(0.179±0.05 μmol/min/mg ptn) in relation to CTR (0.140±0.01 μmol/min/mg ptn). CAT activity was not affected by the exposure to GWSF. Complementary analyses considering these enzymes activities in other tissues, such as digestive gland, are in course for the better understanding of gasoline effects in *C. fluminea*. Financial support: CNPq.

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16.P13. Na^+/K^+-ATPase activity in the fish gills of *Pimelodus maculatus*

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Adenosine triphosphates (ATPases) are a group of enzymes that plays an important role in intracellular functions and are considered to be sensitive indicator of toxicity. Fish gills serve as the major organ for respiration and osmoregulation and the Na^+/K^+-ATPase plays a key role in osmoregulation to maintain Na^+, K^+ and Cl^- concentration in the blood. Seasonality and the changes in the quality of the water can influence in the activity of this enzyme which is related with the active or mature branchial chloride cells differentiation (increase in the activity of the enzyme); or still young or in apoptosis and necrosis (reduction of the enzymatic activity). Furthermore, the increase use of pesticides cause general deterioration of the environment and the widespread use of pesticides may affect the natural population of aquatic fauna. The present study was carried out to evaluated the activity of the gill Na^+/K^+-ATPase in *Pimelodus maculatus* collected in five upstream sites of Furnas Power Plant, MG, Brazil, in June and December/2006. The gills of the fish were removed and the Na^+/K^+-ATPase activity determined. The results showed great variability of Na^+/K^+-ATPase in the fish collected in different sites of the Furnas Lake. These differences may be due to seasonality and possible water quality. Financial support: Furnas Centrais Elétricas S.A., FAPESP, CNPq, CAPES.

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16.P14. Chloride cell density in the gills of the erythrinid fish, *Hoplias malabaricus*, after exposure to deionized water and hypoxia

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The effects of deionized water (DW, 24 h and 48 h) and hypoxia exposure (H, PO_2=25 mm Hg) on the chloride cell (CC) density were investigated in the gills of the erythrinid fish, *Hoplias malabaricus*, that lives in hypoxic and ion water poor waters and did not present CC in the lamellar epithelium as the other species that live in the same environmental water. CC was identified by Na^+/K^+-ATPase immunocytochemistry (IgGα5) and the number of strongly stained (SCC) and weakly stained CC (WCC) were determined. The CC is rare in the lamella (L) and usually found in the filament (F) epithelium of gills in *H. malabaricus* in control (C) groups in normoxia (N). After 24-h exposure to DW, the number of CCs increased significantly in F and L showing higher increasing of SCC in the lamella; however, following 48-h DW exposure, there was a reduction on the CC number. Control fish exposed to hypoxia (HC) increased the CC number on both filament and lamella being higher the number of SCC. Fish exposed to DW and H showed a significantly lower number of CC in relation to group NDW and HC on both 24 and 48 h of exposure although after 48 h of HDW exposure, the CC number was higher than the 24-h exposure. The proliferation of the CC in the lamellar epithelium contribute to maintain the ionic homeostasis, but the CCs in the lamella increase the water–blood barrier diffusion distance and consequently may reduce the transference of gases (O_2, CO_2). The lower increase of CC density, predominantly in the Ls, in fish submitted to two kinds of stress may partially preserve, until certain limit, the efficiency of cascade of O_2 until the tissues as well the ionic equilibrium. Financial Support: CNPq, FAPESP, CAPES.

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16.P15. Branchial osmoregulatory response to salinity challenge in the Lusitanian toadfish

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Halobatrachus didactylus, a marine teleost found in coastal lagoons and river estuaries is often exposed to important salinity changes. Despite its aglomerular kidney, it is able to survive in hypo-osmotic environments, likely via compensatory actions from gills and intestine. We aimed at evaluating the response of the branchial tissue of *H. didactylus* to salinity changes. Fish allocated into 15 groups were exposed to different salinities (0, 5, 12, 36 and 55 ppt) for 4, 24 and 96 h. At each time point, blood samples were taken and osmolality, glucose and ion concentration determined. Fish were sacrificed and gill samples collected for measurement of Na^+/K^+-ATPase activity and fixed

for histology and immunohistochemistry. Mortality occurred only in the 0 ppt group, in which all fish died within 48 to 96 h. Blood osmolality was significantly conditioned by environmental salinity, increasing at 55 ppt and dropping at 5 and 0 ppt. At 4 h, glucose levels were higher in fish in altered salinity than in those in the 100% seawater group, possibly an indication of the adaptive effort required. Adjustments in Na^+/K^+-ATPase activity were seen at 24 and 96 h after transfer, in a characteristic u-shape, peaking at extreme low and high salinities. Contrary to most teleosts, the chloride cells in *H. didactylus* are located in the secondary lamellae and not in the primary filament. Salinity acclimation did not change cell distribution. *H. didactylus* are capable of swift and significant branchial adjustments to ambient salinity and further studies are needed to evaluate the role of kidney and intestine in the osmoregulatory response.

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16.P16. Naphthalene effect on kingfish (*Atherinella brasiliensis*) metabolic rate

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Naphthalene, when introduced in water environment by discharges of oil products, may change the vital functions of organisms and their energetic metabolism. Its effects on the metabolic taxes can be evaluated by the oxygen consumption, which is the objective of the present work. Fish were collected with seines on Praia da Enseada, Ubatuba (SP), and maintained on three treatments for 96 h. After exposure, fish were placed in individual respirometers and acclimated for 90 min, in clean water. Respirometric chambers were sealed for about 60 min and the concentration of dissolved oxygen were determined by the Winkler (1888) method in water samples collected in the respirometers. On the second treatment, other 6 individuals were exposed to 1.7 μL/L of dimethylsulfoxide (naphthalene solvent) for the same period and on the third treatment, the last fish were exposed to 1 μM of naphthalene for 24 h. After these treatments, concentrations of O_2 were determined following the same procedures described above. Results were tested by using one way ANOVA. Survival rates of the organisms were 100%. The results showed a meaningful raise in the consumption of O_2 by the fish exposed to naphthalene (ANOVA, $p<0.05$) in relation to control and DMSO. The exposure of fish to a sublethal concentration of naphthalene caused changes on their metabolism and oxygen consumption, what interferes on the individual survival.

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16.P17. Antioxidant defenses and oxidative damage in the different body regions of the estuarine polychaeta *Laeonereis acuta* exposed to copper

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Copper can induce oxidative stress through Fenton and Haber–Weiss reaction. Previous studies showed the existence of a corporal gradient of enzymatic antioxidant defenses in the estuarine polychaeta *Laeonereis acuta* (Nereididae), suggesting the possibility of differential toxic responses to copper according to the body region. The aim of the present study was to analyze enzymatic activities, total antioxidant capacity (TOSC) and generation of reactive oxygen species (ROS) in the anterior (A), middle (M) and posterior (P) body regions of *L. acuta* exposed to copper (Cu). The catalase activity gradient observed in control group (lowest in A, highest in P; $p<0.05$) was abolished in Cu-exposed group ($p>0.05$). Glutathione-*S*-transferase activity in A region of Cu group was higher ($p<0.05$) than in A region of control group. TOSC values showed no differences ($p>0.05$) against hydroxyl radicals, although antioxidant competence against peroxyl radicals was higher ($p<0.05$) in control group than in Cu-exposed group. No evidence of lipid peroxidation was registered after copper exposure ($p>0.05$) but DNA damage was higher ($p<0.05$) in the A region of the Cu group with respect to the other regions and treatments. Since copper accumulation was similar in the different body regions ($p>0.05$), sensitivity to copper in A regions seems to be related to lowest catalase activity, leading to a higher H_2O_2 concentration, a known precursor of hydroxyl radical in the presence of copper. In vitro assays showed that copper and hydrogen peroxide can induce ROS formation in all regions, although with different sensitivity in different body regions.

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16.P18. Microcystins affect antioxidant competence against peroxyl radicals in different organs of the fish *Jenynsia multidentata* (Jenyns, 1842) (Anablepidae)

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Several cyanobacterial blooms have been registered in estuarine environments. Some cyanotoxins like microcystins (MCs) inhibit phosphatase enzymes and promote oxidative stress. MC is considered a hepatoxin, but recent studies