution of the Institute of Sciences of the Sea and Limnology of the Universidad Autónoma de México. He is specialist in studies on heavy metals hydrocarbons and pesticides in environmental samples. It has published numerous paper in journals specialised in environmental contamination.

Carlos Alberto Romero-Bañuelos obtained his MSc at the Centro Interdisciplinario Ciencias Marinas (CICIMAR) of the Instituto Politécnico Nacional (IPN). At the moment he is investigator of the Centro Multidisciplinario Investigacion Cientifica (CEMIC) of the Universidad Autónoma Nayarit México. He has collaborated in projects on presence of pesticides in wetlands of the state of Nayarit, México.

Gilberto Díaz-González received his PhD in chemical sciences at the University Autónoma Mexico. At the moment he is investigator of the Universidad Autónoma Metropolitana (UAM). He is specialist in analysis of pesticides in environmental samples (sediments and aquatic organisms). It is author and coauthor of paper published in journal specialised in environmental contamination.

1 Introduction

Estuarine systems are homeostatic, physically controlled ecosystems, vulnerable to environmental changes from anthropogenic activities. On the other hand, coastal lagoons of the subtropical Mexican Pacific are among the most productive ecosystems mainly for shrimp fisheries. However, the increase in human settlements, the agricultural wastes as organochlorine pesticides, and the direct discharges of sewage into the lagoons have given rise to severe pollution, jeopardising the ecology and biodiversity of these singular areas (Botello et al., 2000).

Persistent compounds such as organochlorine pesticides (OCPs), besides their important function in agricultural development, have also been used to control transmissible diseases such as dengue and malaria in Mexico. However, because of their persistence, bioaccumulation, and biomagnification features, they may represent a threat to the coastal ecosystems (Albert, 1996).