

Author list

Correia, AD.^{1*}
Freitas, S.¹
Rodrigues, P.¹
Brian, J.²
Harris, C.²
Scholze, M.³
Booij, P.⁴
Lamoree, M.H.⁴
Jonkers, N.⁵
Pojana, G.⁵
Marcomini, A.⁵
Sumpter, J.²
Reis-Henriques, MA^{1,6}

¹CIIMAR -Centro de Investigação Marinha e Ambiental, Porto, Portugal.

* Departamento de Biologia. Universidade do Minho. Braga, Portugal

²Department of Biological Sciences, Brunel University, Middlesex, UK.

³The School of Pharmacy, London, United Kingdom

⁴IVM Institute for Environmental Studies, Amsterdam, The Netherlands

⁵Department of Environmental Sciences, University of Venice, Venice. Italy

⁶ICBAS, Porto, Portugal

Key words: estrogenic chemicals, mixture effects, prediction, fathead minnow, sea bass

The ACE Project: a synopsis of *in vivo* studies to predict estrogenic mixture effects in freshwater and marine fish

This work is part of the ACE project (ACE, EVK1-CT-2001-100) which aims is to investigate multi-component mixtures of estrogenic compounds in aquatic ecosystems. Here we present a synopsis of *in vivo* data related with the joint estrogenic action of five estrogenic compounds (17 β -estradiol, ethynylestradiol, nonylphenol, octylphenol and bisphenol-A) on vitellogenesis in fathead minnow (*Pimephales promelas*) and sea bass (*Dicentrarchus labrax*). The studies were conducted with freshwater adult males and marine juveniles under flow through exposure conditions for two weeks. In the first step, fish were exposed to the five compounds individually in order to generate concentration-response curves. Then mixture effects were predicted on the basis of the potency of each compound by using the model of concentration addition (CA). Finally, the compounds were tested as a mixture at equipotent concentrations, and the observed mixture effects were compared to the predictions. The mixture studies showed an good agreement between observed and predicted effects and provided evidence that CA can be used as a predictive tool for the effect assessment of mixtures of (xeno)estrogens in freshwater or

marine ecosystems. The differences/limitations of running *in vivo* mixture studies with freshwater and marine species will be discussed.

Ana Dulce Correia

CIIMAR- Centro Interdisciplinar de Investigação Marinha e Ambiental

Rua dos Bragas,289

4050-123 Porto

Portugal

phone (+351) 223401800

fax (+351) 223390608