CIIMAR Internal Presentations

29th March 2007, Thursday

14:30 - 14:45

Marta Ferreira

Biomarkers levels in Flounder (*Platichthys flesus*) and Mullet (*Mugil cephalus*) chronically exposed to organic contaminants in river Douro estuary

14:45 - 15:00

Ana Bio

The CIMAR data base — What, What for and How

ABSTRACTS

BIOMARKERS LEVELS IN FLOUNDER (*Platichthys flesus*) AND MULLET (*Mugil cephalus*) CHRONICALLY EXPOSED TO ORGANIC CONTAMINANTS IN RIVER DOURO ESTUARY

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Organochlorine compounds, such as Polychlorinated Biphenyls (PCBs) and Organochlorine Pesticides like dichlorodiphenyltrichloroethane (DDT), due to their tendency to bioaccumulate and difficult elimination are considered to be toxic, even at low concentrations in the environment. Another group of contaminants frequent in the aquatic environment, the polycyclic aromatic compounds (PAHs), originated from petroleum industry, maritime traffic and combustion, equally promote adverse effects in fish, such as genotoxicity, development alterations and endocrine disruption, among others.

This study was conducted with two resident species from River Douro estuary, flounder (*Platichthys flesus*) a benthonic species, and mullet (*Mugil cephalus*) a pelagic fish. We have evaluated the accumulation of Persistent Organic Pollutants (POPs), the PCBs, DDT and it stable

metabolite the dichlorodiphenyldichloroethylene (DDE), in liver and muscle of both species. In mullet, we have also evaluated the presence of four PAH metabolites in bile, namely phenanthrene, naphthalene, pyrene and benzo(a)pyrene.

In environmental monitoring studies it has become frequent the use of several biomarkers. In this study we have evaluated the enzymes from phase I and phase II biotransformation, and oxidative stress, by means of antioxidant enzymes activities and oxidative damages. Both species were allowed to depurate for different periods (1, 4 and 8 months) in a cleaner environment with uncontaminated food, and the levels of pollutants and biomarkers were assessed after depuration periods. Concerning the levels of POPs, no changes were observed in liver even after the 8 month period. However, in muscle a different pattern was seen with a decrease in these pollutants levels after 4 month of depuration. PAH metabolite levels, because they are less lipophilic and more easily metabolised, have significantly decreased with depuration.

In flounder, biomarkers responses were conditioned by biological factors, mainly by reproduction, that have limited phase I responses. In addition, the fasting condition during the depuration period, has limited oxidative stress biomarkers at the level of defences and also damages. In mullets, EROD activity has decreased significantly after one month depuration, maintaining the levels throughout the following depuration periods. Phase II biotransformation enzyme in mullet revealed an increase in activity in some periods, however due to the physiological role of this enzyme it can be considered to be beneficial to the animal. Antioxidant enzymes in mullet have equally showed a decrease with depuration, however not so pronounced as phase I decreases. The decrease in oxidative damages in lipids, throughout the depuration, and in proteins after eight months, has confirmed that animals inhabiting Douro estuary are facing oxidative stress induced by the presence of pollutants in the environment.

In conclusion, this study revealed the presence of several contaminants in River Douro estuary, and that these compounds induce changes at cellular and subcellular levels in the species inhabiting this aquatic environment. In addition, we can also conclude that mullet can be a useful sentinel species for the presence of several contaminants in European estuaries given their large geographic distribution.

THE CIMAR DATA BASE — WHAT, WHAT FOR AND HOW

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Organized data bases (DB) are vital for the management, storage and exploration of the increasing volume and heterogeneity of available scientific data. A common, central CIMAR Associated Laboratory DB operates at several levels: while researchers are helped to get their data organized for easy assessment and analysis, the scientific community benefits from well documented and stored data, which are less prone to get lost (*e.g.* with changing staff), easier to find and query, and which can eventually (after thorough exploration and publication by the data holder) be made available for further research. Furthermore, meta data and research results will be publicised through the Internet, aiding the dissemination of the lab's work and expertise and providing contacts for service and cooperation.

The DB will be imbedded in a GIS, where data can be geographically queried and analysed. Therefore, data shall, whenever possible, be linked to a (geo-referenced or approximate) place and time, though non-geographical data are also accommodated.

The DB model will follow that of the National System of Marine Environment Information – InforM@r, which is presently in development (*Estrutura de Missão para a Extensão da Plataforma Continental* — EMEPC). InforM@r will provide a central, national, geographical marine data inventory and management service. In a web GIS, meta(data) shall be visualized, geo-processed, interpreted and distributed. The InforM@r DB will contain EMEPC data, as well as meta data from other marine data centres (like research labs). Data holders regulate access to their meta(data). CIMAR, like other marine data holders, is now asked to contribute to the final design of the InforM@r DB and to organize its own DB. First we need to determine which meta data are relevant – *i.e.* what information CIMAR would like to make public and searchable, what information researchers do look for in other data bases.