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ABSTRACTS**

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Introduction: Daily consumption of nuts is recommended by nutritionists as part of a balanced diet. Nuts are rich in unsaturated fatty acids, mainly oleic acid ($\omega 9$). Epidemiologic studies have associated regular nut consumption with a reduced incidence of coronary heart diseases. **Objective:** Here we evaluated the effect of consuming a single portion of Brazil nut on biochemical markers of liver and kidney toxicity, and inflammatory markers in healthy volunteers. **Method:** Ten healthy subjects (24.7 ± 3.4 years old) were enrolled in the study. Each subject was tested four times in a randomized crossover in relation to the ingestion of different amounts of Brazil nut: 0, 5, 20 or 50 g. Peripheral blood was drawn before and at 1, 3, 6, 9, 24 and 48, 120 and 720 h following the ingestion of Brazil nuts. Aspartate and Alanine aminotransferases (AST and ALT, respectively), alkaline phosphatase (ALK), γ -GT, urea and creatinine levels were performed using Ortho-Clinical Diagnostics® (Vitros 950®, Rochester, NY, USA). Inflammatory markers (interleukins 1 (IL-1), 6 (IL-6) and 10 (IL-10) were determined using commercial kits (eBIOSCIENCE, San Diego, USA). The statistical analysis was performed using analysis of variance (ANOVA) and non-parametric tests (Wilcoxon). Differences were considered significant when $p < 0.05$. **Results:** AST, ALT, ALK, γ -GT, urea and creatinine levels were not modified after Brazil nut ingestion. IL-1 and IL-6 decreased in the 5-50 g groups. IL-10 was significantly increased after nuts consumption in all groups. However, in 20 and 50 g groups, IL-10 increased from 9 h to the end of study (30 days; $P < 0.01$). In the 5 g group, IL-10 increased significantly only after 24 and 48 h after consumption. We found that the consumption of high amounts of Brazil nut in a single portion caused no overt toxicity and improved inflammatory parameters by decreasing pro-inflammatory IL-1 and IL-6, and by increasing the anti-inflammatory IL-10. **Conclusion:** Here, we have observed that nut consumption decreased seric inflammatory markers without causing hepato- or renal toxicity in healthy volunteers.

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P44/IB-149. TOXICITY OF MIXTURES FROM WASTEWATER OF CHEMICAL INDUSTRY

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Introduction: In general, chemical industries are potentially polluters of aquatic ecosystems due to the complex characteristics of their effluents. At the environment, the chemicals are present as mixtures. The interaction of these compounds may result in additive, synergistic or antagonistic effects. **Objective:** Evaluate the interaction of the mixture of effluents from an inorganic chemical industry. **Methodology:** At first, the production system was studied. Two collection points were selected into the production process. One at the production site of cobalt salts (P1) and other at the production site of iodine salts (P2). Samples were collected in four separate dates. Physicochemical characterizations of the samples were performed. *Mysidopsis juniae* for toxicity tests were obtained from the cultivation in the Laboratory of Environmental Toxicology of UNIVILLE, at the São Francisco do Sul Unit. The acute toxicity tests followed the ABNT NBR 15308/2011. Primarily tests were conducted with each sample individually, and after the CL50 finding testing was conducted by mixing the samples. To evaluate the interaction of substances, the model described by Berenbaum (Environ Res., 38(2): 310-318, 1985) was used. **Result and Conclusion:** The effluent P1 and P2, when mixed, become more toxic than individually, showing a synergistic effect (values < 1). The mixture is more toxic than when both effects are added individually.

P45/IB-150. COPPER OXIDE NANOPARTICLES AND ITS CHRONIC TOXICITY TO *Mysidopsis juniae*

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Introduction: The nanoparticles of copper oxide (CuO NP) are applied in the manufacture of anti-fouling paints for ships. NPs are sources of contamination in aquatic ecosystems, and the decomposition of these paints may release copper in soluble ionic form or as NPs into the surrounding environment. **Objective:** To investigate the chronic toxicity of nanoparticles of copper oxide to *Mysidopsis juniae*, a marine crustacean. **Methodology:** The study was conducted at the Laboratory of Environmental Toxicology, University of Joinville Region (UNIVILLE) at São Francisco do Sul in partnership with the Laboratory of Environmental Toxicology, of Federal University of Santa Catarina (UFSC). The CuONP solution was prepared using copper oxide nanoparticles acquired from MTI Corporation (Richmond, CA, USA). The suspension was prepared at a concentration of 50, 100 and 75 micrograms/L in ultrapure water and placed in 50 mL conical flasks in an ice bath on a magnetic stirrer within the ultrasonic basin and sonicated for 30 minutes using an Ultra Sonic Cell Disruptor at full power. The duration of the test was 31 days. We observed mortality, fertility and the size of bodies. The semi-static test was maintained at 25 °C and the organisms were fed daily with *Artemia* sp. **Results:** Only the exposure to 100 micrograms / L caused chronic toxicity to the organisms, resulting in adverse effects on reproduction. **Conclusion:** The use of *Mysidopsis juniae* for assessing the toxicity of CuO NP in marine and estuarine is feasible based on their sensitivity to the compound. The CuO NP induces chronic toxicity at very low concentrations and therefore deserves special attention as to their use and disposal.

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P46/IB-152. CORRELATION STUDY BETWEEN AIR POLLUTION AND CARDIO-RESPIRATORY DISEASES BY ANALYZING LICHEN SAMPLES

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Introduction. Throughout the world, urban and industrial developments have been responsible for the increase of atmospheric pollutant emissions. These emissions interfere directly with the health of the general urban population. Thus, health effects of air pollution have been the subject of intense study in recent years. In order to evaluate the levels of the air pollutants, their origins and their effects on human health, lichens have been widely analyzed. **Objective:** The objective of this study was to apply Neutron Activation Analysis to obtain air pollution data in São Paulo city, Brazil in order to investigate pollutant effects on the cardio-respiratory system. **Methodology:** The population group selected was of adults over 45 years. *Canoparmelia texana* species was chosen for passive biomonitoring of pollutants. Lichens collected in São Paulo city were cleaned, freeze-dried and ground for the analysis. Samples were irradiated at the IEA-R1 nuclear research reactor along with element standards. The induced activities of the samples and standards were measured using a gamma ray spectrometer with an HPGe detector. **Results:** Concentrations of As, Ba, Br, Ca, Cd, Cl, Co, Cr, Cs, Fe, Hf, K, Mg, Mn, Na, Rb, Sb, Sc, Se, Th, V, Zn and lanthanides were determined. Mortality data for the population due to cardio-respiratory diseases were obtained from the database of the Secretariat of Health of the São Paulo Municipality for the years 2005 to 2009. Results indicated that the origins of pollutants in São Paulo city are due to vehicular and industrial emissions. Statistical treatment of Pearson's correlation

applied to the results of lichen element concentrations and mortality rates indicated significant positive correlation for the elements Co, Mn and Zn. **Conclusion:** The results demonstrated that biomonitoring is a simple, efficient and cost-effective method with the possibility of identifying emission sources and risks. It can be applied in areas without infrastructure of conventional air pollution monitoring. The significant correlation found between the lichen element concentrations and mortality rates can provide indications of possible causes of the mortality due to cardio-respiratory diseases.

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P47/IB-153. STUDY OF CHEMICAL OXYGEN DEMAND (COD) BY AN INNOVATIVE SYSTEM OF ORGANIC MATTER OXYGENATION

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Introduction: The conditions of water sources are being compromised with the launch of effluents; therefore the implementation of methods that evaluate the preservation of water courses is essential for maintenance of life. Organic matter is the main contributor for pollution of water (Von Sperling, 1996) and during the aerobic decomposition of this organic matter, part of Dissolved Oxygen (DO) is consumed, changing the water's quality. Chemical Oxygen Demand (COD) is one parameter of water's quality, which measures the amount of oxygen required to oxidize all carbonaceous organic compounds. Zuccari (1996) proposes the colorimetric method based on sulfochromic oxidation of organic matter, but this technique can be a dangerous laboratorial process. **Objective:** This work proposes the application of an innovative method to determine COD. The utilized method consists in the oxidation of organic matter in the presence of nanoparticles catalyzer and hydrogen peroxide as oxidizing agent. **Methodology:** The method utilized during the experiments cannot be detailed, because it is a patent secret. Initially, a calibration curve of the method was constructed and two water samples collected from a contaminated river had the COD quantified through the oxidation of the organic matter in the presence of a nanoparticles catalyzer and hydrogen peroxide. For the test validation the developed method was compared to the reference method commercialized by Merck and also Biochemical Oxygen Demand of the water samples (BOD) were determined. **Results:** The linearity test, studied through the calibration curve, presented a linear coefficient close to 1. There was no statistical difference between the two methods (developed and commercialized methods) for a 95% confidence interval, and the two water samples presented the following COD values: 23.94 mg/L and 67 mg/L respectively. The values of BOD obtained for the respective samples were 6.12 mg/L and 5.89 mg/L, what results in a coherence between the experiments, once the values of COD are higher than BOD, demonstrating there is a great amount of non biodegradable organic matter in these samples. **Conclusions:** The utilized method presented confidence, satisfactory and coherent results; it is economically viable, environmentally correct, and generates waste of low-toxicity.

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P48/IB-156. DETERMINATION OF CRITERIA FOR THE ESTABLISHMENT OF CENTRAL SORTING WASTE

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Introduction: The solid urban waste in about half of Brazilian cities is destined to dumps and these residues pollute the soil, water and air. The costs for the implementation of landfills and selective collection are

high. The selected waste can be sent for recycling and, in the case of tailings, to landfill. Cells, batteries and fluorescent lamps which have heavy metals on their composition, cause serious impacts on health and environment. Therefore, the establishment of central sorting waste (CSW) is an alternative with lower costs and it is able to reduce the mentioned risks. The adequate residue management improves the quality of life of communities and environment. On the other hand, there are not technical criteria to guide the selection of areas for this purpose.

Objective: to define minimal criteria for central sorting waste establishment. **Method:** the data gathering for the current work was based on research of technical norms of Brazilian Technical Standards Association - ABNT - and legislations of similar purposes of National Environment Council - CONAMA. In order to support this work bibliographical survey in technical studies, dissertations, thesis, and scientific articles was also developed. This research was accompanied by a Technical of the State Foundation of Environmental Protection (FEPAM), Henrique Luiz Roessler, responsible for licensing of these type of areas in Santa Maria Region/GERCEN. **Results:** It could be established a minimal criteria for CSW creation: a) clay, sandy-clay, silty-clay soils; b) minimal distance of any stream of 200 m; c) maximum proximity from the water table to the central basis of 1.5 m; d) inundation areas are not recommended; e) slope greater than 1% and less than 30%; f) minimal distance between settlements and the floor area of 500 m; g) The expected life cycle must be greater than 15 years. **Conclusions:** The establishment of parameters for selecting areas minimizes inherent risks of residues at sites with environmental vulnerability and /or impacted by other activities. The central sorting waste possibilities the separation of residues which toxicity causes damage to the environment and health; natural resource economics, as in the case of metals that are extracted from minerals; beyond other economic, environmental and social benefits.

P49/IB-182. MANGANESE LEVELS IN BLOOD AND ASSOCIATED FACTORS IN URBAN POPULATION AGED 40 OR MORE IN A CITY IN THE SOUTHERN BRAZIL

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Introduction: Human biomonitoring (HB) studies are used to identify and quantify the exposure and risk to chemical substances. They are useful in order to establish and review occupational exposure limits and to provide data on the exposure in risk assessment processes. In Brazil, HB is also being used as a tool in decision making in the health area. Therefore, due to the increasing use of HB, it is necessary to define baseline values and reference values for the main contaminants in Brazil. **Objectives:** establish the Mn levels in blood in urban population aged 40 or over in a city in the south of Brazil and check for a possible association between the Mn levels in blood and the social-demographic, lifestyle and high blood pressure variables. **Methods:** A cross-sectional population-based study was conducted with 958 subjects aged 40 years or older, residing in an urban area in a city in southern Brazil. Manganese concentration in blood was determined by Inductively Coupled Plasma Mass Spectrometry Technique (ICP-MS). Systolic and diastolic blood pressure were measured with digital equipment Omron HEN 742 according to the standards set by VI Brazilian Guidelines on Hypertension. **Results:** The geometric mean and median for manganese in blood in the total population were 12.2 and 12.3 µg/L, respectively. No significant association was found between Mn levels in blood and variables such as gender, age, smoking habits, alcohol consumption, educational and economic levels, and high blood pressure. The lack of significant associations in this population is possibly due to the characteristic of the environmental exposure, age group, among other factors. **Conclusion:** This study contributes to the determination of baseline values for manganese in blood in urban population in Brazil, which is pivotal for the identification of population groups at risk, when