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Surveillance of Heavy Metals Using Atomic Absorption Spectroscopy in the Lagoon La Escondida in Reynosa City, Mexico

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SURVEILLANCE OF HEAVY METALS USING ATOMIC ABSORPTION SPECTROSCOPY IN THE LAGOON LA ESCONDIDA IN REYNOSA CITY, MEXICO.

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Panel Abstract 9

The concentration of heavy metals such: Arsenic (As), Lead (Pb), Cadmium (Cd), Mercury (Hg) and Chromium (Cr) was determined in water and sludge of the lagoon La Escondida in the Reynosa city on the northeastern part of Mexico by the border with USA. The detection limits by Atomic Absorption Spectroscopy (DL, µg mL-1) were 0.05 for As; 0.10 for Pb; 0.10 for Cd; 0.05 for Hg; and 0.30 for Cr in water. The detection limits (DL, µg g-1) were 1.0 for As; 10.0 for Pb; 2.0 for Cd; 0.02 for Hg; and 6.0 for Cr in sludge. The objective of this work was to know the levels of these contaminants in this lagoon, since it is surrounded by a highly populated area of the city, besides it is considered as a natural protected resource, in which the migratory birds coming from Canada and North America in the winter period stop, rest and nest for some time.

Nine samples of water and seven samples of sludge from different points, evenly distributed at the lagoon were taken and analyzed; the sampling places were chose according to the currents, influents and effluents of this body of water. The levels of these contaminates were found to be under the detection limits, except for mercury in a single sampling place, which come to be 0.23 µg mL-1in a sludge sample. This is an indicative of water contamination for heavy metals which requires further studies to establish the source and impact of this contamination.

Topic Areas:
Conservation and Reclaimed Water Use

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SURVEILLANCE OF CHLORINATED PESTICIDES AND PCB´S IN THE LAGOON LA ESCONDIDA IN REYNOSA MEXICO BY GAS CHROMATOGRAPHY WITH ELECTRON-CAPTURE DETECTION (GCED)

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Panel Abstract 10

The quantitative determination of some widely used organochlorine pesticides such as aldrin, heptachlor , dieldrin, endrin, clordano, toxapheno, DDT and PCB's was determinated in water and sludge of the lagoon La Escondida in Reynosa city in the northeastern part of Mexico by the border with USA. The analytical method used was Gas Chromatography with Electron-capture Detection (GCED). The chlorinated pesticides were extracted from water and soil with different solvents, followed by a clean-up of the sample extract; the analytes were eluted with hexane and determined by gas chromatography with electron-capture detection. In water the detection limits (DL, µg mL-1) were 0.0002 for Aldrin; 0.0002 for heptachlor; 0.0002 for dieldrin, 0.0002 for endrin, 0.0005 for clordano, 0.2000 for toxapheno, 0.0002 for DDT; and 0.0002 for PCB's. In sludge the detection limits (DL, µg g-1) were 0.02 for Aldrin; 0.02 for heptachlor; 0.02 for dieldrin, 0.02 for endrin, 0.5 for clordano, 20.00 for toxapheno, 0.02 for DDT; and 0.2 for PCB's. The method used was EPA-8081.

Nine samples of water and seven samples of sludge from different points, evenly distributed in the lagoon were taken and analyzed. The sampling places were chosen according to the currents, influents and effluents of this body of water. The levels of these contaminates were found to be mainly under the detection limits except for the aldrin, dieldrin and DDT in several sampling places, the samples found above the detection limits happen to be 3 or 4 times it. This is an indicative of contamination in some points of the lagoon by different organochlorine pesticides, however the source and the impact of this contamination is yet to be determined.

Topic Area:
Conservation and Reclaimed Water Use

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BASIC CHARACTERIZATION OF THE LA ESCONDIDA LAGOON

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Panel Abstract 11

It was carried out the basic characterization of the lagoon La Escondida, the sampling of selected areas of the lagoon was done to generate the physiochemical characterization of the lagoon water. The analyzed parameters are: pH, temperature (T), electric conductivity (CE), calcium (Ca+2), magnesium (Mg+2), carbonates (CO-3) and bicarbonates (HCO3-), chlorides (Cl-) and sulfates (SO4-2), using the Mexican Norms (NMX). This research will help to a know ledge the community and the municipal, state and federal authorities, the degree of water contamination in the lagoon. The results from this research will help to prevent health problems and on the development of the region.

Topic Areas:
Conservation and Reclaimed Water Use
Water Resources Education

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CHARACTERIZATION OF THE MICROBIAL METABOLIC ACTIVITIES AND SANITARY QUALITY OF THE LAGOON LA ESCONDIDA IN REYNOSA, MEXICO

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Panel Abstract 12

Water in one of the main mechanical vector for the transmission of infectious diseases, because the infection is caused by the drinking of contaminated water or exposure to air borne droplets present in the surroundings of the contaminated body waters. In Reynosa City, Mexico, is located the lagoon La escondida, with an extension of 320 hras of extension and because of the rapid growing population of the city now is localized inside a heavily populated area. This lagoon takes waters from rain that gets to there because of the surface level, waste water of the surroundings and does not have any kind of aeration devises, and because of this the water can standstill for several months before get new discharges or evaporate; because of this situation, in necessary to have a microbiological characterization of this lagoon. The aim of this work was to measure the quality of the water of this lagoon by official methods and determine the presence of metabolic activities of pathogen organisms. Several representative points of the lagoon were sampled, and analyzed for the determination of mesofilic bacteria (NOM-020SS11994), total coliforms (NOM-113-SSA1-1994) and fecal coliforms (NOM-112-SSA-1994), presence of pathogen protozoa, and the growing in the follow media: blood agar, salt and manitol, nutritive media, Salmonella and Shigella agar, EMB agar, XLD agar and McConkey agar. There was growing of variable density in the different culture media tested, which shows great diversity of metabolic activities present, some potentially pathogenic like alpha and beta hemolisis, the presence of coliform bacteria and diverse pathogenic protozoas like Thaenia sp and Ascaris lumbricoides, were also detected. According to the results of the official methods the water quality is poor and in the actual state, could represent a health risk for the population in the surroundings and for the biodiversity that sustains.

Topic Areas:
Conservation and Reclaimed Water Use
Water Resources Education

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FLORA AND FAUNA ON THE LA ESCONDIDA LAGOON IN REYNOSA, TAMAULIPAS, MEXICO

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Panel Abstract 13

This lagoon is close to the Rio Grande in the southern part of Texas where the American city Hidalgo is the closest neighbor in the border. There is a bird watching place called The Old Pump House in Hidalgo where they report around 260 species of birds that have been observed in that spot. Some observations and records have been done on the La Escondida lagoon by university students where most of the species are in that list.

The living creatures reported have been birds, turtles, shellfish, insects and terrestrial vegetation in the lagoon and its surroundings. The species of these biotic elements have been identified and classified in this work.

Topic Areas:
Water Resources Education
Other

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OPTIMIZATION OF MICRO SCALE METHOD FOR THE DETECTION OF THE HEAVY METALS IONS: SILVER, CHROMIUM, LEAD AND ARSENIC

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Panel Abstract 14

In this work methods of micro scale analysis were optimized for the detection of the heavy metals ions: silver (Ag+), chromium (Cr+3 and Cr+6), lead (Pb+2) and arsenic (As+3). The objective of this project was the optimization of a micro scale analysis method for detection of these metals. The methods proven were: silver test with magnesium nitrate and alkali, the test for oxidation in acid solution with persulfate of alkaline metal for chromium, the test with ditizone, for lead and test of Gutzeit for arsenic using different concentrations and quantities of reagents to adapt them to the conditions of our laboratory. The achieved detection limits were: 1.0 ìg arsenic, 0.8 ìg chromium, 0.04 ìg lead (in neutral solution), and 2.0 ìg silver. The analysis methods of micro scale analysis present the advantage of using small quantities of reagents, which allows the decrease of residuals and allows making preliminary analysis in situ in the field.

Topic Areas:
Water Resources Education
Other

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