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## ABSTRACT BOOK

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(IS) and resident individuals (RES) collected close to the mouth of two tropical estuaries, Bacia do Pina Estuarine System (BPES), and Barra de Jangada Estuarine System (BJES), in the Brazilian northeastern coast. This study is based on the analysis of water concentrations and internal accumulation of bile metabolites of polycyclic aromatic hydrocarbons (PAHs) by fixed fluorescence (FF), as well as biochemical responses related to the biotransformation of contaminants ethoxyresorufin-O-deethylase (EROD) and glutathione S-transferase (GST), and to neurotransmission acetylcholinesterase (AChE). Behavioral activities related to swimming speed and resistance were also evaluated. Individuals grown in the laboratory were used for *in situ* exposure and also as controls (CON) for IS and RES. Significant contamination by PAHs was evidenced from both estuarine systems, with higher phenanthrene and chrysene concentrations in the bile of resident fish at BPES, which in turn partially justified the significant induction of EROD and GST in these individuals. Resident fish at BJES showed high EROD and GST induction that cannot be explained by PAHs contamination, and suggests the presence of other contaminants with mechanisms of action similar to dioxins, possibly from a paper industry. Elevation of GST activity was detected in three of the four sites assessed on both estuaries, and loss of swimming resistance was verified on individuals exposed at the same sites, indicating a correlation between GST and this behavioral effect relevant to survival of the species. Indications of acetylcholinesterase inhibitors were not detected, except at the BPES inner region. This study shows the potential and feasibility of using the guppy *P. vivipara* on the evaluation and monitoring of pollution in estuaries along the Brazilian coast.

#### MO019

##### NEW METHODOLOGY TO DETERMINE BTEX IN SOIL SAMPLES BY HPLC-DAD

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Benzene, toluene, ethylbenzene and xylene, commonly referred as BTEX, are constituents of fossil fuels that cause serious negative impacts on the environment and human health. At fuel stations whose storage tanks are leaking, these substances may in contact with the soil and even reach the groundwater. In order to detect the concentration of these compounds in contaminated soils, gas chromatography (GC) is the most commonly used technique. In the present work it is proposed the use of high performance liquid chromatography coupled to diode array detection (HPLC-DAD) for the determination of BTEX in soil samples. A methodology was developed using as mobile phase methanol and H<sub>2</sub>O acidified with 250 µL of H<sub>3</sub>PO<sub>4</sub> (70:30, v / v), Eclipse XDB C18 column (5 µm x 4.6 x 250mm), flow of 1.5 mL min<sup>-1</sup>, λ = 205nm and T = 50 °C. The analysis was carried out using the Agilent 1220 HPLC system equipped with an automatic injector, a column oven, and a diode array detector. Data were acquired using the OpenLAB A.01.05 software. A calibration curve for BTEX standards was constructed in 7 concentration levels: 1 to 68 ppm for benzene, 1 to 80 ppm for toluene, 1 to 80 ethylbenzene and 1 to 85 for xylene. The curves were submitted to inter- and intra-assay repeatability analyzes. Standard curves with adjustments above 0.991 relative standard deviations (% RSD) of less than 1.9% were obtained. Reproducibility tests were performed with two solutions obtained from the standard solution. In the samples containing analytes from the soil contaminated with gasoline, % RSD was obtained below 6.5% and recovery rate was 68% for benzene and 75% for toluene, 78% for ethylbenzene and 78% for xylene. The method of soil analysis via HPLC is therefore efficient and as an alternative to be highlighted for analyzes of soils contaminated with gasoline. It is intended to validate the methodology using appropriate protocols and apply it in contaminated areas for the verification of BTEX levels in a next step.

#### MO020

##### Petroleum pollution of alluvial sediments near Sava river, Serbia

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Heating plant "New Belgrade" is located on the left coast of the Sava River, about 1km from its estuary in the Danube, and represents a potential source of petroleum pollutants for the alluvial area of the river, ground water as well as Sava river. The aim of our research was to determine the presence of petroleum pollutants and their vertical migration in the alluvial area of Sava river. The investigation was started in the summer of 2015. The soil was sampled in three different microlocations (Z1, Z3 and Z7) up to depth of 15m. The sampled material was organized in the layers, and for all microlocations was made a lithological profile. Most of the samples have had a clayey-sand structure with low content of organic matter. Extraction of petroleum pollutants from soil samples were done using the Soxhlet apparatus with dichloromethane. After extraction, the dichloromethane extracts were then fractionated by column chromatography into fractions of: saturated hydrocarbons (Fraction I), aromatic hydrocarbons (Fraction II), and polar compounds (alcohols and keto compounds (Fraction III) [1]. For monitoring changes in the vertical migration of petroleum pollutants, and the relationship of this migration with the soil characteristics, the group composition was determined for each borehole of all

microlocations, taking into account their lithological profiles. Results of our research showed that in all samples the most represented were polar compounds (Fraction III), while the saturated hydrocarbon were least represented (Fraction I). This trend is almost unchanged in samples from different microlocation at different depths. It can be concluded that composition of petroleum pollutants can be unchanged through the alluvial sediments up to 15m depth and they can reach the underground waters, Sava river and consequently disturb the quality of the environment. References: Miletic S., Ilic M., Avdalovic J., Solevic Knudsen T., Beškoski V.P., Branimir Jovancevic B., Vrvic M.M. (2015) Oil pollution in the vicinity of a heating plant in New Belgrade (Serbia) – influence on the quality of the surrounding soil and sediments. 16th European Meeting on Environmental Chemistry, EMEC16, Book of Abstracts. November 30 – December 03. 2015, Torino, Italy. Acknowledgements This work was supported in part by Ministry of Education, Science and Technological Development of the Republic of Serbia, Project No: III 43004.

#### MO021

##### Prey capture to male aggression: the role of ecologically relevant behaviours in the assessment of complex petroleum based contaminants.

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Crude oil and its associated by-products are ubiquitous in the aquatic environment due to both natural and anthropogenic sources (i.e. oil seeps and rivers flowing over surface bitumen, and pipeline ruptures, grounded ships, storage tank leaks and tailing pond seepage, respectively). This diversity in sources gives rise to a large family of complex contaminant mixtures, including weathered and unweathered oil, unconventional oil, such as diluted bitumen (dilbit), and crude oil extraction-based mixtures, such as oil sands process water (OSPW). Historically, studies focused on lethality and cardiotoxicity; complex behaviours have been, for the most part, overlooked despite the merits of including these endpoints in toxicological studies. In this study, we compared various ecologically relevant behaviours (prey capture, male aggression, reaction to alarm odourant) of developmentally exposed fish (*Danio rerio* and *Cyprinodon variegatus variegatus*) across various contaminants. Exposure to oil-based contaminants did not impair outright function, but instead altered the variation in behavioral phenotypes present in the population of exposed fishes. Previous studies suggest cortisol can be associated with behavioural phenotypes, and that developmental cortisol levels may pre-determine the behavioural phenotypes found in a population of exposed fishes. Complex behaviours are sensitive sublethal endpoints that could be used in the risk assessment of contaminant mixtures. The inclusion of complex behaviours in toxicological studies brings ecological relevance to a biomarker dominated field.

#### MO022

##### Risk-Based Approach: Assessment of Offshore Discharge Waters

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In 2012, OSPAR (Oslo and Paris Conventions) adopted the recommendation 2012/5 for a 'Risk Based Approach (RBA) to the management of Produced Water (PW) discharges from offshore installations'. The application of the RBA recommendations (2012/5) is implemented by the UK's regulator, the Department for Business, Energy and Industrial Strategy (BEIS). The objective of the RBA is to assess the environmental risk of a PW discharge in the OSPAR maritime area. This is achieved by analysing the effluent and added substances to obtain a measure of the risk of the discharge. If the result is out-with the recommended criteria, a Produced Water Management Plan (PWMP) must be adopted to comply with the RBA regulatory requirements. Processing the information generated by the RBA, each PWMP would be specific to the discharged effluent, platform and area, aiming to minimise environmental risk of each PW discharge. The RBA method is compiled of a six- step process. The steps are based on a standard method where a Predicted Environmental Concentration (PEC) and a Predicted No Effect Concentration (PNEC) of the PW or individual products are determined, and a PEC:PNEC ratio is calculated. The PEC:PNEC ratio and Environmental Impact Factor (EIF) which describes a PEC:PNEC ratio in a specified volume of water characterises the potential risk imposed to the receiving environment. With use of a dispersion modelling tool, the fate of the PW and thus the relative environmental risk can be mapped specifically to the installation area providing an overall risk profile. The PW is additionally characterised at a substance level, highlighting components which contribute to the overall environmental risk, and will feed directly into the PWMP. Notably in the UK RBA methodology is the absence of PW WEA concerning sensitivity to fish, and we therefore studied the comparative inference of use of different trophic level species, including fish (*Cyprinodon variegatus*). This study provided unique and important empirical data and information to evaluate significant considerations for implementation of regulatory PW management methodology. In addition to the potential environmental impact and comparative contribution from production chemicals & naturally occurring substances, and validity of the step-wise tiered screening approach, the investigations provided valuable assessment into adequacy and sensitivity of ecologically relevant species and the implications for regulatory monitoring regime.