

# BIOACCUMULATION OF ORGANOCHLORINATED COMPOUNDS IN CAGED MUSSEL (*MYTILUS GALLOPROVINCIALIS*) AT THE IBERIAN MEDITERRANEAN AND BALEARIC WATERS. INFLUENCE OF LIPID CONTENT AND MUSSEL GROWTH

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## Abstract

Caged mussels were used as sentinel organisms of organochlorine (OC) contaminant bioavailability in the Iberian Mediterranean and Balearic waters, within the surveillance network developed by the Mytilos project in the western Mediterranean area. The mussels were collected from an uncontaminated site and transplanted to 30 stations. After 3 months, concentrations of PCBs and OC pesticides were measured in the mussel tissues. The distributions of OC compounds are showed herein, and the influence of two biological factors on the levels of these pollutants have been examined: lipid content and mussel growth.

**Keywords :** *Monitoring, Bivalves, Chlorinated Hydrocarbons.*

## Introduction

The purpose of monitoring contaminant concentrations in bivalve tissue is based on the mussel capacity to integrate the bioavailable portion of contaminants in the water column over time. Two different strategies have been adopted in the Mussel Watch Programs; pasive biomonitoring, with indigenous populations, and active biosurveillance with transplanting individuals [1]. Active biomonitoring allows to control the bioaccumulation process. However, bioaccumulation in marine organisms could be influenced by several factors such us lipid content or the mussel growth [1]. In this work, the influence of lipid content, condition index and organochlorine compounds have been studied in transplanted mussel in the Iberian coast. We have used this method of active biomonitoring to evaluate chemical contamination by PCBs (IUPAC ns 28, 52, 101, 105, 118, 138, 153, 156 and 180), and pp'DDT and its metabolites.

the Iberian coast, far from industrial and urban areas. These data showed the dilution of the land source pollution in the marine shelf waters. The highest concentrations of CB153 were observed in El Portus and Palma Port, 7 and 9 ng/g dw, respectively. These levels reflect the high degree of industrialization and/or urbanization of the cities of Cartagena and Palma de Mallorca, respectively. The levels of pp'DDE and pp'DDD varied in the range of 0,3-4,0 and from nd -1,76, respectively, and the highest pp'DDE concentrations were found in Aguilas, C.de Gata, Almeria and Adra (Fig. 2). In contrast, pp'DDT was no detected in the samples. Tissue concentrations of CB153, CB138 and pp' DDE were positively correlated with the lipid content (R=0,496, 0,456 and 0,936, respectively, N=30, p<0,01) and the CI (R=0,381, 0,379 and 0,936, respectively, N=28, p<0,05), a biometric parameter related to the growth. From our results, it is deduced that the normalization of the organochlorine concentrations to the lipid content or the growth is necessary to reveal the real spatial bioavailability of the contaminants along the Iberian and Balearic coasts.



Fig. 1. Map with sampling points.

## Materials and methods

The mussel transplantation technique is described in details elsewhere [1]. The mussels were transplanted to 30 stations shown in the Fig. 1 (April-June 2004 and 2005). The ratio of dry flesh weight to dry shell weight was used to determine a condition index (CI) for each sample. Samples were freeze-dried and soxhlet extracted. An aliquot of extract was used to determine gravimetrically lipid content. After the chromatographies over alumina and silica, the extracts were analyzed by GC-ECD.

## Results and Discussion

Distribution of the congener CB153 is shown in Fig.2. Most of PCBs concentrations were similar to the levels found in native mussel sampled in

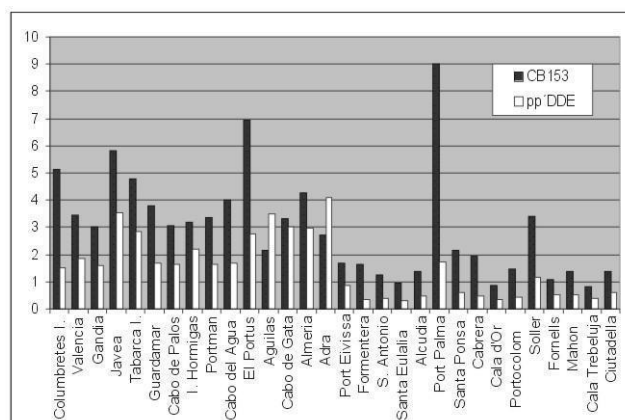


Fig. 2. Levels of PCB 153 and pp'DDE in the investigated stations (unit: ng/g dw).

## Reference

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