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Brazilian national and state legislations establish that Ecological Risk Assessment (ERA) should be carried out in contaminated sites where ecological assets must be protected. There are several manuals and international standards establishing ERA methodology, however, in Brazil, a National Standard, that was under discussion by the Brazilian Technical Standards Association (ABNT) was not finalized. In São Paulo, the State Environmental Agency (CETESB) reviewed its "Procedures for the Management of Contaminated Sites" in 2017, establishing some guidelines for the execution of an ERA. ERA will be required whenever there is a natural ecosystem, defined as a fragment of legally protected vegetation, in a Conservation Unit of Integral Protection under the influence of a contaminated site. In areas that are close to water bodies, compliance of water quality standards and requirements is established. Nevertheless, in other processes such as authorizing the use of products in aquatic environments, assessing the impact of introducing exotic species or permits in areas with special ecological interest, an ecological risk assessment may be requested, at CETESB's discretion. Due to the current regulation, several ERA are already underway in processes involving contaminated sites, and the proposed methodologies are evaluated on a case-by-case basis. Some issues have already been identified such as the lack of knowledge of wildlife receptors habitat, home-range and diet, to establish exposure and intake of chemical using models, generating high uncertainties in risks prediction. In order to establish appropriate methodologies to local problems, involving both terrestrial and aquatic ecosystems CETESB is developing a Technical Guidance for ERA in the State of São Paulo. These guidelines consider different lines of evidence and the evaluation of direct and indirect structural and functional effects on the spatial and temporal scales of the ecological receptors. It is based on problem formulation, with a conceptual model of ecological risk and a study design, with emphasis on field data, in order to characterize and interrelate exposure and effects to which the selected receptors may be subjected, as a result of either chemical, physical or biological stressors. ERA can be developed in stages and is finalized when CETESB and other stakeholders consider that there is enough confidence in the results of risk evaluation for decision making on risk management.

WP067 Cytotoxic effects of losartan in marine ecosystems in different ocean acidification scenarios

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In Brazil, deep oil exploration activities include the injection of CO_2 to increase the pressure to remove oil from the wells, thus increasing the efficiency of the extraction system. This technique is used, among other reasons, to decrease the input of CO_2 concentrations from anthropogenic sources in the atmosphere. Since the last decade, several studies have reported the presence and effects of drugs in the marine environment, especially the antihypertensive class, such as losartan, which is mostly used by the elderly population. However, there is little knowledge about the occurrence and physiological effects of losartan in marine invertebrates, especially regarding its behavior in the face of a possible ocean acidification scenario. Given this context, the aim of this study was to evaluate the occurrence and effects related to the cellular stress (LMS) of losartan on *Perna perna* and *Mytella guyanensis* mussels exposed to contaminated and non-contaminated water and sediment samples, respectively, considering the influence of predicted marine acidification until the end of the century (pH 8.0 - 7.6 - 7.3). Water and sediment samples were collected at 5 points around the launch of the Santos submarine outfall. Losartan was observed at all sampling points, with concentrations ranging from 1.37 - 7.63 µg/L in water and from 0.08 to 3.10 µg/g in sediments. With regard to water cytotoxicity assays, after 96 hours of exposure, the LMS of *P. perna* mussels significantly decreased from the concentration of 3000 µg/L when compared to the control group at pH 8.0 and 7.6. However, the toxic effects were more severe in organisms exposed to pH 7.6. Already in the results of the *M. guyanensis* sediment trials under exposure to losartan after 96h of exposure, the LMS decreased significantly at concentrations 3; 30; 300 µg/L compared to control at pH 8.0 and 7.6. It was observed significant differences related to more severe effects at pH values of about 7.6. At pH value of 7.3 there was only significant difference in the concentration of 300 µg/L. From the obtained results, it was proved that the marine acidification process by means of an increase of the proton concentration activate and increase the effects of losartan in the different matrices used in this study. This study demonstrated the importance of deepening drug-related toxicology and pH changes in the marine environment, as increased drug toxicity was observed when subjected to the acidification process.

WP068 Acute toxicity assessment for binary and tertiary mixtures containing fluoxetine, propranolol and diclofenac to microcrustacean and zebrafish embryos

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Pharmaceuticals are essential for treatment and prevention of several diseases and for the maintenance of human and animal's life quality. Due to the increasing use of pharmaceuticals worldwide, many actives substances are currently detected in µg.L-1 and ng.L-1 in different environmentals matrices such as surface water, ground water, soil and sediment. Many of these emerging pollutants are recalcitrant to biological treatment process in WWTPs and they may cause ecotoxicological effects on organisms and also possible to reach the human food chain. Pharmaceuticals are frequently detected as mixtures and may induce toxic effects to aquatic organisms, producing synergistic, additive or antagonistic toxic effects. Fluoxetine hydrochloride (FXT) is a selective serotonin reuptake inhibitor, prescribed as an antidepressant. Propranolol (PRP) is a beta-adrenergic blocker widely prescribed for the treatment of cardiovascular diseases and diclofenac sodium (DIC) is a non-steroidal anti-inflammatory drug, often recognized as the "world's

most popular pain killer". These compounds are worldwide used for healthy treatment and also often detected in aquatic environments. This work aims to assess the toxicity of three pharmaceutical individually and in a mixture for both Daphnia similis and zebrafish embryos. The results of individual acute toxicity showed that the microcrustacean was more sensitive to FXT (EC50 = 1.08 mg/L), PRP (EC50 = 5.92 mg/L) and DIC (EC50 = 25.0 mg/L), respectively, while for zebrafish embryos, it was only calculated LC50 of 30.5 mg/L for DIC, after 48h exposure. Antagonistic effects of binary mixtures of FLX + PRP (EC50 = 9.38%) and FXT + DIC (EC50 = 24.2%) were observed to D. similis. For Danio rerio embryos, binary mixture of FLX + DIC (LC50 = 82.1%) presented antagonistic effects, while no acute toxicity was observed for the of FXT + PRP mixture. Tertiary mixture of the three compounds showed an antagonist effect (EC50 = 5.57%) for the microcrustacean and additive effect for zebrafish embryos (LC50 = 87.5%). In conclusion, most of the binary mixture resulted in antagonistic effects, in which the response of acute toxicity depended on the organism and type of pharmaceutical mixture. Therefore, it is necessary further studies to assess the toxicity of different mixtures.

WP069 An Integrative Analysis of the Effects of Neonicotinoids on the Ruby-throated Hummingbird, Archilochus colubris.
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Neonicotinoids are the most widely used class of insecticides globally, due to their high efficacy and apparent target specificity. Although exposure is known to occur in a variety of non-target organisms, effects on these systems are largely unquantified. This is especially concerning for hummingbirds, which experience exposure through the floral nectar that supports their extreme metabolisms. To respond to this concern, we measured the sublethal cellular, physiological, and behavioral effects of imidacloprid, a common neonicotinoid, on ruby-throated hummingbirds (Archilochus colubris). Birds were exposed to one of three field-realistic dosing conditions (control, 0.172 mg/kg, and 2.5 mg/kg) once per day for three days prior to terminal sampling. Cholinesterase activity assays in brain and flight muscle showed no effects of imidacloprid exposure in hummingbirds. Contrarily, birds' metabolic rates (VO2) showed significant dose-dependent decreases within 2 hours after dosage. Metabolic rates did not differ between control and dosed birds 24 hours after exposure demonstrating an acute effect on activity immediately after exposure. Measurements of thermal and metabolic responses provided insight into how imidacloprid exposure affects daily energy budgets. No emergent trends arose between torpor propensity and exposure to the pesticide from preliminary data analyses, though body mass did show a significant decreasing trend in either of the dosage conditions. Oxidative damage biomarkers were quantified to elucidate the non-specific effects of detoxification in liver and muscle tissues. The stress-induced suppression of the humoral immune response to imidacloprid was determined through relative heterophile to lymphocyte ratios. Additionally, feeder tracking ability was tested after dosage, while hovering, preening, and feeding behaviours were indexed to evaluate how toxic effects may be expressed on a whole-organism level. This novel integrative study highlights the deleterious off-target effects of one of the most widely used agrochemical in Canada. Researching these effects is critical in the prevention and remediation of the consequences that arise from anthropogenic activities on ecosystems near and within agriculture.

WP070 Rodenticides as regulators of epigenetic control: In silico evaluation of pesticides as potential modulators of human DNA Methyltransferases
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DNA methyl transferases (DNMTs) are the determining enzymes in DNA methylation processes during gene expression. The environment and many chemicals have shown modulation of epigenetic functions by inhibiting DNMTs, including pesticides. In this study, human DNMTs were evaluated as potential target for pesticides through virtual screening of 1038 pesticides on DNMT1 (3SWR, 3PTA) and DNMT3A (2QRV). Molecular docking calculations for DNMTs-pesticide complexes were performed using AutoDock Vina. Binding-affinity values and contact patterns were employed as selection criteria of consensus pesticides as virtual hits for DNMTs. The best three DNMT-pesticides complexes selected according to their high absolute affinity values (kcal/mol) for both DNMT1 and DNMT3A were Flocoumafen (-12.5; -11.7; -9.9), Brodifacoum (-12.4; -11.6; -8.4), Difenacoum (-12.1; -10.8; -8.7). These chemicals belong to second generation rodenticides. The most frequent predicted interacting residues for DNMT1-pesticide complexes were Trp1170A, Phe1145A, Asn1578A, Arg1574A and Pro1225A; whereas for DNMT3A those were Arg271B, Lys740A, and Glu303B. These molecular docking results were validated *in silico* using re-docking and dynamics simulations, as well as correlating docking results with experimental data. These results suggest that rodenticides used for pests control are potential DNMT ligands and therefore may modulate DNA methylations. Although the *in silico* analysis of DNMT inhibition is a complex process that includes not only the enzyme itself, but also small-size factors and other macromolecules, these results should encourage the designing of new DNMT ligands as drug-like candidates for the control of methylation processes in several diseases, where epigenetics plays a fundamental role.

WP071 Microplastic interaction with 17α ethinyl estradiol: effects on tropical oyster Crassostrea brasiliana
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Nowadays the use of personal care products containing exfoliating plastic particles is raising concerning because they can cause impacts on aquatic environments. Due to improper disposal and loss during use, microbeads end up in sewage collection networks and can interact with a variety of compounds including drugs, such as the synthetic hormone 17α ethinyl estradiol (EE2). Consequently, microplastics can act as a vector of these compounds in the aquatic