

< 0.5 ppm; liver < 7.2 ppm; kidney < 1.0 ppm). These significantly higher heavy metal levels and a clear distribution pattern between organs, strongly suggest that there is a rapid intake of heavy metals during the first months after weaning; the presence of Hg and Cd indicates an early predation on fish and squid.

(T/EH023) Accumulation of heavy metals in the La Plata Dolphin (*Pontoporia blainvillei*). Gerpe, M.S.^{1,2,*}, Moreno, V.J.¹, Rodriguez, D.H.^{1,2}, Bastida, R.O.^{1,2} and de Moreno, J.E.¹ ¹Department of Marine Sciences, Mar del Plata University. ²CONICET. Marine mammals accumulate heavy metals in their tissues showing different concentrations according to trophic levels and environmental conditions. La Plata dolphin (*Pontoporia blainvillei*) is a small coastal species endemic of marine and estuarine areas of the Southwestern Atlantic Ocean. Its diet includes numerous species of small fish, squid and crustaceans. The aim of the present paper was to study the heavy metal distribution in different age classes and sexes, to evaluate the accumulation processes and body burden for cadmium, total mercury, zinc and copper. Heavy metal concentrations (wet weight) were determined in eighteen dolphins by Atomic Absorption Spectrophotometry (AAS), by the cold vapour technique (mercury) or with air/acetylene flame (cadmium, zinc and copper). Liver showed the highest concentrations for Hg (max. 8.8 ppm), Zn (max. 29.7 ppm) and Cu (max. 19.0 ppm), whereas the highest Cd concentrations (max. 6.7 ppm) were found in kidney. Adults showed the highest concentrations for all heavy metals, with juveniles and calves in decreasing order, suggesting an age-related accumulation. No differences ($p > 0.05$) were found between sexes within each age class. Body burden distribution were different between juveniles and adults. In the former the highest values for Hg (max. 1.3 mg), Cu (max. 3.7 mg) and Zn (max. 35.8 mg) were found in muscle and the Cd (max. 0.5 mg) ones in liver, whereas in adults was strictly the opposite (2.1, 4.8, 10.4 and 2.2 mg, respectively). We can conclude that *P.blainvillei* accumulates heavy metals and due to its coastal distribution it may be considered as a biomonitor of its environment.

(T/EH024) Levels of trace elements in octopus (*Octopus vulgaris*) tissues: gender and seasonal variations. Seixas, S.^{1,*}, Pinheiro, T.^{2,3} and Sousa Reis, C.⁴ ¹Universidade Aberta, Lisboa, Portugal. ²ITN, E.N.10, Sacavem, Portugal. ³Nuclear Physics Centre, Lisbon University, Portugal. ⁴Faculty of Sciences, Lisbon University, Portugal. *Octopus vulgaris* is a benthic species with a high growth rate, relatively short life cycle, widespread in various marine ecosystems at the Portuguese coast. The octopus can constitute an attractive organism for environmental assessment, as it may accumulate natural compounds and pollutants in their tissues and organs depending on their bio-availability in the ecosystem. This work reports on the elemental concentrations, i.e., Mn, Fe, Ni, Cu, Zn, As, Mo and Pb, determined in the octopus digestive gland, branchial heart, gill and arm tissues and on the influence of season, gender and environmental characteristics on tissue contents. Octopuses were collected in autumn and spring since 1999 at a coastal area of Portugal near Lisbon. At least five males and five females are assessed for each season. Elemental concentrations were determined by Particle Induced X-ray Emission (PIXE). All the tissues analysed contain Mn, Fe, Ni, Cu, Zn and As. Mo was determined in branchial hearts, and Pb was found in all tissues except arm. The highest contents of Ni were determined in branchial heart while in the digestive gland, the Mn, Fe, Cu and Zn levels were significantly enhanced. Seasonal associated alterations were verified for Cu concentration in digestive gland, branchial heart, gill, and arm, as well as for the increased levels of As and Ni in digestive gland. High levels of Pb were determined in the digestive gland and branchial heart. The Pb variability was likely associated to gender. This work permit to build a database for elemental concentrations in octopus tissues that will enable to programme extended surveys on bioaccumulation at marine environment.

(T/EH026) Comparison of two methods of quantitative and qualitative identification of phytoplankton in aquatic outdoor mesocosms. Ebke, K.^{1,*}, Börgel, C.¹, Farrelly, E.², Neugebauer-Büchler, K.³ and Mitchell, G.⁴ ¹Covance Laboratories GmbH, Germany. ²EF Consultant, United Kingdom. ³Biologist, Germany. ⁴BASF Agro Research, New Jersey. Two complementary methods were used to determine phytoplankton populations in an outdoor enclosure study conducted. Depth integrated water samples from the enclosures were taken and split into two subsamples. One subsample was fixed with Lugol's and subsequently identified and enumerated using an invert microscope, and the other subsample analysed within hours using delayed fluorescence excitation spectroscopy (DF). DF-excitation spectroscopy is a novel technique to quantitatively estimate phytoplankton composition of freshwaters by determining photosynthetic activity in living cells. A deconvolution programme separates the detector output into algal groups each of which produce different excitation spectra. The four groups are Green algae (chlorophyceae, euglenophyceae, conjugatophyceae), Blue-green algae (cyanophyceae), Cryptophyta and Diatoms (bacillariophyceae, chrysophyceae, dinophyta, xanthophyceae). In addition calibration of the detector enables quantitative determination of pigment levels. Taxonomic data produced using invert microscope were compared with those generated using DF excitation spectroscopy and good correlation between the techniques was clearly demonstrated during the study. DF-excitation spectroscopy has the potential to provide quick and accurate quantitative and qualitative estimates of changes in phytoplankton population and composition.

(T/EH027) New Environmental Technologies in Leather Industry - Wastewater decontamination. Catarino, J.^{1,*}, Lança, A.¹, Silva, L.¹, Mendonça, E.¹, Picado, A.¹, Fernandes, A.¹, Peneda, M.¹ and Pinho, N.² ¹INETI, Az. Lameiros 1649-038 Lisboa Portugal. ²IST, Av. Rovisco Pais 1049-001 Lisboa Portugal. A study on leather industry wastewaters minimisation contributed to the application of new technologies associating simultaneously environmental and economical aspects to achieve better industry performances. With these results the best options in terms of eco efficiency aspects were proposed, focusing those which can get more economic benefits in water and raw material consumption and at the same time provide environmental compliance. In a Portuguese Leather industry selected to be a demonstration unit, some treatment options (screening, textile membrane filtration, flocculation, micro-filtration, flotation and ultrafiltration) were experimented and the different process units liquid effluents were chemically and ecotoxicology monitored. The operation sequence suggested for the first and the second soaking effluent is a wastewater screening followed by filtration on textile membranes, prior to ultrafiltration. For liming wastewater it is envisaged besides the pre-treatments, to include a flotation operation prior to ultrafiltration, allowing better removal rates of pollution load and an improvement of the respective fluxes. We should notice that the maximum fluxes are achieved with membranes of 0,20µm pore size for microfiltration and cut-off 15 KD for ultrafiltration. The use of ultrafiltration is more advantageous than microfiltration. In that way it was possible to achieve water savings, a natural resource of the greatest importance, regarding material use and costs. In particular, concerning liming effluents, it is most interesting to reuse wastewater, allowing water and sulphides savings which may be reincorporated in the process. Performed bioassays pointed out that the liming effluent is the most ecotoxic. Along treatment process an increase of the CI 50 values was observed, but a treated effluent without ecotoxicity was not achieved. This kind of approach allows us to associate, in the company, productivity factors to environmental safeguard, and that way to contribute to sustainable production for tanneries. The treatment options studied were promising in reducing pollution loads and a recycling strategy could be faced.

(T/EH028) The application of a "multi-trial biomarker approach" in caged bioindicators for the ecotoxicological assessment of an AGIP Oil Plant: the BIOAGRI project. Ferraro, M.^{1,*}, Fossi, M.², Casini, S.³, Marsili, L.³, Leonzio, C.³, Neri, G.³, Ancora, S.³ and Mori, G.³ ¹Eni S.p.A., Div. Agip, Italy. ²Messina University, Italy. ³Siena University, Italy. The BIOAGRI pilot project (the first project on this subject at European scale) was born in order



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Abstracts

