

Gill histological and oxidative stress evaluation in the *Oreochromis niloticus* exposed to Red 195 Dye

Insaf Ayadi^{1,5,*}, Mariza Monteir², Marc El Beyrouthy³, Lara Hanna Wakim³, Imed Regaya⁴, Maria Manuel Oliveira⁵, Francisco Peixoto⁵, Wissem Mnif^{1,*}

1: LR11-ES31 Laboratory of Biotechnology and Valorisation of Bio-Géo Ressources, High Institute of Biotechnology of Sidi Thabet, Biotechnopole of Sidi Thabet, 2020, Tunisia.

2: Laboratory of biology and ambient, UTAD- University of Trás-os-Montes and Alto Douro, Vila Real, Portugal.

3: Department of Agricultural Engineering, Faculty of Agricultural and Food Sciences, The Holy Spirit University of Kaslik (USEK), B.P. 446, Jounieh.

4: Higher Institute of Environment Sciences and Technologies of Borj Cédria- University of Carthage, Tunisia

5: Laboratory of Biochemistry, UTAD- University of Trás-os-Montes and Alto Douro.Vila Real, Portugal.

Corresponding author: *Email: w_mnif@yahoo.fr / insaf@utad.pt

Abstract:

In this work, we study the relation between biochemical and histological changes in gill exposed to red 195 dye in tilapia *Oreochromis niloticus*. Tilapia were fed and exposed to different concentrations (0.05; 0.1 and 0.2 mg/L) of the dye for three weeks (7, 14, and 21 days). During each week, we performed the dissection of 12 fishes after measuring their weight, their lengths and determined their sexes. The gills of each fish were removed. A portion of the gills were crushed and homogenized in phosphate buffer (KH₂PO₄, pH 7, 4) and then centrifuged at 16000 g for 20 min at 4°C. The supernatant used for the enzymatic assays (CAT, GST and GR). CAT activity was measured with a Clark-type oxygen electrode (Hansatech®, Del Rioetal., 1977). GST and GR activity were determined by the spectrophotometer (Variant-Cary®50, Carlberg and Mannerviek, 1985). The other part of the gills are placed in cassettes and after in formaldehyde for histological section.

In gills, the results showed that CAT activity decreased at the highest dose after 14 and 21 days of exposure compared to the control. Although, GST activity was increased at the highest dose after 14 and 21 days of exposure, but GR activity was increased slightly after 7 and 21 days of exposure, compared to the control. Furthermore, the observation of histological changes of gill showed severe lesions, such as lamellar fusion and necrosis.

Keywords: Red 195 dye, Tilapia, Antioxidant Enzymes, Gill, Histological, oxidative stress