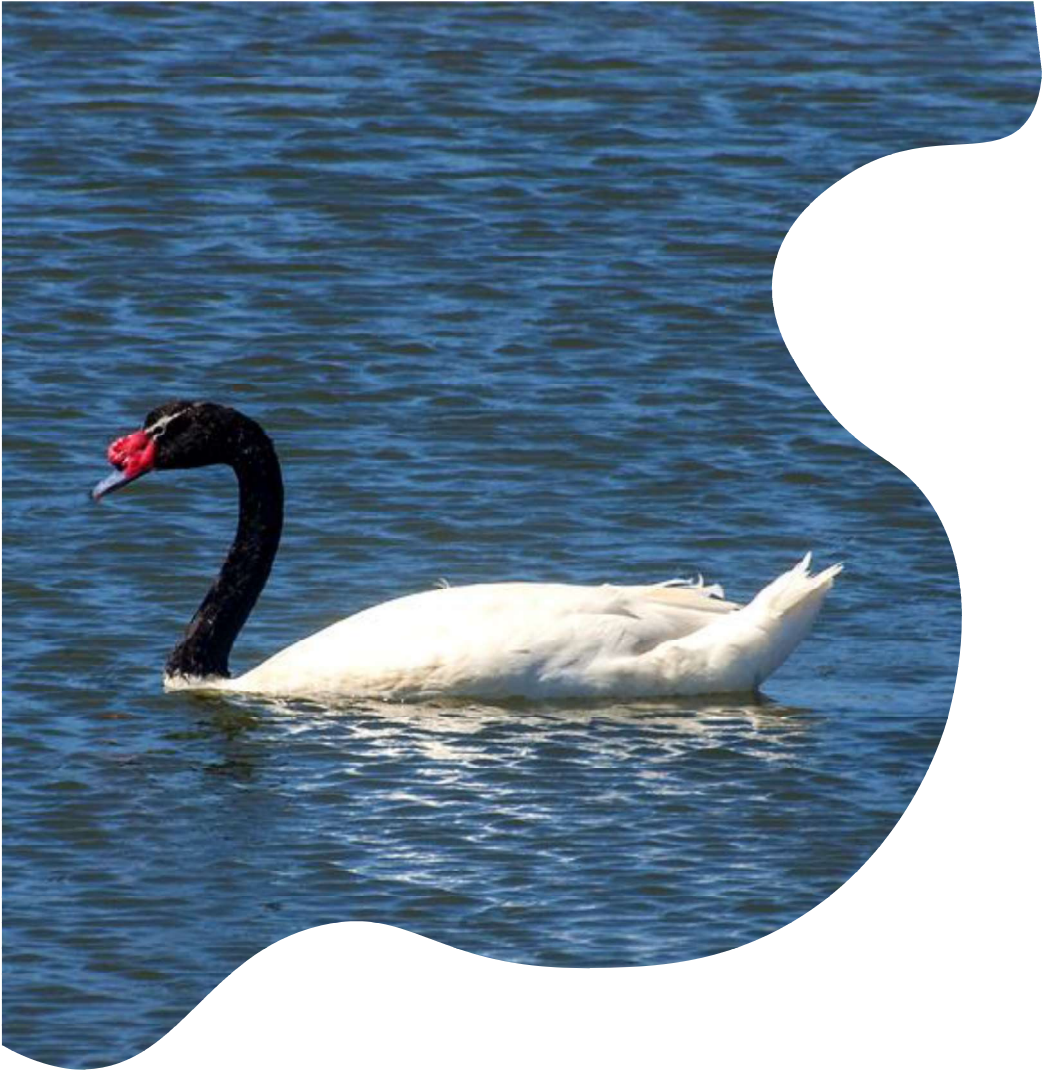

Abstract Book

SETAC Latin America 14th Biennial Meeting

Latin America, Diversity of Knowledge for a Sustainable Future

26–29 SEPTEMBER 2021 • VIRTUAL

Abstract Book

SETAC Latin America 14th Biennial Meeting

Table of Contents

Abstracts by Session

01A. Effects and Risks of Pesticide Used in Agriculture I 4
01B. Effects and Risks of Pesticide Used in Agriculture II 9
02. Micro- and Macroplastics Pollution 13
03. Chemistry and Exposure Assessment....19
04. Contaminants of Emerging Concern 27
05. Traditional Knowledge, Policy, Management and Communication 36
06A. Aquatic Toxicology, Ecology and Stress Response I....40
06B. Aquatic Toxicology, Ecology and Stress Response II....52
07. Ecotoxicology of Birds and Mammals: Novelty and Challenges....63
08. Endocrine Disruptors Compounds: Environmental Presence and Effects 67
09. Behavioral Ecotoxicology: Where Organism and Population-level Effects Meet 71
10. Engineering, Remediation and Restoration 75
11. Sources, Fate and Effects of Pollutants in Marine Ecosystems....79
12. Environmental Toxicology and Stress Response 82
13. Terrestrial Ecotoxicology and Ecosystem Services....87
14. Environmental Impact of Mining and Other Industrial Activities 94
15. Alternative Approaches to Animal Testing in Ecotoxicity and Risk Assessment....97
16. Occurrence and Risks of Pollutants in Latin America 102

Indices

Keyword Index 109
Author Index....113

This book comprises the abstracts of the presentations for the platform and poster sessions of the Society of Environmental Toxicology and Chemistry (SETAC) Latin America 14th Biennial Meeting, conducted virtually from 26–29 September 2021. The abstracts are reproduced as accepted by the Scientific Program Committee and appear in numerical order. In each abstract, the presenting author's name is underlined. The author index cross-references the corresponding abstract numbers.

las tasas de remoción de color y conductividad en el caso del efluente secundario de celulosa kraft, y sobre la remoción de hierro en el caso del agua subterránea. En general, se apreciaron porcentajes de remoción entre 20 hasta 60% de cada uno de los contaminantes.Esta investigación abre nuevas alternativas para desarrollar tratamiento de aguas con contaminantes de diferente naturaleza (metales o moléculas orgánicas), en aguas tanto de origen industrial como natural.

11. Sources, Fate and Effects of Pollutants in Marine Ecosystems

11.01 Methylmercury Biomagnification in Coastal Aquatic Food Webs From Western Patagonia and Western Antarctic Peninsula

G. Chiang, Universidad Andrés Bello / Facultad de Ciencias de la Vida, Departamento de Cs Biológicas; K.A. Kidd, McMaster University / Department of Biology and School of Geography and Earth Sciences; M. Diaz-Jaramillo, Instituto de Investigaciones Marinas y Costeras CONICET-Universidad Nacional de Mar del Plata; W.E. Espejo, Universidad de concepcion / Animal Science; P. Bahamonde, University of Playa Ancha; N.J. O'Driscoll, Acadia University / Earth and Environmental Science; K.R. Munkittrick, University of Calgary / Biological Sciences

Mercury (Hg) is a global pollutant of concern because its organic and more toxic form, methylHg (MeHg), bioaccumulates and biomagnifies through aquatic food webs to levels that affect the health of fish and fish consumers, including humans. Although much is known about trophic transfer of MeHg in aquatic food webs at temperate latitudes in the northern hemisphere, it is unclear whether its fate is similar in biota from coastal zones of the southeastern Pacific. To assess this gap, MeHg, total Hg and food web structure (using $\delta^{13}C$ and $\delta^{15}N$) were measured in marine macroinvertebrates, fishes, birds, and mammals from Patagonian fjords and the Antarctic Peninsula. The trophic webs in Patagonia were shown to have a much more vertical structure than in Antarctica. Thus, the $\delta^{13}C$ values in Patagonia varied between -7 and -18 $^{0}/_{00}$ at the site near the mouth of the Marchant River, while for the offshore site it varied between -10 and -16 $^{0}/_{00}$. For Antarctica, both sites showed a greater amplitude of trophic width, with values from -14 to -30 $^{0}/_{00}$ $\delta^{13}C$. In Patagonia, MeHg levels vary from 0.0019 mg kg^{-1} in filter feeders to 1.4625 mg kg^{-1} in predatory benthic fish. Meanwhile, in Antarctica the lowest levels were found in krill with 0.003 mg kg^{-1} and 10.797 mg kg^{-1} in elephant seals. Food web in Patagonia showed Trophic magnification slopes (TMS; log MeHg versus $\delta^{15}N$) for coastal food webs of Patagonia were high when compared with studies in the northern hemisphere, and significantly higher near freshwater inputs as compared to offshore sites (0.244 vs 0.192). Similarly, in Antarctica, the site closer to glacial inputs had a significantly higher TMS than the one in the Southern Shetland Islands (0.132 vs 0.073). Composition of the food web also had an influence, as the TMS increased when mammals and seabirds were excluded (0.132–0.221) at a coastal site. This study found that both the composition of the food web and the proximity to freshwater outflows are key factors influencing the TMS for MeHg in Patagonian and Antarctic food webs.

11.02 Concentration and Distribution of Polycyclic Aromatic Hydrocarbons in Oysters From Todos Os Santos Bay (Bahia, Brazil)

A.B. Martins, UFBA / Institute of Geosciences of UFBA; . Moreira, Federal University of Bahia; V. Hatje, Universidade Federal da Bahia / Centro Interdisciplinar de Energia e Meio Ambiente; A. de Assis, Federal University of Bahia; A. Barbosa, Federal University of Bahia / Department of Oceanography

Aquatic environments located near urban and industrial areas represent regions vulnerable to the presence of contaminants, such as Polycyclic Aromatic Hydrocarbons (PAHs) whose main sources for the environment are anthropic. Among these, we can mention oil (and derivates) spills, or deposition of compounds formed in the fossil fuels burn. Because they promote toxic effects, there is an interest in studying the concentrations, distribution, and sources of these compounds to aquatic systems. Bivalves are one of the main biomonitors of PAHs contamination studies because they have a wide geographical distribution, are sessile and filter large volumes of water, concentrating the contaminants present in the place where they are found. Besides, they are widely consumed by humans. These characteristics make bivalves good sentinel organisms. The present study evaluated the contamination of PAHs in oysters (*Crassostrea rhizophorae*) sampled in distinct areas of Todos os Santos Bay (BTS - Bahia, Brazil). This is the second largest bay of Brazil and is subjected to various anthropic activities, as industries, a petrochemical complex, oil refineries, maritime terminal, ports and shipyards. Further, BTS also receives both treated and untreated industrial/domestic sewage. Ten samples of oysters were collected in ParaguaÃu river, Madre de Deus port and Jaguaripe river. PAHs concentrations were determined using a gas chromatography coupled to a mass spectrometer. The highest concentrations of total PAHs were found in Madre de Deus port (36.3 to 37.8 ng g^{-1} in dry weight, dw). This region has industries, ports, and a petrochemical complex. In the Paragua!! river estuary, the concentrations were intermediate (23.2 to 25.7 ng g^{-1} dw). The region of the Jaguaripe river presented the lowest concentrations (1.7 to 32.4 ng g^{-1} dw). This area is relatively well preserved and has few direct sources of contaminants. Through the use of diagnostic ratios and the presence of high molecular weight PAHs, it was observed that the main sources of PAHs to the areas are pyrolytic. The toxic equivalence quotient estimated values for Benzo[a]pyrene found ranged from 0.28 to 4.17. A few stations in the Paraguaçu river and in Madre de Deus showed values above the acceptable levels for risk of cancer.

11.03 A Chemo-Metric Approach to Assess Heavy Metal Pollution Status in a Human Impacted Coastal System

D. Truchet, Instituto Argentino de Oceanografía (IADO, CONICET-UNS); C. Negro, Instituto de Limnología INALI-CONICET; N.S. Buzzi, Instituto Argentino de Oceanografía (IADO, CONICET-UNS); C. Mora, Instituto de Limnología INALI-CONICET / Chemistry; M.G. Ardusso, F. García, Instituto Argentino de Oceanografía (IADO, CONICET-UNS); J.E. Marcovecchio, Instituto de Oceanografía / Oceanografía Química

Estuaries are among the most threatened coastal environments since they receive several pollutants from riverine discharges, large urban settlements, industries and ports. Human pressures are enhanced in developing countries of South America, such as Argentina, where the biota is at risk due to several pollutants (metals, POPs and microplastics), and therefore, biomonitoring of these areas is highly recommended. However, few studies have achieved this concern and the scientific tools displayed in an integrative way where abiotic and biotic matrices are combined using multiple indices were even less studied. The current study compared metal concentrations (Cd, Cu, Pb, Zn, Mn, Ni, Cr, Fe) in sediments and a resident benthic crab species, *Neohelice granulata* and the biochemical biomarkers (CAT, GST, H_2O_2, MT) in this organisms in a salt marsh (SM) and a mudflat (M) in different

stations (autumn and spring) of a SW Atlantic estuary (Bahía Blanca estuary, BBE) in Argentina. This area is currently influenced by several industrial and domestic discharges, ports and large scale fisheries. Metals in sediments did not exhibit significant differences between sites and seasons, except for Mn that was higher in SM during spring. Crabs bioaccumulated more Cu from sediments during autumn than spring for both sites. Except for Cd in M, Mn, Ni and Fe in SM, metals did not exhibit significant differences between sites, but tended to increase in autumn at both sites. Through geochemical indices, it was observed that sediments were low to medium polluted with probable adverse biological effects to the biota. Some of the biochemical analyses applied (i.e., IBR) demonstrated high values in the SM during spring with a great contribution of H_2O_2 and GST. By multivariate analyses (Pearson correlations and PCA), it was possible to observe that the biomarkers induction might be due to natural intrinsic factors such as energetic costs for reproduction and not strictly metallic pollution. But also, it should be considered that during spring, the available organic matter in the estuary is higher and specifically in the SM that also uptakes metals coming from plants. These metals are ultimately incorporated into the body burden of organisms and some correlated metals like Zn, Cu, Mn and Cd can cause biomarkers induction.

11.04 Oxidative Responses As Biomarkers of Polycyclic Aromatic Hydrocarbons (PAHs) Pollution in Ramnogaster arcuata

T.V. Recabarren Villalon, Instituto Argentino de Oceanografía (IADO, CONICET-UNS); A.C. Ronda, The Argentine Institute of Oceanography; L. Girones, P. Palacios, M. Orazi, A. Oliva, A. Arias, Instituto Argentino de Oceanografía

Polycyclic Aromatic Hydrocarbons (PAHs) are a global concern. Due to their ubiquitous presence and their impacts on organisms, PAHs have become a major threat to the health of the marine ecosystem. To assess their impacts, the use of biomarkers are useful early warning tools for biological effects detection in environmental quality studies. The present work assessed relations between muscle 17 PAHs and oxidative stress biomarkers in liver and muscle of an estuarine-resident fish: *Ramnogaster arcuata*. Specifically, lipid peroxidation (evaluated by thiobarbituric acid-reactive substances; TBARs), tripeptide glutathione (GSH) and glutathione S-transferase activity (GST) were determined in liver and muscle tissues. Fish were captured seasonally in Bahia Blanca estuary (BBE), an area highly impacted with one of the most important petrochemical parks of South America. The PAHs levels observed for *R. arcuata* were between minimally and moderately polluted (range: 5.14-340.31 ng/g w.w.), being the highest level observed in summer represented by a mixture of petrogenic and pyrolytic sources. Spearman correlation analyses showed positive correlations ($p < 0.05$) of total PAHs (Σ17 PAHs) with hepatic TBARs (0.66) and muscle GSH (0.62). Also, correlations with individuals PAHs were found: hepatic TBARs-anthracene (0.96), hepatic TBARs-phenanthrene (0.76), muscle GSH-anthracene (0.79), muscle GSH-naphthalene (0.72), hepatic GST-chrysene (-0.93), and hepatic GST-fluoranthene (-0.69). These results suggest that hepatic TBARs and muscle GSH could be more sensitive biomarkers to chronic pollution of complex mixtures of PAHs. On the other hand, the correlations of individual PAHs suggest that hepatic GST could be a more specific biomarker for 4-ring PAHs, since it only correlates with this group of PAHs. While both hepatic TBARs and muscle GSH could be good biomarkers for petrogenic PAHs. The results of this work increase the understanding about the oxidative stress biomarkers in response to PAHs in *R. arcuata* and confirms that this species is a good bioindicator of the BBE. These results could have a positive influence on future biomonitoring of estuarine areas, allowing the early detection of PAHs effects and the consequent decision-making before irreversible environmental damage occurs.

11.05 Assessment of Health Status of Artemia franciscana Nauplii Exposed to Contaminated Sediments

A. Sobrino-Figueroa, Universidad Autonoma Metropolitana / Hidrobiology; A. Perez-Rojas, Universidad Autonoma Metropolitana Iztapalapa / Limnology and geology Laboratory. Department of Hydrobiology

The BRI Index (Biomarker response index) integrates the response obtained in the evaluation of physiological and biochemical biomarkers that can be evaluated in bioassays with environmental samples. This Index has been used to determine the State of Health of an organism. The objective of this work was to carry out an evaluation of 4 biomarkers in the microcrustacean *Artemia franciscana*, to detect the toxic and genotoxic effects of metals and persistent organic compounds (POCs) present in sediment samples, to determine the usefulness of these biomarkers in biomonitoring studies and in ecological risk assessment. The levels of metals and Cops were measured in seven sediment samples and in parallel bioassays were carried out with the nauplii of *Artemia franciscana*, to determine the toxicity of the sediments, in addition the following physiological parameters were evaluated: respiration rate, excretion rate and biomarkers: lipoperoxidation and genetic damage. The data obtained were integrated to establish the biological health status of the exposed organisms. The results indicated that in the multiple correlation analysis, a significant relationship was observed between the concentrations of the metals Cd, Cr, Ni, Pb, V, PAHs and PCBs and the response of the 4 biomarkers ($p < 0.05$). Therefore, the battery of biomarkers used could be a useful tool for environmental biomonitoring and ecological risk studies.

11.06 Assessment of the Toxic and Neurotoxic Effects of Coastal Systems Sediments

A. Sobrino-Figueroa, Universidad Autonoma Metropolitana / Hidrobiology; A. Perez-Rojas, Universidad Autonoma Metropolitana Iztapalapa / Limnology and geology Laboratory. Department of Hydrobiology; S. Alvarez-Hernandez, Universidad Autónoma Metropolitana-Iztapalapa / Applied Ficology Laboratory. Department of Hidrobiology

In our country, studies of the presence and effects of pollutants in aquatic systems are scarce, for this reason the objective of this work was to detect the presence of compounds with a toxic and neurotoxic effect in sediments of 4 coastal lagoons located in the state of Veracruz: La Mancha, Farallon, El Llano and Laguna Verde, in addition to 2 beaches located in the Mexican Pacific: Papanoa and the Gatas Gro. Sediment samples were collected in each coastal lagoons and the supralittoral zone of the beaches. To evaluate the presence of toxic compounds, bioassays were performed with *Artemia franciscana* nauplii (NMX - AA-110). And for the detection of neurotoxic compounds, an *in vitro* test was implemented. The results obtained show that the degree of toxicity of the sediments was (from the most toxic to the least toxic): El Llano> La Mancha> Laguna Verde> Laguna Farallón. on the beaches: Las gatas> Papanoa. Of the total of 22 samples (100%), 45% of the samples (10 samples) did not present compounds with neurotoxic effects. The percentage of inhibition of the activity of the enzyme AchE, ranged from 55 to 14% in the tests. The highest values of AchE inhibition were recorded in the sediments of the La Mancha and Llano lagoons and the beach Las gatas. The evaluation of the Ache enzyme