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Plasma total oxidant/antioxidant status in *Dicentrarchus labrax* after exposure to experimental hypoxia, hyperoxia and hypercapnia

P. Di Marco[a], A. Priori[a], M.G. Finoia[a], T. Petochi[a], G. Marino[a], G. Lemarié[b], M. Alexis[c], A. Alberti[d] and D. Macciantelli[d]

[a] ICRAM Central Institute for Marine Research, Italy
[b] Ifremer, Palavas-les-Flots, France
[c] HCMR, Hellenic Centre Marine Research, Greece
[d] ISOF–CNR, Italy

With respect to other vertebrates, fishes are more susceptible to in vivo lipid peroxidation due to their large amounts of long-chain polyunsaturated fatty acids, which are labile and easily oxidizable. This study aimed to investigate the effects of long-term exposure to hypoxia (3 mg/l O2 for 7 weeks) hyperoxia (up to 250% O2 saturation for 8 weeks), hypercapnia (up to 50 mg/l CO2 concentration for 5 weeks) and combined hyperoxia–hypercapnia (up to 230–250% O2 saturation+50–60 mg/l CO2 for 9 weeks), on plasma total oxidant and antioxidant status in cultured sea bass. Reactive oxygen metabolites (ROMs) and plasma total antioxidant capacity (TAC) were measured by two complementary assays based on Fenton's reaction, the d-ROMs Test and the OXY Adsorbent Test (Diacron International, Italy). The d-ROMs Test was previously validated on fish sera samples by ESR spectroscopy. The different treatments did not significantly affect plasma ROM concentration (2-way ANOVA PN0.05). A transient increase was measured in response to both hyperoxia and hypercapnia and initial values were recovered at the end of the experiment. Conversely, all treatments produced significant effects on total antioxidant capacity (2-way ANOVA Pb0.05). An increase was observed under hypoxic conditions, probably due to an adaptive mechanism to cope with oxidative stress arising from tissue reoxygenation. An impairment of total antioxidant defences was measured in response to severe hyperoxic conditions, suggesting an increased risk of oxidative stress for sea bass.