

ENVIRONMENTAL CHEMISTRY AND WATER SCIENCES

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Water is essential for life and plays a vital role in the proper functioning of the Earth's ecosystems. The pollution of water and sediments has a serious impact on all living creatures, and can negatively affect the use of water for drinking. Some of these pollutants, such as pesticides, metal and industrial chemicals known as polychlorinated biphenyls (PCBs), were released and persist for many years. Five major types of pollutants are found in sediments: nutrients, including phosphorous and nitrogen (ammonia); bulk organics, a class of hydrocarbons (oil and grease); halogenated hydrocarbons or persistent organics, polycyclic aromatic hydrocarbons (PAHs), a group of organic chemicals that includes several petroleum products and byproducts, and metals, including iron, manganese, lead, cadmium, zinc and mercury, and metalloids such as arsenic and selenium. The main objective of this activity is to study the behaviour and distribution of substances toxicant, essential and nutrients in the aquatic ecosystems, surface water, sediments and drinking water. Scientific Cooperation Programs supporting by CNPq and FAPESP - public policies, in partnership with Environmental Agency State (CETESB) and SABESP were developed:

Metal and trace elements concentrations in water and sediments of Vale do Ribeira hydrographic basin in São Paulo State, Brazil

Assessment of water and sediment were evaluated in a hydrological period (2002/2003) at 43 drinking water distribution systems from Vale do Ribeira, São Paulo State. Ag, Al, As, B, Ba, Cd, Co, Cr, Ca, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, P, Pb, Se, Sn, V, Zn, F⁻, Cl⁻, NO₃²⁻, PO₄³⁻, SO₄²⁻ were evaluated (FIG.1). The main aim of this investigation is to check if the trace elements levels comply with Brazilian Drinking Water Standards (Portaria 518/2004/MS) and also an effort of this group to determine baseline levels of elements in different types of water in Ribeira de Iguape Basin, São Paulo State.

Drinking Water As, Se, Sb and Hg Monitoring in São Paulo State

In order to quantify toxic metals levels, a survey of As, Se, Sb and Hg in drinking water samples was conducted at 634 distribution sites from regional areas in São Paulo State. These elements were detected in 14,4% of the samples, and in 1,9% of then were observed violations of the Brazilian Drinking Water Legislation (Portaria 518/2004/MS).

Pesticide monitoring in surface catchments areas

The work aimed to evaluate the environmental water quality in the localities of water supply intake for the 10 cities on the Ribeira Basin. The sampling was carried out in a hydrologic period, were sampled bimonthly for 12 months (march 2002/ fev/2003). At study started with 18 sites were surveyed. The number of sites was reduced to 10 during the second trip. Sites were selected according to proximity agriculture fields and urbanization. (FAPESP, CNPq, SABESP)

Critical Revision in Brazilian Drinking Water Standards - Portaria 518/04/MS

Evaluation of drinking water, in 18 communities belonging to Ribeira de Iguape Basin, São Paulo State. Critical analysis of the national norm that establishes the procedures and relative responsibilities to the control and

surveillance of the water quality for human consumption. (FAPESP, CNPq, SABESP)

The Process of Urban Expansion Linked with the Relation Between the Urban Forest Structure and Water Potentials of Registro-SP, in the Hydrographic Basin of River Ribeira de Iguape, SP.

The aim of this work is to provide environmental information needed to aid public policies and strategic planning of hydrographic unit. The main objective is to translate the environmental condition associated to the process urban evolution in this municipal area (FIG.2).

Waste Management Laboratory

Laboratory waste solutions are monitored before releasing into the waste drain. If necessary, these wastes are chemically treated to be in agreement to the concerned legislation. Techniques such as ion exchange, precipitation and oxidation are commonly used at this laboratory.

Preparation and characterization of semiconductor nanoparticles and thin films with structural modifications to improve the visible light absorption.

The characterization of some physiochemical properties of the prepared materials will be made by X ray diffraction (XRD), electronic microscopy (SEM, TEM), optical properties (UV-VIS DRS) and surface area (BET). These materials will be applied in photocatalytic systems to organic compounds photodegradation or water cleavage for hydrogen production. (FAPESP)



FIGURE 1 - Environmental Chemistry Laboratory.



FIGURE 2 - Waste Management.