

## Scientific Paper:

Comparative Biochemistry and Physiology, 2011, Part C 153, 318 - 327

### **Oxygen requirements of zebrafish (*Danio rerio*) embryos in embryo toxicity test with environmental samples**

Ruben Strecker<sup>a</sup>, Thomas-Benjamin Seiler<sup>b</sup>, Henner Hollert<sup>b</sup>, Thomas Braunbeck<sup>a</sup>,

<sup>a</sup> Aquatic Ecology and Toxicology Section, Department of Zoology, University of Heidelberg, Im Neuenheimer Feld 230, D-69120 Heidelberg, Germany

<sup>b</sup> Department of Ecosystem Analyses, Institute for Environmental Research (Biology V), RWTH Aachen University, Worringer Weg 1, D-520074 Aachen

#### **Abstract:**

The zebrafish embryo test is a widely used bioassay for the testing of chemicals, effluents and other types of environmental samples. Oxygen depletion in the testing of sediments and effluents is especially important and may be a confounding factor in the interpretation of apparent toxicity. In order to identify oxygen levels critical to early developmental stages of zebrafish, oxygen consumption of zebrafish embryos between 0 and 96 h post fertilization, minimum oxygen levels required by the embryos for survival as well as the effects of oxygen depletion following exposure to model sediments were determined. No significant effects on zebrafish embryo development were observed for oxygen concentrations between 7.15 and 3.33 mg/L whereas at concentrations between 3.0 and 2.0 mg/L minor developmental retardations were observed, yet without any pathological consequences. Oxygen concentrations lower than 0.88 mg/L were 100 % lethal. In the sediment contact tests with zebrafish embryos, native sediments rich in organic materials rapidly developed strongly hypoxic conditions, particularly at the sediment-water interface (0 to 500  $\mu$ m distance to the sediment)

Key-words: zebrafish embryo test, sediment contact test, hypoxia, oxygen depletion