

# ORGANOCHLORINATED (PCBS) AND ORGANOBROMINATED (PBDES) CONTAMINANTS IN EUROPEAN ANCHOVY (*ENGRAULIS ENCRASICOLUS*) FROM THE NORTH-WESTERN MEDITERRANEAN SEA

C. Munsch<sup>1</sup>, V. Loizeau<sup>2</sup>, H. Pethybridge<sup>2</sup>, C. Tixier<sup>1</sup>, J. Tronczynski<sup>1\*</sup>, N. Bodin<sup>3</sup>, F. Le Loch<sup>4</sup> and M. Harmelin-Vivien<sup>5</sup>

<sup>1</sup> IFREMER - Biogeochemistry and Ecotoxicology Unit, Laboratory of Biogeochemistry of Organic Contaminants (BE/LBCO), Nantes, France - jtronczy@ifremer.fr

<sup>2</sup> IFREMER - BE/LBCO, Brest, France

<sup>3</sup> IRD - UMR 212 EME, Victoria, Seychelles

<sup>4</sup> IRD - UMR 212 EME, Sète, France

<sup>5</sup> Institut Méditerranéen d'Océanologie, Aix-Marseille Université, UM 110, Station Marine d'Endoume, Marseille, France

## Abstract

Polychlorinated biphenyls (PCBs) and polybrominated diphenyl ethers (PBDEs) were investigated in European anchovy (*Engraulis encrasicolus*) collected in the Gulf of Lions. The contaminants were determined in different organs and tissues of male and female adult fish sampled during the spawning and resting seasons. The influence of sex, age and reproduction on contaminant concentrations was evaluated.

*Keywords: Bio-accumulation, Gulf of Lyon, Fishes, Pcb*

Small pelagic fish, such as European anchovy (*Engraulis encrasicolus*), stand at intermediate levels in food webs and play an essential role in North-Western Mediterranean ecosystems [1]. Understanding their contamination by persistent toxic contaminants is therefore of importance. The contamination of selected organochlorinated (polychlorinated biphenyls - PCBs) and organobrominated (polybrominated diphenyl ethers -PBDEs) contaminants was investigated in European anchovy collected in the Gulf of Lions (North-Western Mediterranean Sea). The spatial distribution of contamination was assessed at different locations throughout the Gulf of Lions, from the mouth of the Rhône River in the Eastern part of the Gulf, to Port Vendres in the South-Western part. Male and female adult fish of homogeneous size were sampled during the spawning and resting seasons (i.e., July 2010 and March 2011, respectively). Contaminant determination was done on pooled individuals of similar size and sex, and replicate pools were analysed when available. Extensive determination of contaminants in different organs and tissues (muscle, liver, gonad, viscera and carcass) allowed to calculate the whole body's contamination levels and to assess the effects of anchovy's reproductive activity on the distribution and levels of organic chemicals. Fish contamination was examined together with total lipid content. Lipid classes (triacylglycerols, sterols and phospholipids) as well as carbon and nitrogen stable isotopes were also determined in selected tissues in individual anchovies. Finally, contaminants, lipids and stable isotopes were assessed in anchovy main diet (small zooplankton), and BMF and TMF were evaluated. No significant differences in anchovies' contamination levels were observed throughout the Gulf of Lions, revealing a fairly homogeneous population within the study area and no local influence of contaminant inputs on fish contamination. During the spawning season, females exhibited lower contamination levels than males, while no statistically significant difference was found during the resting season. CB-153 (predominant PCB congener) concentrations ranged from 4.1 ng g<sup>-1</sup> wet weight (ww) to 9.3 ng g<sup>-1</sup> ww in females and males respectively during the reproductive season; they ranged from 9.6 ng g<sup>-1</sup> ww to 12.2 ng g<sup>-1</sup> ww during the resting season. BDE-47 (predominant PBDE congener) concentrations were 40- to 60-fold lower than those of CB-153. The lower PCB and PBDE levels measured in females during the spawning season could result from a decontamination process that occurred during spawning [2]. Moreover, a modelling approach based on the Dynamic Energy Budget (DEB) theory revealed age differences between fish of given sex and length between the two seasons [3]; this could also explain the differences observed in anchovies' contamination.

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*Frédéric Briand  
Directeur Général, CIESM*

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