

Green Lifestyle Becoming the Men's New Way of Life

luly 20 - 23, 2014 Cubatão, Brazil

Book of Abstracts

Edited by Claudio da Rocha Brito Melany M. Ciampi





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SAFETY, HEALTH AND ENVIRONMENT WORLD CONGRESS –Green lifestyle becoming the men's new way of life. Cubatão, 2014. v.14 n.1 53p. BOOK OF ABSTRACTS – XIV Safety, Health and Environment World Congress. July 20-23, 2014. Orgs. Claudio da Rocha Brito (ISBN 978-85-65992-36-7) & Melany M. Ciampi (978-85-66680-36-2). Science and Education Research Council, COPEC – Cubatão: SHEWC, 2014. ISSN 2317-3173 1. Environment – Congress. 2. Health – Congress. 3. Safety – Congress I. BRITO, Claudio da Rocha. II. CIAMPI, Melany, M. III. Title



I start this message saying that it is always a pleasure being the General Chair of such conference as SHEWC - Safety, Health and Environment World Congress. Once again it happens in Brazil and in a city that is an example of pollution control, Cubatão. It is a fact that major challenges are in the horizon of mankind and some of them are due to social and economic nature that impacts environment and society in a large spectrum. Among the challenges are: the increasing urbanization and urban

growth effects, the ageing of the population, changing household and family structures, continued population growth and immigration, housing affordability, the impact of information technology in every level of life, skills and education, globalization promoting restructuring of the economy and competitiveness, environmental impacts of consumption and development and climate change.

Indeed the scenario is not very optimist due to the economic crises that is over nations and it is important now more than ever to take the real actions at governmental and organizational level, in a global scale, to solve these issues for the sake of future generations.

Yet there are lots of issues that need attention and fortunately sciences and technology are in place to deal with many of these issues. Therefore the importance of research and development of projects seems to be one key element for success allied to the commitment of politics, organizations and individuals to address efforts towards actions to assure the future of mankind in the planet.

The 14th edition of the **SHEWC** discusses all aspects of environment not only the use of water and land but also social aspects of engineering; the safety, the global economy impact on human development, among others.

The theme of the congress "Green Lifestyle becoming the Men's New Way of Life" has been chosen by the organizers and promoters because of the present need to instigate researchers and scientists of safety, health and environment to show their researches in the fields. The responses to these issues are impressive and it is interesting the spectrum of papers about the green life style as a way to reach the sustainable development for all.

It is an event that shows cutting edge useful information in environment, health and safety and provides a rich encounter for the community.

As the General Chair of SHEWC'2014 on behalf of COPEC team I am pleased to thank the host institution Cubatão City Hall that embraced the organization of this congress. It is imperative to acknowledge and thank in special all the people involved in the organization of this edition of SHEWC such as Prof. Mauro Sérgio Braga and Prof. Edmilson Roberto Braga, Local Chairs of SHEWC'2014 and Marcelo André Parreira de Oliveira, who have worked diligently for the accomplishment of a successful event.

The XIV Safety, Health and Environment World Congress - SHEWC'2014 is organized by COPEC – Science and Education Research Council and promoted by SHERO – Safety, Health and Environment Research Organization in Technical Cooperation (in alphabetical order): AAMP (Fishing Museum Friends Society), ABENC (Brazilian Society of Civil Engineers), ABENGE (Brazilian Society for Engineering Education), ABO (Brazilian Dental Association), AENUI (Asociación de Enseñantes Universitarios de la Informática), AGERCO (Brazilian Agency for Coastal Management), ASEE (American Society for Engineering Education), ASIBEI (Iberian-American Association of Engineering Education Institutions), GCMM (Global Congress on Manufacturing and Management), IEEE-Ed.Soc. (Education Society of the Institute of Electrical and Electronics Engineers), IFEES (International Federation of Engineering Education Societies), IGIP (Internationale Gesellschaft für Ingenieurpädagogik), INTERTECH (International Council for Engineering and Technology Education), IRCWR (International Reference Center for Water Reuse), ISTEC (Iberian American Science & Technology Education Consortium), OERN (Institute of Engineering), RCI (Réseau Carthagène d'Ingénierie), SBA (Brazilian Automation Society), SBE (Brazilian Society of Ecotoxicology), SEFI (Société Européenne pour la Formation des Ingénieurs), SPEE (Portuguese Society for Engineering Education), SPEED (Student Platform for Engineering Education Development), WCCA (World Council on Communication and Arts) and WCSEIT (World Council on Systems Engineering and Information Technology).

I could not forget to thank to our sponsors FAPESP (State of São Paulo Research Foundation), CNPq (National Council for Scientific and Technological Development), CAPES (Coordination for Improvement of Personnel of Superior Level) and SUPNET - Technology & Information.

I want to thank the authors and participants for their collaborations and willing to share their contributions for the development of science and technology for the betterment of humanity in their fields of expertise.

We are very pleased you have joined us in SHEWC'2014!

Prof. Dr. Claudio da Rocha Brito GENERAL CHAIR President of COPEC

Message from the Technical Program Chair



"Green Lifestyle becoming the Men's New Way of Life" is the theme of this edition of SHEWC that has counted with valuable collaborations of great importance for the achievement of sustainable development of nations and peoples.

As usual it has been very rewarding for me to be the Technical Program Chair of SHEWC'2014 – XIII Safety, Health and Environment World Congress. And along

these 14 years it has been a success always providing a high quality conference for the international scientific community willing to share their achievements in their fields of expertise.

This edition of the conference counts with many interesting collaborations of authors bringing the discussions about the search for a more sustainability of nations and peoples and once more the scientific researches instigate the discussions bringing the solutions for issues that mainly affects the life on earth making future possible.

I have the pleasure to acknowledge the good work of the reviewers who have dedicated time and efforts for the revision process. Equally important are the author's contributions as well as of workshops leaders and plenary session's lecturers bringing interesting topics related to the theme.

On behalf of the Technical Program Committee of **SHEWC'2014** I thank all the people involved in the Congress and all the authors and participants, hoping that everybody enjoys it.

I am sure that all the participants take the most of the conference.

Prof. Dr. Melany M. Ciampi TECHNICAL PROGRAM CHAIR President of SHERO

Message from the Honorary Chair



It is gratifying for our country having been chosen as the site for this 14th edition of **SHEWC - Safety Health and Environment World Congress**.

It is a honor and, at the same time, a special opportunity for the Municipality of Cubatão to host this great event that reunites the most outstanding specialists, researchers, and scholars of safety, health and environment from all over the world.

Our city has, for over decades, worked hard to open a privileged space for discussions in these areas as fields of knowledge and as practical exercise that effectively result in the protection and respect of persons, their dignity, and rights as human beings; but it has also set its sights and become attentive of the effects of new knowledge and technological tools that affect the environment, the habitat of all life forms.

The Congress represents a unique opportunity for society, scholars in the subject, and other interested parties to approach safety, health and environment through one of the events with the strongest tradition in the topics in the international context. We believe participants experience a taste of the Brazilian culture, in Cubatão, a city that is an example of transformation and application of science for the betterment of nature and men. Our country and Cubatão, in particular, is enthusiastic about your visit and are confident you have a memorable experience.

I hope you have the time to explore and experience Cubatão, a city with a rich community spirit, with a strong civic consciousness exhibited by numerous community groups. A city with multifaceted attractions featuring not only natural treasures, but also modernity and non-stop action as the city with the largest industrial park of Latin America.

As Cubatão Mayor, it is my great pleasure to welcome you to the **SHEWC'2014**. On behalf of the city board, the entire city staff, and myself we hope you enjoy this conference and learn all about our city and what Cubatão has to offer its citizens! We sincerely welcome you to the **SHEWC'2014**!

> Marcia Rosa de Mendonça Silva HONORARY CHAIR Mayor of Cubatão City

Message from the Local Chairs



It is my great honor to welcome you to the SHEWC'2014 - Safety Health and Environment World Congress. This edition aims at enabling presentation of new results in the field of safety, health and environment so important for our lives. The SHEWC objective is not only to deal with technologies but also with applications. It is an opportunity to share novel research ideas as well as practical applications in the areas. I would like to take this opportunity to thank all of our organizing committee

members for their support, help, and consistent effort to make this conference a success.

My thanks will also be for all of the technical committee members for their diligent and untiring effort in reviewing the submissions and all the speakers and authors. The experience and efforts of those mentioned above are indeed a great contribution for the success of this conference.

Welcome to **SHEWC'2014!**

Prof. Mauro Sérgio Braga LOCAL CHAIR



I am pleased to welcome you, on behalf of the Local Committee, to the **SHEWC'2014** - **Safety Health and Environment World Congress.** This is a great opportunity to talk, share and learn about safety, health and environment and their role in our societies. We have put together an exciting conference with a wide representation of fields, specializations and interests. The program includes a variety of panels and roundtables designed to present cutting-edge research and theory.

Whether you are a technologist seeking to understand new applications, a scientist looking into the latest technological tools to support your research or represent an industry that requires data and information to support its business needs, the **SHEWC'2014** conference connects you with new ideas and opportunities.

We sincerely welcome you to the SHEWC'2014!

Prof. Edmilson Roberto Braga LOCAL CHAIR

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Technical Program Chair: Melany M. Ciampi

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Green Lifestyle Becoming the Men's New Way of Life

luly 20 - 23, 2014 Cubatão, Brazil

Program

Edited by Claudio da Rocha Brito Melany M. Ciampi





Science and Education Research Council

SHEWC'2014 – Program at Glance

Time	Sunday 20	Monday 21	Tuesday 22	Wednesday 23	Time		
8:30 am 9:00 am	Registration	Registration	Registration	Registration	8:30 am 9:00 am		
9:00 am					9:00 am		
9:30 am					9:30 am		
9:30 am		Opening Session			9:30 am		
10:00 am			Technical Sessions	Workshop II	10:00 am		
10:00 am					10:00 am		
10:30 am		Plenary Session I			10:30 am		
10:30 am					10:30 am		
11:00 am	Cultural Session	Coffee Break	Coffee Break	Coffee Break	11:00 am		
11:00 am					11:00 am		
11:30 am			Technical Sessions	Workshop II	11:30 am		
11:30 am		Plenary Session II			11:30 am		
12:00 pm					12:00 pm		
12:00 pm					12:00 pm		
12:30 pm					12:30 pm		
12:30 pm					12:30 pm		
1:00 pm					1:00 pm		
1:00 pm					1:00 pm		
1:30 pm	Lunch	Lunch	Lunch	Lunah	1:30 pm		
1:30 pm	Lunch	Lunch	Lunch	Lunch	1:30 pm		
2:00 pm					2:00 pm		
2:00 pm					2:00 pm		
2:30 pm					2:30 pm		
2:30 pm	1		Technical Sessions	ions Workshop III	2:30 pm		
3:00 pm		Technical Sessions			3:00 pm		
3:00 pm	1				3:00 pm		
3:30 pm	workshop i				3:30 pm		
3:30 pm					3:30 pm		
4:00 pm					4:00 pm		
4:00 pm	Coffee Break		Coffee Break	Coffee Break	4:00 pm		
4:30 pm	Collee Bleak			Collee Dieak	4:30 pm		
4:30 pm					4:30 pm		
5:00 pm			Closing Session		5:00 pm		
5:00 pm	Workshop I		ereenig eeeeen	Workshop III	5:00 pm		
5:30 pm					5:30 pm		
5:30 pm					5:30 pm		
6:00 pm					6:00 pm		
6:00 pm					6:00 pm		
6:30 pm					6:30 pm		
6:30 pm	- Free Welcome Cocktail		Free		6:30 pm		
7:00 pm		Free			7:00 pm		
7:00 pm					7:00 pm		
7:30 pm					7:30 pm		
7:30 pm					7:30 pm		
8:00 pm					8:00 pm		
8:30 pm			Congress Dinner (for adhesion)		8:30 pm		
8-30 pm					8-30 pm		
9.00 pm					9.00 pm		
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9:30 pm	-				9:30 pm		
10:00 pm					10:00 pm		

SESSION AND PRESENTATION CODES Codes are used to determine when and where a paper is presented.

Technical Session Coding

A four- character designator is associated with each technical session, as in **LDTN** Where:

L - is a letter that designates the language of the session:

- E designates English sessions and papers;
- P designates Portuguese sessions and papers;
- **D** is a letter that designates the day of the session:
 - M designates Monday sessions and papers;
 - T designates Tuesday sessions and papers.

T – is a number that designates the time slot for the session:

- 1 is early afternoon (9:00 am 10:30 am);
- 2 is late morning (11:00 am 12:30 pm);
- 3 is early afternoon (2:30 pm 4:00 pm);
- **N** is a letter that designates the parallel session within any time slot. A is the first parallel session; B is the second parallel session.

Note.

Five minutes will be allowed for introductions and instructions at the beginning of each session. Each paper will be given 10 minutes for the total presentation, with two minutes for questions. All papers will start in 12 – minutes increments to allow conference attendees to "session hop" hear papers of interest. If there is a no-show author in a session, a 12 - minutes break will be called. *Papers will not be moved up in sessions.*

Papers times for sessions are shown below. (H is a letter that designates hour of the day).

Session Begins	H:00	H:30
First paper	H:05	H:35
Second Paper	H:17	H:47
Third Paper	H:29	H:59
Fourth Paper	H:41	(H+1):11
Fifth paper	H:53	(H+1):23
Sixth paper	(H+1):05	(H+1):35
Seventh paper	(H+1):17	(H+1):47
Session Ends	(H+1):29	(H+1):59

Sunday – July, 20

08:30 pm – 2:30 pm REGISTRATION

9:00 am – 12:30 pm CULTURAL SESSION

Cubatão is a city embraced by a green belt that spreads cliffs 700 feet high, fewer than thousands of species of trees and even animals at risk of extinction, such as the ocelot and the red-guara. A quiet place where history was imprinted in stone paths and imposing monuments, dotted with ecologic parks and preserved mangroves, cut by fishy rivers with beaches on its shores.

Located only 58 kilometers from São Paulo, the city, regarded as worldwide symbol of environmental recovery by the United Nations, today presents itself as an example that it is possible to combine an industrial profile with tourism.

Created in 1948 from several municipalities of Santos, Cubatão has become one of the state's principal banana producers as well as an important industrial center. One of the largest petroleum refineries in the country is located in Cubatão, producing oil, asphalt, plastic, synthetic rubber, and propane and butane gas in addition to petroleum fuels. Cubatão also has a large steel plant and two major hydroelectric generating facilities. The negative result was initially industrial pollution, earning the area the name Valley of Death, but pollution

controls and other environmental efforts cleaned up the city in the late 1980s and '90s. The city is linked to Santos, of which it is an adjacent suburb, by highway, and both a highway and a railroad extend northward from Cubatão to São Paulo city, the state capital.

The Cubatão South River is 25 km long, rises in the Serra do Tabuleiro in São Bonifacio, and empties into the Atlantic Ocean, in the city of Palhoça. It is the main river basin in the region and often used in Caldas da Imperatriz for canoeing and rafting. Onsite happen even at national level competitions. The nature that surrounds it is a spectacle and virtually untouched.

On Sunday 9:00 am our meeting point is the City Hall Building at Praça dos Emancipadores, s/nº - Centro - Cubatão - SP - CEP 11510-900 where we are leaving to a visit tour to CARBOCLORO a company that focused on the chlor-alkali and derivatives industry in Cubatão, followed by a ecologic tour.

Do not miss this opportunity to know better Cubatão city.

2:30 pm – 6:00 pm WORKSHOP I

MEDICINA TRADICIONAL CHINESA: PIONEIRISMO EM ESTABELECER A RELAÇÃO ENTRE MEIO AMBIENTE E SAÚDE (in Portuguese) Prof. David Roberto da Almeida – Pontifical Catholic University of São Paulo (PUC/SP) –

Brazil

6:00 pm – 8:00 pm WELCOME COCKTAIL

All the participants are welcome to join us for the "Welcome Cocktail" on Sunday at 6 pm. It is a nice start for a period of four days of hard work. It is the opportunity to get in touch with other colleagues and make new friends in a pleasant historical and cultural environment.

Monday – July, 21

8:30 am – 4:30 pm REGISTRATION

9:00 am – 10:00 am OPENING SESSION

Chair: Prof. Claudio da Rocha Brito – General Chair of SHEWC'2014 Prof. Melany M. Ciampi – Technical Program Chair of SHEWC'2014 Marcia Rosa de Mendonça Silva – Honorary Chair of SHEWC'2014 Prof. Mauro Sérgio Braga– Local Chair of SHEWC'2014 Prof. Edmilson Roberto Braga – Local Chair of SHEWC'2014

10:00 am – 10:30 am PLENARY SESSION I

Chair: **Prof. Claudio da Rocha Brito** – General Chair of SHEWC'2014 Title: **GREEN LIFESTYLE BECOMING THE MEN'S NEW WAY OF LIFE** Speaker: **Prof. Melany M. Ciampi** – Technical Program Chair of SHEWC'2014

10:30 am – 11:00 am *Coffee Break*

11:00 am – 12:30 pm PLENARY SESSION II

Chair: Prof. Melany M. Ciampi – Technical Program Chair of SHEWC'2014 Title: PRECISE CONTROL OF AN EDUCATIONAL ROBOT TO PICK AND PLACE AN OBJECT USING BOTH CONVENTIONAL AND SOLAR ENERGY Speaker: Prof. Rafiq Noorani – Mechanical Engineering Department, Loyola Marymount University; Los Angeles, California USA

> 12:30 pm – 2:30 pm LUNCH

2:30 pm – 4:00 pm TECHNICAL SESSIONS

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Chairs André Luiz de Lima Reda Marcia Silva de Oliveira

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Tuesday – July, 22

8:30 am – 4:30 pm REGISTRATION

9:00 am - 10:30 am TECHNICAL SESSIONS

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4:30 pm – 5:30 pm CLOSING SESSION

Chair: Prof. Claudio da Rocha Brito – General Chair of SHEWC'2014 Prof. Melany M. Ciampi – Technical Program Chair of SHEWC'2014 Prof. Mauro Sérgio Braga– Local Chair of SHEWC'2014 Prof. Edmilson Roberto Braga – Local Chair of SHEWC'2014

8:00 pm – 11:00 pm CONGRESS DINNER

Congress dinner is a pleasant way to gather and to close a successful conference accompanied by the colleagues in a beautiful and inspiring environment. The tickets will be available at the reception desk.

Wednesday – July, 23

8:30 am - 10:30 am REGISTRATION

9:00 am – 12:30 pm WORKSHOP II METODOLOGIA E TECNOLOGIA EM PROL À RECUPERAÇÃO E/OU SUSTENTABILIDADE AMBIENTAL (in Portuguese) Prof. Dr. Claudio A. Oller do Nascimento – Politechnic School – University of São Paulo – Brazil

> 12:30 pm – 2:30 pm LUNCH

2:30 pm – 6:00 pm WORKSHOP III

TECNOLOGIA DE SENSORES APLICADOS EM CONTROLE AMBIENTAL (in Portuguese) Prof. Dr. Walter Jaimes Salcedo – Politechnic School – University of São Paulo – Brazil



Green Lifestyle Becoming the Men's New Way of Life

luly 20 - 23, 2014 Cubatão, Brazil

Abstracts

Edited by Claudio da Rocha Brito Melany M. Ciampi





Research Council

Plenary Sessions

GREEN LIFESTYLE BECOMING THE MEN'S NEW WAY OF LIFE

Claudio da Rocha Brito, Melany M. Ciampi, Mauro Sérgio Braga, Edmilson Roberto Braga, Victor F. A. Barros

This is the 14th. Edition of SHEWC – Safety, Health and Environment World Congress, a congress that has been happening for 14 years. It is important to point out that despite all the difficulties and crises that countries and organizations have faced and still are it is a congress that can count with many organizations participation. It shows that it is an idea that encounters the expectations of scientific and research environment. COPEC and SHERO have been working to put up a top scientific congress with quality and impact in academic and professional communities. SHEWC – Safety, Health and Environment World Congress'2014 has the collaboration of many scientists in the several fields of expertize, who have embraced the ideal of fostering the quality of life of human being.

PRECISE CONTROL OF AN EDUCATIONAL ROBOT TO PICK AND PLACE AN OBJECT USING BOTH CONVENTIONAL AND SOLAR ENERGY

Jassim Alrashaid, Abdulaziz Ben Nekhi, Abdulaziz Ali, Dean Kurilich, Omar Almahmoud, Rafiq Noorani

The goal of this project is to conceptualize, design, and build a reprogrammable and multifunctional Boe-Bot robot to simulate a manufacturing environment. The designed robot is completely autonomous and will navigate its way using sensors responding to the external environment. The robot will operate off its own battery power and solar power and will be governed by a computer code specifically designed to help the robot function in a manufacturing environment. The Boe-Bot robot is largely composed of two servo motors to operate the wheels, a servo motor to operate the gripper, and a Board of Education (BOE) carrier board. This motherboard is controlled by a robot coding program called BASIC Stamp. It is expected to be a great learning tool for high school and college students interested in the applications o robots in manufacturing.

Thecnical Sessions

Session EM3A

COMBINED SEWER OVERFLOWS IN BRAZIL: A 2014 SITUATION REPORT

André Luiz de Lima Reda, Paulo Ferreira, Marcel Mendes, M. Bruce Beck

Combined sewer systems are common at cold regions, where heavy storms, that disturb wastewater treatment processes by combined sewer overflows (CSO), are rare. However, in warm countries, the ageing process of collection pipes (causing underground leakage of rain water into separate sewers) and illicit connections of drainage pipes into sewers (increasingly common, either inside premises or between public, sewer and drainage systems) cause wastewater treatment plant inflow surges and quality disturbances to raw and treated sewage. Such perturbations bear close similarity to CSO impacts, and cause plants to yield low quality effluents – thus, jeopardizing receiving-water quality. The article briefly introduces the CSO problem in the world, first. Then, it reports the current situation at some Brazilian cities and towns that are fighting the problem by legal measures, and campaigns for educating citizens and companies such as to reduce illicit connections and preserve the integrity of these hydraulic systems.

PARENTAL IMMUNIZATION REFUSAL

Gloria Auxiliadora Oxendale, Patricia Burrell

Parental vaccine refusal is raising concern and has received considerable attention worldwide. Although the most prevalent and consistent predictor for vaccine refusal remains adverse events follow immunization (AEFI). Other causes exist that could increase risk when combined. Awareness regarding immunization refusal risk factor and adopt a practice to address parent's concerns to reduce risk, including clinic base education, academic detailing and reminder recall interventions have been show to increase knowledge and vaccine coverage. The purpose of this review is to examine the state of science on immunization refusal and gain knowledge about the nature and origins of parent's concerns, attitudes, beliefs and behavior; and how that might impact on global health and immunization practices. Nursing theory and model are examined. Strategies that can be implemented by the Advanced Practitioner Register Nurse (APRN) to address parental concerns; thus increase knowledge and intentions to vaccinate their children are explored.

BREATHALYZER ELECTRONIC CONTROLLED BY ARDUINO UNO PLATFORM

Cleymisom Queiroz da Trindade, Daniel Vitor Domont Ferreira, Carlos Alberto Tenório de Carvalho Júnior, Samuel Ferreira de Souza, Júlio Sancho Linhares Teixeira, Wilson Sacchi Peternele, Ciro José Egoavil Monteiro

In a series of breathalyzer measures the amount of alcohol per liter of alveolar air, which is air from the lungs. The project aims to develop a breathalyzer, using the gas sensor MQ-3, an Arduino Uno microcontroller, one liquid crystal display and a Bluetooth module. For each concentration of alcohol sensor determines a value displayed on the Arduino Uno Serial Port 'COM3' with a range from 0 to 1023, this corresponds to variation of the output voltage ranging from 0 to 5 volt circuit for each concentration. The concentration is measured and displayed on the LCD in a mobile phone through an application, the determination of the concentration present in the air.

A GENERAL NAIVE BAYES STYLE FUZZY PROBABILISTIC CLASSIFIER

Ronei Marcos de Moraes

Some kinds of naive Bayes style networks have been proposed, such as the multinomial naive Bayes, possibilistic naive Bayes and fuzzy Gaussian naive Bayes. However, a general formulation for a naive Bayes style fuzzy probabilistic network was not proposed yet. In this paper, we proposed a formulation for this kind of supervised classifier, using random variables without specifying any statistical distributions. This approach can be useful for classification purposes, when random variables can have different statistical distributions. A brief discussion about applications for data classification from health sciences is provided too.

ANALYSIS OF LIVER CYTOLOGICAL HISTOPATHOLOGICAL THE ACTION NANDROLONE DECANOATE (DECA-DURABOLIN) AS A RISK FACTOR FOR THE DEVELOPMENT OF HEPATOCELLULAR CARCINOMA IN RATTUS NOVERGICUS

Tatiele Barboza dos Reis Gomes, Marcia Silva de Oliveira, Anna Maly de Leão, Neves Eduardo

The Nandrolone Decanoate is a type of anabolic steroid that is used for regeneration of different tissues such as muscle and blood corneum. It is a synthetic androgen with molecular structure similar to testosterone. The drug has the ability to stimulate muscle growth and cellular resistance. Due to this benefit many people who do bodybuilding use it in excessive doses for better physical performance and aesthetic, making it one of the most commonly used drugs by gym goers. The AAS in medical point of view are drugs that are ingested without professional supervision cause the annulment of cardioprotection, AMI (acute myocardial infarction) and may

silently reflecting on the fifth most common tumor worldwide, liver cancer. Although good results initially with the use of Deca, it is feasible to do careful research to resolve this paradigm, which is to show the inevitability that the abuse of AAS can bring.

Session PM3A

CAROTENOIDS ACHIEVING FROM TOMATOES DISCARDED USING IONIC LIQUIDS AS EXTRACTING FOR APPLICATION IN FOOD INDUSTRY

Paula L. Martins, Veridiana V. de Rosso

This work aims to evaluate the application of ionic liquid to extraction carotenoids from discarded tomatoes to use in food industry as a bioactive component or natural colorant. Tomato samples that would be discarded were donated, without any classifications or selections of fruits. Different ionic liquid derivate of 1-n-butyl-3-methylimidazolium were tested in the extraction. Carotenoids determinations qualitative and quantitative were done using HPLC-PAD-MS/MS. Comparative of acetone a conventional solvent and ionic liquid extraction allowed estimate the most applicative techniques to obtain the carotenoids, specially the lycopene. Results were promising confirm hexafluorophosphate 1-butyl-3- methylimidazolium ionic liquid as the best able to extract 5.56 μ g/g of lycopene, value significantly higher than when the employee conventional solvent acetone with 3.65 μ g/g, concluding that ionic liquid application in extraction process is a viable alternative, which follow the Green Chemistry principals, minimizing contaminates and optimizing obtainment of nature pigments important, as the carotenoids.

FUNÇÃO DE PEDOTRANSFERÊNCIA PARA ESTIMATIVA DE TEOR DE CARBONO EM SOLO SOB ÁREAS DE CAMPO LIMPO ÚMIDO DO DISTRITO FEDERAL

Andreia M. S. França, Edson E. Sano, Arminda M. Carvalho

The objective of this research was to obtain a pedotransfer function to estimate the carbon content over humid grasslands of Federal District of Brazil. The estimation of carbon contents from low time-consuming data acquisition variables such as soil texture, represented a useful measurement not only to quantify carbon content but also to facilitate calculation of soil carbon storage which depends on availability of data regarding carbon content (grams of C/kg of soil) and bulk density. The pedofunction was described by a nonlinear regression and the evaluation of its efficiency of prediction was obtained based on coefficient of determination (R2), standard error of estimation and graphical interpretation. The carbon contents in Gleysols and Plintosols under humid grasslands were estimated successfully, with coefficient of determination higher than 0.8.

ARDWEATHER: UMA ESTAÇÃO METEOROLÓGICA BASEADA NO ARDUINO E EM WEB SERVICES RESTFUL

Alexandre Artimos de Araujo Elias, Jefferson Clyton Pereira da Silva, Rafael Napoleão Gonçalves, Thiago Silva-de-Souza

Weather stations are equipment used for weather and climate characterization. Areas such as Agriculture and Civil Defense require daily climate information more specific than those provided by TV programs. However, professional weather stations usually have high cost and complexity of operation, which restricts its use. This paper presents the ArdWeather, an integrated hardware and software system composed by a low cost weather station and a web application. The station uses an Arduino board equipped with sensors to measure the temperature, relative humidity, barometric pressure, wind speed, luminance and rain precipitation. The web application can display the data measured, send alerts via Twitter and manage similar weather stations. The features of the application were developed like RESTful Web Services, enabling other applications to integrate to the system

PROCESSOS HÍBRIDOS NA ARTE CONTEMPORÂNEA E NOVAS MÍDIAS: A LINGUAGEM COGNITIVA INTUITIVA APLICADA EM TECNOLOGIAS

Célio Martins da Matta, Pelópidas Cypriano Pel, Andre Martins da Matta

The article deals with the application of correlations Art Hybrid-interface, Technology, Visual Arts and New Media, applied to the embodiment of creative insights of artistic objects (works) or applications for use in communication and artistic processes. The paper presents partial results of doctoral research in development in the Masters and Doctorate in Fine Arts Institute of the Universidad Estadual Paulista.

REMOÇÃO DE CORANTE CATIÔNICO UTILIZANDO PÓ DE SEMENTES DE MORINGA OLEIFERA

Carlos Alexandre Borges Garcia, Simonise Figueiredo Amarante, Cyntia D'Angeles E. S. Barbosa, Olga Silva Santos, André Alves de Jesus, José Augusto Machado, Helenice Leite Garcia

The adsorption of methylene blue dye in aqueous solution was performed using seed powder as adsorbent Moringa low cost. The adsorption equilibrium of the system occurred after 300 min to methylene blue. The adsorption isotherms were analyzed by nonlinear modeling of Langmuir and Freundlich. The adsorption data were better described by the Freundlich model checked both by the values of the correlation coefficient as the agreement between theoretical and experimental results. For the kinetic test, the model that best set the experimental data was the Avrami model. The effect of the concentration tests showed that the adsorption capacity increased with increasing concentration of the adsorbent. The results show that the seed powder moringa oleifera is an effective adsorbent for removal of cationic dyes.

QUALIDADE DA ÁGUA NA CARCINICULTURA NA GRANDE ARACAJU-SERGIPE

Carlos Alexandre Borges Garcia, Gracylenne Prata dos Santos, Helenice Leite Garcia

This study aimed to analyze, through the physicochemical parameters, the quality of the water used in shrimp farming in the Great Aracaju, SE. The main parameters analyzed were, turbidity, total dissolved solids , dissolved oxygen, conductivity, total phosphorus, total nitrogen, ammonia, nitrate, nitrite, chlorophyll-a , biological and chemical oxygen demand, carbon total organic, salinity , three sampling campaigns . Samples were collected at three stations: two ponds and spillway. The total phosphorus, total nitrogen, total organic carbon, biological oxygen demand and dissolved oxygen exceeded the limit permitted by Brazilian legislation for brackish water class I. Levels of chemical oxygen demand were greater than those reported in other studies. The observed accumulation of nutrients may be related to the way of handling, feed, fertilizers, antibiotics; accumulated organic matter and use of the area as a disposal of domestic sewage in nature.

CARACTERIZAÇÃO QUÍMICA DO EFLUENTE DO PROCESSAMENTO DE MANDIOCA EM SERGIPE

Carlos Alexandre Borges Garcia, Ana Carla Santos Andrade, Anderson Lima de Menezes, Thamires Just Andrade, Helenice Leite Garcia

Advantages associated with the development and technological growth of manufacturing industries is the generation of a wide variety of wastes. The potential high polluting industrial waste involves studies on technologies aimed at minimizing the impacts of these pollutants. Commonly, these wastes are disposed without treatment or assess the implications in the receiving body, so that this common criminal practice and is still one of the biggest environmental problems facing humanity. Thus, there is the generation of waste and pollution of water bodies as the assumption that the technological development requires a robust and

updated environmental technology. In the scenario of cassava processing, an important factor with regard to the definition of the method of effluent treatment is the economic factor. This research is based on the characterization of the effluent from cassava processing for identifying a treatment as a means of adding value to cassava in the state of Sergipe.

CARACTERIZAÇÃO QUÍMICA DO EFLUENTE DO PROCESSAMENTO DE MANDIOCA EM SERGIPE

Carlos Alexandre Borges Garcia, Ana Carla Santos Andrade, Anderson Lima de Menezes, Thamires Just Andrade, Helenice Leite Garcia

Advantages associated with the development and technological growth of manufacturing industries is the generation of a wide variety of wastes. The potential high polluting industrial waste involves studies on technologies aimed at minimizing the impacts of these pollutants. Commonly, these wastes are disposed without treatment or assess the implications in the receiving body, so that this common criminal practice and is still one of the biggest environmental problems facing humanity. Thus, there is the generation of waste and pollution of water bodies as the assumption that the technological development requires a robust and updated environmental technology. In the scenario of cassava processing, an important factor with regard to the definition of the method of effluent treatment is the economic factor. This research is based on the characterization of the effluent from cassava processing for identifying a treatment as a means of adding value to cassava in the state of Sergipe.

ÍNDICES DE QUALIDADE DA ÁGUA DOS RESERVATÓRIOS DE SERGIPE

Helenice Leite Garcia, Carlos Alexandre Borges Garcia, Anairam Piedade de Souza Mel, Valdinete Lins da Silva

The environmental situation in areas surrounding the reservoirs of Sergipe has been alarmingly undermined by population growth and an analysis to establish sustainable development is unquestionably necessary and urgent. In this context, the present work aims to evaluate the water quality of the main reservoirs of the State on the basis of physical, chemical and biological parameters that embody the formulation of Water Quality Indices (SEQI). Were used environmental data provided by the Laboratory of Environmental Analytical Chemistry UFS and applied the different correlations IQA proposed in the literature to classify reservoirs accordance with the environmental regulations for such. The results show that urban growth in the vicinity of reservoirs, especially in relation to animal husbandry and horticultural activities, is putting the tanks in conditions that preclude the use of water for human consumption and that a policy of sustainable environmental development should be predominantly consolidated.

Session PM3B

INFLUÊNCIA DA URBANIZAÇÃO NO AUMENTO DA TEMPERATURA DA SUPERFÍCIE NA ILHA DO MARANHÃO

Fabrício B. Silva, C. H. L. Silva Junior, Ana Talita Galvão Freire, R. N. Lima Neto

The effects of urbanization on surface temperature have been widely demonstrated in scientific studies. The objective of this study was to evaluate the increase of surface temperature in relation to urbanization on the Ilha do Maranhão, in the period from 1975 to 2013. The estimated temperature was obtained by integration of temperature and NDVI from sensor MODIS and NDVI from sensor TM and OLI aboard the Landsat satellite. The results showed an increase of surface temperature mainly from 2000. During this period was observed increase in deforestation, removal of mangroves and increasing real estate projects.

O AMBIENTE GEOLÓGICO-PEDOLÓGICO DAS PLANÍCIES INUNDÁVEIS DO MARANHÃO E SUA FRAGILIDADE ÀS AÇÕES ANTRÓPICAS

Ana Talita Galvão Freire, J. J. Mendes, F. S. Brito, C. H. L. Silva Junior, R. N. Lima Neto

O The present study aimed to characterize the physical the lowland, with great economic potential for the state. This approach is based on geological, geomorphological, pedological, hydrological, climate and slope description. All belonging to the microregion of Maranhão Lowlands, which corresponds to north middle region of Maranhão, divided into 21 municipalities, having a significant part of the population of Maranhão. The Maranhão geological formation is structured according to the main, by the Training and Mudslides Itapecuru tidal Marine. The soils in the region are predominantly formed the Plinthosols, Epiaquic Tiomórfico, red-yellow Podzolic, Solonetz Solodizado. As a result two main geomorphological features were presented : the higher areas of marshland, as sublitorânea surface presents training Itapecuru yielding soils of red - yellow podzolic type and lower areas such as floodplains presents alúvio - Pleistocene colluvial as training, yielding soil type Solonetz – Solodizadosn.

MAPEAMENTO DA SUSCETIBILIDADE NATURAL A MOVIMENTOS DE MASSA PARA A BACIA HIDROGRÁFICA DO RIO ANIL, SÃO LUÍS – MA

C. H. L. Silva Junior, Fabrício B. Silva, D. C. A. Pereira, H. de M. Almeida, J. R. N. Santos

In urban areas to evaluate landslide risks requires knowledge about the conditions that affect the slope stability. The objective of this work was to map mass movement susceptibility across Rio Anil watershed in São Luis city at Maranhão state of Brazil. For this, were applied a spatial modelling methodology based in Fuzzy logic. Were used a dataset composed by thematic map of geology, geomorphology, soil type and numerical data of slope and terrain shape. The map resultant of this study showed that mass movement area with moderate susceptibility corresponds to most of study area. It would be explained due to high population density and vegetation cover suppression.

ANÁLISE ESPAÇO-TEMPORAL DA PRECIPITAÇÃO NO ESTADO DO MARANHÃO NO PERÍODO DE 2003 A 2012

Fabrício B. Silva, J. R. N. Santos, M. L. S. de Araújo, C. H. L. Silva Junior

Precipitation is the most important climatological variable in tropical regions specially in trasiction area between azmazon and savanna. This study was designed in order to conduct a study of climatological precipitation in Maranhão. Through three agro-meteorological bulletins will be released an analysis of precipitation. For both numerical predictions of precipitation global circulation were evaluated. On the outcome of this work can be stated that the precipitation decreased in the last decade in the state of Maranhão. Considering the data from 12 stations, 83.3% (10 stations) showed constancy in the rate of growth (ICC) negative in the last 10 years. Since the year 2011 not considered in the calculation of the ICC.

RELAÇÃO DE FATORES AMBIENTAIS E ANTRÓPICOS NA OCORRÊNCIA DE DESLIZAMENTOS NO MUNICÍPIO DE SÃO LUÍS – MA, BRASIL

H. de M. Almeida, C. H. L. Silva Junior, Fabrício B. Silva, Ana Talita Galvão Freire, J. J. Mendes

Landslides are considered modelers natural processes of the landscape and can be the result of natural processes or human activity. This study aimed to analyze the relationship between environmental and anthropogenic factors with the occurrence of slip in São Luís In the methodology adopted to compare the spatial distribution of risk in the study area with environmental and anthropogenic factors. The results obtained showed that factors such as soil, geology and slope are only part of a complex system that triggers the occurrence of landslides. The amount of occurrence is not related to the areas of greatest slope or less susceptible to the type of soil in relation to frailty, however, the population density has shown that the amount of slip and the occurrences are directly linked to the amount of homes per square mile, along with determining the occurrence of slip in São Luís.

A PEDAGOGIA DA SUSTENTABILIDADE NO CONTEXTO DA EDUCAÇÃO BÁSICA NO ESTADO DO MARANHÃO

Thalita Rachel C.C. Silva, Fabrício B. Silva, Luigi Lo Monaco

In Maranhão, socioeconomic indices reflect conditions of low quality of life coupled with strong environmental degradation. In this context the objective of this work was to propose sustainability pedagogy as a method to design of curriculum of fundamental education level. The current state educational policy, sustainability concepts have no grip on the teaching-learning process. The use of the principles of the pedagogy of sustainability in the design of curriculum guidelines and the state plan for education, will provide developing a pedagogical practice that existentially binds the individual to the environment.

ANÁLISE DE FOCOS DE QUEIMADAS NO PARQUE ESTADUAL DO MIRADOR UTILIZANDO UM SISTEMA DE INFORMAÇÃO GEOGRÁFICA – SIG, ESTADO DO MARANHÃO, BRASIL

J. M. Caldas, Fabrício B. Silva, C. H. L. Silva Junior

The present study presents the fire spots in the conservation area of the Mirador State Park, which is nestled in this region of the headwaters of the Rio Itapecuru which its waters supplying the capital of Maranhão State, among other municipalities. The study period is from 2002 to 2012, taking into consideration the fire spots available by INPE, using MODIS Aqua satellite and Earth. This work has as main objective the study of the focuses in PE Mirador as well as a spatial analysis of these foci in the park through Kernel method, and also, through an analysis of weather data available on BDMEP. It is very important to protect these areas, for this reason it is interesting to use various technologies to monitor these outbreaks, one of these is the remote sensing this tool that is becoming essential for environmental analysis.

Session PT1A

DETERMINAÇÃO SIMULTÂNEA DE DIPIRONA, CLONIDINA E CETOCONAZOL EM ÁGUAS DE ABASTECIMENTO PÚBLICO ATRAVÉS DE UM SENSOR A BASE DE QUITOSANA

Tamires Reis Menezes, José do Patrocínio Hora Alves, Carlos Alexandre Borges Garcia, Helenice Leite Garcia, Maria de Lara Palmeira de Macedo Arguelho

The monitoring of drug presence on environment has been growing as research interest about anthropogenic impact on aquatic biota. For instance, the indiscriminate use of antibiotic drugs has the increase in microbiological resistance, as well as a contamination of water resources, as a direct consequence. The chitosan is a biologically inert material which has great adsorptive capacity. In this work we propose a development of an electrochemical sensor based on chitosan applied to drugs analysis and monitoring. Some drugs from different chemical classes and from different pharmacological and physicochemical properties were chosen as models for application. Ketoconazole, dipyridamole and clonidine presented oxidation processes well defined, which allowed the definition of analytical parameters, such as linear range and detection limit. There was also the possibility of simultaneous analysis of dipyridamole and clonidine in acid medium and analysis of ketoconazole by reduction.

DETERMINAÇÃO DIRETA DO ACICLOVIR EM LEITE MATERNO PELO USO DE UM SENSOR ELETROQUIMICO

Jéssica Brito dos Santos Lima, Luciano Evangelista Fraga, José do Patrocínio Hora Alves, Carlos Alexandre Borges Garcia, Helenice Leite Garcia, Maria de Lara Palmeira de Macedo Arguelho

Acyclovir is an important antiviral drug of positive action on survival of immunosuppressed individuals. Nevertheless, there is a need for further comprehension among toxicological phenomena, which become even more relevant when related to lactation. Sensors development is an analytical proposal very attractive, from the viewpoint of direct analysis about drugs in complex samples, such as breast milk. In this work, it was developed an electrochemical sensor based on carbon paste, once appropriate conditions were in place to enhance signal resolution and analytical quality. In the determination of acyclovir into breast milk samples, collected and stored in natura, it was verified that sample volumes greater than 25 μ L can interfere with the analytical signal. Acyclovir presented electrochemical activity with peak of oxidation quite defined in 0,705 V vs (Ag/AgCl. The method employed presented suitable sensitivity, accuracy and precision for analysis of acyclovir in breast milk samples.

DESENVOLVIMENTO DE BIOSSENSSOR ENZIMÁTICO A BASE DE EXTRATO DE SEMENTE DE PINHÃO-MANSO (JATROPHA CURCAS L.) PARA DETECÇÃO DE COMPOSTOS FENÓLICOS

Jéssica Brito dos Santos Lima, Karine Oliveira de Barros, Renata Silva-Mann, Carlos Alexandre Borges Garcia, Helenice Leite Garcia, Maria de Lara Palmeira de Macedo Arguelho

Within the framework of environmental monitoring, the development of enzyme biosensors for detection of phenolic compounds has been focused by several researches. Phenolic compounds can be associated to pollution, depending on its nature and its concentration. The seeds of the species Jatropha curcas L., also known as physic nut, have been studied as an alternative source of biodiesel, however, the filter cake produced as by-product of oil extraction has a biochemical potential still little explored. In this work, it was obtained enzymatically active extracts from the filter cake made of physic nut seeds. Biosensors were modified from 1 up to 25% of biological element percentages. Scans were carried out using differential pulse voltammetry with variations on amplitude and scan speed. The biosensor presented activity in the presence of phenolic compounds and electroactivity change as a function of contact time with substrate.

ELETROQUÍMICA COMO FERRAMENTA EFICAZ NA REMOÇÃO DE FÁRMACOS EM ÁGUAS DE ABASTECIMENTO PÚBLICO

Natália Ribeiro Dórea, Renê Humberto Tavares Santos, Luciano Evangelista Fraga, Carlos Alexandre Borges Garcia, Helenice Leite Garcia, Maria de Lara Palmeira de Macedo Arguelho

In the last decades, pharmaceutical drugs have been highlighted as emerging contaminants. Water treatment conventional methods do not eliminate effectively and functionalized small molecules such as pharmaceutical drugs. The aciclovir is one of the most commonly used antiviral drugs. It is primarily used for the treatment of herpes simplex virus infections. Its pharmacological importance and widespread use motivated the choice of this pharmaceutical drug as application model of the method developed in this work. For monitoring the electro-degradation process of the pharmaceutical drug in water supply, an analytical curve was obtained by spectrophotometry. For optimization of the variables that influence the electro-degradation process, were used electrodes of titanium oxide in acid solutions or saline solutions. Cyclic voltammetry showed that the electrode surface is not altered after electrochemical oxidation in the presence of chloride and in optimal conditions.

ESTUDO DA APLICABILIDADE DO CARVÃO ATIVO QUIMICAMENTE TRATADO NA REMOÇÃO DE COR EM EFLUENTE DE TINTURARIAS

Natália Ribeiro Dórea, João Baptista Severo Júnior, Carlos Alexandre Borges Garcia, Helenice Leite Garcia, Maria de Lara Palmeira de Macedo Arguelho

The adsorption of dyes in carbonaceous adsorbents has been theme of lots of researches on new materials for wastewater treatment. In this work, the adsorption of Reactive Orange 16 Dye was investigated using Carbon, activated by phosphoric acid 85%, as adsorbent. The study indicates that the dye's adsorption has physical and endothermic nature, showing low activation energy value (34 kJ mol-1). The kinetic parameters show that an elevation in the temperature of the system provokes increase of the initial adsorption rate associated a pseudo-second rate constant. The values of enthalpy of activation, Gibbs energy and entropy of activation indicate that the final activation process occurs with energy absorption and decrease in randomness of the solid/solution system, however, there was not significant change in the carbon's internal structure.

ELABORAÇÃO DE UM SOFTWARE PARA REALIZAR ESTIMAÇÃO DE PARÂMETROS APLICADOS À CINÉTICA ENZIMÁTICA

Fernanda Palmeira Beatriz, Carlos Alexandre Borges Garcia, Helenice Leite Garcia, Maria de Lara Palmeira de Macedo Arguelho, João Baptista Severo Júnior

Parameter estimation for mathematical models related to enzyme kinetics, as reported in the literature, has been usually inappropriate, due to disregard of suitable statistical analysis. The most common model used is the Michaelis-Menten one. Such model often has been rewritten on linear forms for its parameter estimation. It simplifies the estimation, however, it fails to give due consideration to statistical assumptions. The present work aimed to develop software, supported by the Fortran 90 programming language, capable to do appropriate estimation of kinetic model parameters, through linear regression and non-linear form, according to the model preferred by the user. To achieve this, the necessary adaptations were made on ESTIMA. It is of great importance good parameter estimation, especially when it is intended to project a process in bigger scales. Therefore, this software should be a very useful tool in academic and industrial scenes.

UTILIZAÇÃO DO PLANEJAMENTO FATORIAL PARA ANÁLISE DE ERROS EM PROCESSOS DE ADSORÇÃO

Fernanda Palmeira Beatriz , Carlos Alexandre Borges Garcia , Helenice Leite Garcia , Maria de Lara Palmeira de Macedo Arguelho , João Baptista Severo Júnior

Not only is factorial design of experiments known for its satisfactory results within a reduced number of experiments, it is also very efficient on identification of process variables influences. This paper presents an application of such experimental design on adsorption processes, so that it can be verified the behavior of experimental errors according to input variables. Therefore, the necessary data was obtained through adsorption experiments in stirred tank, with five replications for each condition, in order to calculate the outcome variable, in this case, the variance. Methylene blue dye was used as adsorbate, varying solution concentrations and volumes, and activated carbon was used as adsorbent. Evaluating the results achieved, it was observed that error values were greater around the central point. Furthermore, it was possible to verify that the variable which had more influence on dataset was concentration.

Session PT1B

A EFETIVIDADE DE ÁREAS PROTEGIDAS NA CONTENÇÃO DA CONVERSÃO ANTRÓPICA DE HABITATS NATURAIS NA REGIÃO NUCLEAR DO BIOMA CERRADO

Rodrigo José Oliveira Paiva, Ricardo Seixas Brites

Studies evaluating the effectiveness of Protected Areas under the focus of natural habitat conservation define effectiveness as a measure of its influence to avoid the advance of anthropogenic conversion of natural areas. The overall objective of the study is to evaluate the effectiveness of conservation units in the core region of the Brazil's Cerrado Biome, taking into account the influence of the restriction degree and governmental sphere on the performance of protected areas. It is desirable that such analyzes control the statistic bias caused by the correlation error and / or autocorrelation, which can generate underestimate or overestimate results. With the use of GIS tools and the Mahalanobis Score Matching method, it was possible to control these sources of bias. The results showed a positive influence of Protected Areas, with variations due to the restriction degree, and also the governmental sphere to which the Protected Areas belong.

BOTCH4: UM ROBÔ REMOTAMENTE CONTROLADO PARA DETECÇÃO DE GÁS METANO EM ATERROS SANITÁRIOS

Thiago Silva-de-Souza, Daniel Soares da Silva, Eliane dos Santos Estanislau, Alessandro de Almeida Castro Cerqueira

Generally, the methane leak detection in landfills is performed manually. Although nontoxic, methane is a flammable gas, which can become highly dangerous for humans. In this paper, we introduce BotCH4, an integrated hardware and software system that aims to automatize methane emission monitoring in landfills and biogas production sites. BotCH4 consists of a robot and an Android application. The robot comprises, among other equipment, an Arduino board, a gas sensor and GSM and Bluetooth modules. Through Android application one can remotely control the robot's movements and measure the methane concentration in certain spots. The result in parts per million (ppm) is sent by SMS. The robot also has line followers sensors making it capable of operating in automatic mode, following a predetermined circuit.

ESTRATÉGIAS PARA CARACTERIZAÇÃO DOS RESÍDUOS SÓLIDOS GERADOS EM COMUNIDADES AMAZÔNICA

Ellem Cristiane de Sousa Morais Contente, Viviane de Oliveira Lima Zeferino, Lilyanne Rocha Garcez, Maria de Nazaré Alves da Silva, Taty Anny Cristine F. de Souza

The problematic of solid waste acquired in the last years a vital importance due to the increase of the generated quantities and its inappropriate management. The Amazonian cities are copies of the country's reality, since most of them are excluded from the home collection system of solid waste and face difficulties to set an urban cleaning system within the sanitary standards. In this context, the present study aimed to present the strategies used to characterize the solid waste and also indicate appropriated final destination alternatives within the study area. Thus, the study involved two stages, in the first moment methodological tools were applied to the recognition of the area and the mobilization of the community in the binomial context of public health and solid waste. In the second stage, waste characterization was performed by gravimetric and volumetric determination of compositions generating a quantitative and qualitative identification that contribute to the waste management plan.

PLANO DE AMOSTRAGEM DA QUALIDADE DE ÁGUA EM COMUNIDADES AMAZÔNICA

Viviane de Oliveira Lima Zeferino, Ellem Cristiane de Sousa Morais Contente

To the characterization of the water quality in a given area it's necessary the elaboration of a sampling plan based in essentials standards like present legislation, local specificities which

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means seasonality and arrival logistic in the study area. Associated to these factors, can also be detached the organization of the support laboratory. Thus, the purpose of this study was based in the elaboration of a sampling plan of the water quality according to their major uses, according to the local characteristics of Amazonian communities, located in Presidente Figueiredo City/AM and able to be replicated in others communities of the region. With this purpose, the study was structured following these steps: identification of main uses of water, definition of sampling points according to its main uses, sampling frequency, quantity of samples, analysis parameters, volume calculation per sample and parameters in locu.

CARACTERIZAÇÃO HIDROGEOQUÍMICA DA ÁGUA SUBTERRÂNEA DA COMUNIDADE FÉ EM DEUS - PRESIDENTE FIGUEIREDO - AM

Lorena Mota de Castro, Nathalie Brites Paiva Santos, Viviane de Oliveira Lima Zeferino, Ellem Cristiane de Sousa Morais Contente, Maína Barreto de Souza

The chemistry composition of underground water is a reflection of the means where it percolates, being influenced by the types of drained rocks and also by adjacent human activities. The exploitation of these resources should follow the norms in force in order to provide drinking water and meet population demand. The reality faced by Fé em Deus community, located in Presidente Figueiredo City/AM, is the need to a plan for monitoring the subsurface water quality available to the population. The sampling plan consisted in periodic collection of wells output following the region seasonal cycle, analysis on situ and laboratory of physical and chemical parameters. The results were compared with published data about the chemical composition of the study area soil. For systematization and analysis of monitoring data, some tools of descriptive statistics were applied and checked for compliance with the limits established by current legislation.

AVALIAÇÃO DOS PARÂMETROS FÍSICO-QUÍMICOS DAS LAGOAS COSTEIRAS DO PARQUE DAS DUNAS, SALVADOR-BA

Elaine Santos de Souza, Manoel Jerônimo Moreira Cruz

The study on understanding the dynamics of physic-chemical parameters in water bodies is essential to understand the functioning of aquatic ecosystems. Thus, the present study it is necessary to know the actual chemical composition of the dune ecosystem that is considered an important area of groundwater recharge. Therefore, this study aims to evaluate the physic-chemical parameters of coastal lagoons of Parque das Dunas, Salvador - BA, using the spatial variation of some limnological variables in six coastal lagoons, in this urban area. The samples were collected and analyzed at the laboratory of Institute of Geosciences of UFBa. The parameters studied were: temperature, pH, turbidity, conductivity, DO, total dissolved solids, salinity, nitrate, sulfate, OBD and chlorophyll a. Five lakes had values above the nitrate established by CONAMA Resolution 357/05 (10mg/L).

O DESIGN COMO ESTRATÉGIA DE MOBILIZAÇÃO PARA A GESTÃO INTEGRADA DE RECURSOS HÍDRICOS

Patrícia Rocha Santos, Annunziata Donadio Chateaubriand, Jacqueline Carril Ferreira da Rocha, Adorea Rebello da Cunha Albuquerque, Elizabeth Ferreira Cartaxo

The PIRAHIBA Project (Integrated Planning of Hydropower Reservoirs in the Amazon Basin), Federal University of Amazonas, since November, 2010, has developed actions that contribute to the integrated and participatory management of UHE Balbina Reservoir, President Figueiredo/Amazonas, continually seeking involvement of residents and representatives of local organizations. In this regard and in order to continue the process of mobilization and training in four pilot communities located in its surroundings, workshops MY HOUSE, MY SCHOOL, MY COMMUNITY were performed when results of characterization studies of land use were presented and water, made by groups Water & Communities and Geography PIRAHIBA Project, with the involvement of local residents and governmental and nongovernmental organizations. This paper therefore presents the role and importance of the products developed by Design in the mobilization process.

Session PT1C

ESTUDO PARA IMPLANTAÇÃO DE UM NOVO SISTEMA DE TRANSPORTE PÚBLICO EM SÃO CAETANO DO SUL

Leandro H. S. de Deus, Nereu P. C. Antonio, Ricardo K. Taira, Roberto T. F. Silva, Pedro José da Silva

In recent decades the Metropolitan Region of São Paulo experienced a major economic and population growth, in particular the ABC region. The city of São Caetano do Sul has the best Human Development Index of the country, however it has an efficient transportation system, capable of meeting the needs of its residents during peak hours. The present work aims to study the alternatives and promoting the value of public transportation. The methodology is based on a descriptive study, it is to observe and record events that occur in a given space of the real world, identified as São Caetano do Sul, which then features a Case Study. It is presented as a result a proposal consists of the implementation of two circular rows around the central city, stem fed by radial lines passing through neighborhoods in great demand, linking them to future monorail stations.

MELHORAMENTOS DO PORTO DE SANTOS PARA SUA ADEQUAÇÃO À CONDIÇÃO DE PORTO CONCENTRADOR

Marília Guimarães Bondezan, Jéssica Rêgo de Mello, Pedro José da Silva

Since the beginning of the great civilizations in the Mediterranean, the economy was mostly conducted through the sea routes, and therefore water transport has become essential for the development of trade. This study aims to analyze the main problems at the Port of Santos and propose solutions, such as the works of improvements, so the Port of Santos can fit condition hub port. The methodology is based on a descriptive survey or study because it consists of observing and recording events that occur in a given space of the real world, identified as Port of Santos, which then features a Case Study. Results stand out as other requirements that are not physical, characterized by the works of improvements but also the need for companies to adhere to the Port of Santos as a Port Concentrator, thus moving a larger amount of charge

MULTIMODALIDADE APLICADA AO ESCOAMENTO DAS PRINCIPAIS MASSAS ECONÔMICAS COM DESTINO À EXPORTAÇÃO PELO PORTO DE SANTOS

Marcelo Gemignani, Thaion B. Lambais, Thais C. F. Rocha, Pedro José da Silva

The paper describes the current transport system involved in the flow of the main cargoes for export through the Port of Santos. This study aims to identify the modes of transportation improvements based on further study of the marketing of soy production in Mato Grosso, accelerating socioeconomic development of the country. The methodology is based on an exploratory study, as seeking to establish correlations between events analyzed. It presents results in a study that identifies the need for increased investment in transportation infrastructure is important, not only for the soybean complex, but also to considerable reduction in the cost Brazil, that will encourage the Brazilian agricultural and industrial production, and for both presents some proposals, such as unitization of cargo; adequacy of the mesh unitised system; duplication and road paving; expansion of the rail network; modernization of intermodal terminals; rail ring in the MRSP.

A ACESSIBILIDADE DOS EDIFICIOS NA UNIVERSIDADE ESTADUAL DE SANTA CRUZ

Protasio Ferreira e Castro, Ludmille Souza Santos, Thiago Pacheco Fernandes, Marcela Moura Herculano, Jacqueline Costa dos Santos

The process of social integration for disabled person is also attended when undergraduate courses in higher education institutions are offered. Studying at a university is a right for disabled people to have a dignified professional life. This paper presents an accessibility analysis to some buildings at the State University of Santa Cruz, in Ilheus, Bahia. Accessibility conditions of hallways, stairs, lifts, ramps, bathrooms and classrooms, were analyzed. Based on requirements of the Ministry of Education a form for accessibility evaluation was carried out. The form was applied to the case study here presented. Several actions are required to overthrow architectural barriers and no other is less than that disposed warning signals on the way.

A POLÍTICA DE SAÚDE DA MULHER E SUA EFETIVAÇÃO POR MEIO DOS PROCESSOS DE TRABALHO DA ENFERMAGEM

Bruna Lopes da Silva, Ulisses Umbelino dos Anjos, Ana Tereza Medeiros Cavalcanti da Silva

Women's health is a brazilian government's priority, but until now the health actions failed to contemplate the women's needs. The nursing, even being a profession near to the population, in practice can't attend women fully. Therefore, the aim of this study was to evaluate the process of work related to women's health, accomplished by nurses of Health District I in João Pessoa. For this we carried out a study with a sample of 20 nurses, with questionnaires, which were subjected to Cluster Analysis to identify the elements of the work process and your consonance with the Public Health Model. The work process performed by nurses was fragmented, the work elements are not related, because they are not targeted to a single health model, not allowing the realization of actions that reach the women's biopsychosocial.

A IMPORTÂNCIA DO CONSUMO EQUILIBRADO DE ÁGUA PARA MANUTENÇÃO E PROMOÇÃO DA SAÚDE: UMA REFLEXÃO A PARTIR DA PERCEPÇÃO DOS ALUNOS DO ENSINO MÉDIO

Viviane O. L. Zeferino

The water is revealed as life natural foundation, since it is vital for balancing and maintenance of species, being the only mineral that is associated with all human activities, but among its multiple uses stands out the use for human consumption. Anyway, the transport of substances into or out of the cell, the regulation of body temperature and most of the chemical reactions that occur in it depends on the aqueous medium, among other contributions. However there are several controversies regarding the adequate daily intake of water necessary to the body equilibrium, based on this standoff, this action aims to know the perception that high school students of a public school, from Manaus-Am, have about the relation between balanced water consumption and maintenance and health promotion, as well as understand the multiple factors that they consider to be associated with fluid replacement.

RESPOSTA DE EQUILÍBRIO CORPORAL EM CONDIÇÃO DE INSTABILIDADE COM USO DE TÊNIS HABITUAL E DESCALÇO

Glauce Gonzaga Silva, Luiz Heleno Moreira Duque, Tamotsu Hirata

The practice of activities of daily living encounter in various unstable surfaces. Therefore, it is necessary that adjustment of the musculoskeletal system such conditions. The present study aims to investigate the body balance response in their biomechanical aspects on an unstable surface. The unstable surface was created using a balance board generally adopted by physiotherapists for treatment of patients in rehabilitation. The experiments were performed with bare feet and tennis shoes. Biomechanical parameters such as oscillation period in anterior to

posterior direction, lower limb joint angles and muscle activity during simulation of instability were analyzed. The sample was selected 12 university volunteers aged 25.7 ± 4.3 years, weight 55.7 ± 7.0 kg and height of 1.6 ± 0.1 m. The results showed a significant difference in joint angles and muscle activities, especially in the posterior oscillation between two conditions evaluated.

Session PT2A

GESTÃO DE SISTEMAS DE INFORMAÇÃO E GOVERNANÇA DE TI EM BIBLIOTECAS DIGITAIS

Francisco Carlos Paletta, Edison Puig Maldonado, Audilio Gonzales Aguilar

This work aims to discuss the role of Information Technology Governance in Digital Library, its structures, processes and relational mechanisms to control the formulation and implementation of an IT strategy to support the Library operational mode in the digital environment. We analyze the dynamics of ICT and its ability to generate innovations with direct impact on the services provided by the Library. Analyzing the organizational models of Libraries that stand out in the use of technology, the study points out the best practices on three key aspects to an effective organization of IT: defining the most appropriate organizational structure, functions and critical competencies that should be centralized and governance for investments in technology that allows Digital Libraries to reach tangible and sustainable results.

DOSIMETRIA DE CAMPO MAGNÉTICO NA BIBLIOTECA CENTRAL DA FUNDAÇÃO UNIVERSIDADE FEDERAL DE RONDÔNIA - UNIR

Judson Cascaes Matos, Rogério Marcos da Silva, Carlos Alberto Tenório de Carvalho Júnior, Ciro José Egoavil Monteiro

This research presents the development and application of a methodology to perform dosimetry levels of magnetic fields at 60 Hz power frequency in the Central Library Roberto Pires Duarte, located on campus José Ribeiro Filho, Federal University of Rondônia Foundation, the city of Porto Velho, capital of the state of Rondônia. All equipment used to perform the dosimetry field is described in the main project. The levels of magnetic field are analyzed and compared with the maximum allowable limits for human exposure established by international and national standards (ABNT) and adopted by WHO since the high intensity magnetic fields can induce currents that can go through the human body, causing in some cases, discomfort or stimulation of nerves and muscles. And for cases where such levels exceed the preset limits, measures to mitigate the magnetic field should be adopted.

EFICIÊNCIA DE TECIDOS FOTOPROTETORES COMO EQUIPAMENTO DE PROTEÇÃO INDIVIDUAL CONTRA OS EFEITOS NOCIVOS DA RADIAÇÃO ULTRAVIOLETA

Claudio Orestes Britto Filho, Juliana Meira de Vasconcelos Xavier

Excessive sun exposure has contributed significantly to negative health impacts. The main measure to minimize the damage caused by ultraviolet radiation photoprotection is through chemical protectors, accessories and clothing. However, some types of fabrics do not provide sufficient protection. New textile products, with the incorporation of particles of inorganic sunscreens, has been the subject of research. The research aimed to evaluate the effectiveness of sunscreen fabrics such as personal protective equipment. The development of the study was based on the analytical method of literature review. Protective clothing can be an effective strategy to be implemented.

ESTIMATIVA DE EMISSÃO DE COMPOSTOS ORGÂNICOS VOLÁTEIS DE UM POSTO DE ABASTECIMENTO DE COMBUSTÍVEL E SEUS IMPACTOS NO AMBIENTE

Amanda Fereira Diniz, Claudio Lins Schoendorfer, Ligia Cristina Gonçalves de Siqueira

Volatile organic compounds (VOCs) are a class of air pollutants which are emitted from various sources, such as industries, vehicles, storage and distribution of crude oil products. This study aimed to quantify the emissions of these compounds on the basis of regulatory issuance of the U.S. Environmental Protection Agency (USEPA) emission factors considering the sources of emission of a gas fuel supply, which only sells alcohol and gasoline. The total of those emissions amounts to about 22 tCOVs/year. Extrapolation was performed considering that the total number of service stations that sell gasoline and ethanol in the Metropolitan Region of São Paulo is 2,211, reaching a total of about 50,000 tCOVs/year only issued for the sale of gasoline and alcohol. It was concluded that these emissions can be considered representative and cause adverse effects on the environment and health with adoption of necessary measures for its reduction and effects.

EMISSÕES DE DIOXINAS E FURANOS NA PRODUÇÃO DE CARVÃO VEGETAL EM FORNOS RUDIMENTARES

Ligia Cristina Gonçalves de Siqueira, João Vicente de Assunção, Maria Yumiko Tominag, Lady Virginia Traldi Meneses, Nilson Silva Soares, Sergio Alex Constant de Almeida

Brazil is a major global producer of charcoal, mainly from eucalyptus. In São Paulo, charcoal producers are in rural areas and use rudimentary kilns. As the carbonization process of wood involves temperatures in the range of formation of dioxins and furans, it is important to check its quantification to support impact studies on the environment and on the health of exposed populations. Samples of ambient air, charcoal and ashes were collected and analyzed according to current methodology. The concentrations of dioxins and furans in ambient air are close to those found in several Brazilian cities, concluding that they are in levels of urban atmospheric air, but can not be neglected. For coal and ashes, the results showed values are close to, but above the detection limit of the analytical method used, indicating that the content in both is very low and for the vinegar the results are very low too.

INTEGRA.SAÚDE: UM MODELO PARA INTEGRAÇÃO DAS UNIDADES ENVOLVIDAS NA EXECUÇÃO DE EXAMES LABORATORIAIS PELO SUS

Manoel Albino Neto, Fabiana Souza Santos, Rodrigo Cândido Borges

In most Brazilian cities inland, marking laboratory procedures by the Unified Health System (SUS) comply with bureaucratic and costly steps. Often, the tests prescribed by doctors in hospitals or public payphones are not performed in situ, access to the private network of laboratories is needed. This means in general the Departments of Health are driven mainly by poor people in grants to fund crave exams. Fragmentation, and the computerization of these steps does not cause inconvenience to those involved, especially delaying the care of patients. Given scenario, this paper proposes a model for integration of the units involved in this process: Public Health Centers, Clinical Laboratories and Departments of Health. Named Integra.Saúde, the model adds variables aimed at interoperability between distributed information, encapsulating requirements to meet specific mobile and ubiquitous computing.

DA AGENDA 21 À AGENDA SOCIOAMBIENTAL: UM DESAFIO PARA O INSTITUTO FEDERAL DE EDUCAÇÃO CIÊNCIA E TECNOLOGIA FARROUPILHA – CÂMPUS SANTA ROSA

Raquel Fernanda Ghellar Canova, Arnedio Canova, Rafael Lopes Ferreira

This article presents the main actions developed by the project "Building a Social and Environmental agenda" for the Federal Institute of Education, Science and Technology, Farrukhabad (IFF), Santa Rosa campus, performed in the years 2011 and 2012. This is a project that had as one of the documents discussed and referrals generated during the 2nd World Conference on the Environment, Rio +20, held in Rio de Janeiro. To understand the decisions of this event, is initially made a brief report on world conferences on the environment. Global, National and Local: after a brief tessitura on the theoretical aspects of the environmental agenda are presented. As the project was developed in a public institution, it is justified the importance of this article to show how to apply in practice an environmental project and thus set an example to the general public on environmental issues.

Session PT2B

PRAÇAS, PARQUES E PASSEIOS PARA AMORTECER ENCHENTES URBANAS: PLANILHA ELETRÔNICA PARA DIMENSIONAR REVESTIMENTOS POROSOS

André Luiz de Lima Reda, Carolina de Oliveira Barbosa, Ludmilla Hanna Ribeiro El Atra, Ana Júlia Ferreira Rocha, Ana Lúcia Bragança Pinheiro

Designing park, square and walk-pavement drainage systems offers great opportunities to 'capture' rainfall water near to precipitation sites, either through local soil infiltration, or stormwater reservation basins. The faster urban infrastructure designers and Architects perceive this, the easier for implementing sustainable urban development. In fact, retention of rainfall waters upstream at hydrologic catchments is crucial for reducing surface flood volume and peak at downstream inundation-prone sites; recharging underground-water reserves, and busting water retention upstream – either in the channels, underground, or inside purpose-built reservoirs. This paper presents a simple method for designing drainage systems for parks, squares, walking areas or sport-court surfaces based on a purpose-built electronic spreadsheet. It considers peak attenuation by underground infiltration through porous soils with vegetation, porous pavements and different porous substrata, or by low-slope surface flow. The spreadsheet can compute surface volumes leaving a drainage-area outlet for proposed combinations of covering layers and design rainfall events.

APROVEITAMENTO DO LIXO URBANO PELO PROCESSO DE COMPOSTAGEM

Terezinha Jocelen Masson, Leila Figueiredo de Miranda, Antonio Hortêncio Munhoz Jr.

For centuries, the societies have produced goods easy and lasting assimilation and decomposition based on natural raw materials or slightly processed goods. The waste generated were inert or readily degradable and not such a problem. After Second World War there was a period of exceptional development that brought with it a radical change in patterns of production and consumption, and over the years, many cities have suffered from the disordered growth, bringing increased as a direct consequence of urban waste and all the problems related to it. From a socio-economic and environmental term, among the solutions studied, is that composting is the recycling of household waste, and compost produced is used in agriculture as organic fertilizer or even to avoid erosion. This paper analyzed the efficiency of the composting process, the compost quality, changes over time (natural aspects, changes in consumer habits), and their use by farmers.

METODOLOGIA PARA O ENSINO DE FÍSICA NOS CURSOS DE ENGENHARIA DA UNIVERSIDADE PRESBITERIANA MACKENZIE

Terezinha Jocelen Masson, Leila Figueiredo de Miranda, Gilberto Teixeira da Silva, Antonio Hortêncio Munhoz Jr.

In this paper, we present a methodology that uses an interactive learning environment for teaching Physics, integrating resources of the web technology and digital media with a

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consistent didactic-pedagogic project. The research and development of new teaching methodologies to facilitate the teaching-learning process have become an important factor in education, both formal and non-formal, as a pedagogical strategy, especially the increasingly easier access to Internet and digital media. This methodology, with the characteristics of distance learning courses has been deployed in the School of Engineering, Mackenzie Presbyterian University, discipline General Physics I for students who already attended in person and have been deprecated in order to motivate them to continue their studies, reducing the dropout so characteristic in the first semesters of engineering courses.

WORKSHOP – TROCA DE EXPERIÊNCIAS NO ENSINO DE ENGENHARIA

Leila Figueiredo de Miranda, Terezinha Jocelen Masson, Antonio Hortêncio Munhoz Jr.

This reports methodological activities to integrate subjects of the Materials Science Engineering Course syllabus, both within a single course stage (horizontal integration), and among subjects from different stages (vertical integration). The methodology is to study a problem or situation that motivates and encourages knowledge acquisition, competence development stimulation, skills and professional attitudes through Workshops organization. Workshops are held every semester, involving 5 to 8 students from each final stage, encouraging mutual cooperation among them. In its 13th edition, these workshops aim at enabling student teams to study and develop current issues not addressed in classrooms, discussing multidisciplinary questions. The "feedback" takes place by means of questions, when each group orally presents their solutions to a tutor, who evaluates and discusses them with everyone. In every issue, students end up unanimously accepting this project development – this becoming evident in the great interest demonstrated through participation in the discussions.

COMO REDUZIR OS IMPACTOS AMBIENTAIS ATRAVÉS DO ECOTURISMO LAGOA AZUL SUSTENTÁVEL

Elton Carlos Eller Pedroso, Hélio Nery Junior

This article is about ecotourism project that seeks to integrate ecological concerns with social and economic development in the Blue Lagoon and the neighborhoods that surround it in Caraguatatuba-SP, in a sustainable way in order to keep alive the caiçara culture. For both ideas were worked out partnerships with NGOs and the creation of a cooperative and capabilities with regard to inclusion of the local community in tourism. The idea of the project is also providing the tourist pleasure in sports, cultural activities, which may reflect and enjoy nature in a way that maintains the point preserved for future generations to enjoy the same, the richness of the local flora and fauna. Anyway, what is expected is a change in attitude to environmental issues, because through rules and procedures can generate behaviors for the good of nature and community, creating a fully sustainable development.

BIODIVERSIDADE URBANA: UM ESTUDO NOS QUINTAIS DO BAIRRO MUTIRÃO, ABAETETUBA, PA, BRASIL

Gerciene de Jesus Miranda Lobato, Flávia Cristina Araújo Lucas, Ana Cláudia Caldeira Tavares-Martins, Mário Augusto Gonçalves Jardim

Urban backyards represent a source of natural resources to the people who live and survive of plant cultivation and animal husbandry. Culturally, engaged role in the identity of individuals, expressed, among others, through the knowledge of plants. The objective is to demonstrate the importance of natural resources in the quality of life of Mutirão, Abaetetuba, PA neighborhood population. Using semi-structured interviews and participant observation, where the informants (n =103) were selected by random sampling. Plants (29.02%) and animals (22.99%) characterize urban backyards surveyed, which define and delineate, meet the needs of its inhabitants. The most frequent species were food (44.9 %) and medicines (28.7 %). Such resources used for subsistence (89.32 %), allow low reliance on products purchased externally.

Plant cultivation and animal husbandry strengthens popular knowledge as there are social interactions based on the exchange of botanical material and information (income, farming), in addition to improving quality of life.

PESQUISA AMBIENTAL PARA DEMONSTRAR O IMPACTO CAUSADO PELO USO DO HERBICIDA GLIFOSATO EM PANICUM MILIACEUM L. ORGANISMOS EM ENSAIOS ECOTOXICOLÓGICOS

Larissa F. Ferreira, Rafaela de Castro, Marcia Regina M. Barbosa, Julian Boccato, Virgílio de A. Pereira, Ronaldo T. Pelegrini

The Glyphosate herbicide is used in brazilian agriculture. One way to evaluate the impacts from the herbicide on the environment is use seeds as organisms tests in toxicity assays. This study refer to an ecotoxicological concentrations evaluation from glyphosate agrochemical on Panicum miliaceum L. In this research, it was used macro and micro nutrients under optimized conditions for develop seeds plant embryos. It was also used ÁGAR in the medium as a support material to help the seedling growth. The technique allowed to evaluate in the tests performed the chronic toxicity caused by agrochemical in period of 168 hours. In this test was used 50 Panicum miliaceum L. semeds in PET containers which were placed 25 mL of ÁGAR in the medium. Concentrations from 8,0 mg.L-1 Glyphosate showed chronic toxicity for the studied species. The analytical technique presented itself as a simple, safe and high sensitivity methodology for ecotoxicological evaluations.

Session PT2C

ANÁLISE DA DISTRIBUIÇÃO ESPACIAL DA TUBERCULOSE NO MUNICÍPIO DE JOÃO PESSOA-PB EM 2011

Frederico Fávaro Ribeiro, Joabson Gomes Rodriges, Jodavid de Araújo Ferreira, Ronei Marcos de Moraes

Tuberculosis is an infectious disease with cases around world. In Brazil, the Paraiba state was the 18th in the rank of the Brazilian states with higher incidence, with 6 municipalities classified as priority for tuberculosis control, including its capital: João Pessoa city. The study aimed to identify spatial clusters of tuberculosis in João Pessoa in the period from January to December, 2011. An ecological study was conducted, using secondary data from tuberculosis cases residents in João Pessoa. Relative risk maps and maps of the spatial scan method for all months in the study were generated. The neighborhoods with the highest relative risks were detected by the scan method and classified as spatial clusters. They are concentrated mainly in the north of the city. Thus, it was possible to detect priority areas, which can support health managers in their efforts to control tuberculosis in the city.

CURSO DE APERFEIÇOAMENTO EM EDUCAÇÃO AMBIENTAL: RELATO DE EXPERIÊNCIA DE FORMAÇÃO DE PROFESSORES DA REDE PÚBLICA

Germano O. Ribeiro, Herik Zednik, F. Herbert L. Vasconcelos, Cintia O. Sales, Ana Karina C. Holanda

This article describes the experience of teacher training Course in Environmental Education, offered to public school teachers of Ceará State, in 2012, the Federal University of Ceará in partnership with the Ministry of Education and the Department of Continuing Education, Literacy and Inclusion. The objective of this work is to socialize the experience, identifying the positive variables (motivation, interest and availability) as well as negative variables (short period of time for completion of the course and level and quantity of activities). The study made a chronological survey of the main facts that accompanied the development of the course, as well as glare and deepening the discussions involving the tripod: Distance Education, Teacher Training and Environmental Theme.

MODELO E-M: GESTÃO TECNOPEDAGÓGICA – ANÁLISE DA FERRAMENTA AVALIATIVA

Herik Zednik, Liane Margarida R. Tarouco, Luis R. Klering, Eder Paulus M. Guerra, Ana Garcia-Valcárcel

The e-Maturity Model (e-M) – Management techno-pedagogical features a self-assessment questionnaire to support the management of technology in an educational perspective and assist the school community in monitoring the actions and progress of strategic use, efficient and innovative information technology and communication in order to put technology at the service of improving educational outcomes. The instrument was based on the tools e-learning Maturity Model-eMM; Self Review Framework for ICT and model CM3600 In this sense, this work is justified by the importance and need to test and validate the self-assessment questionnaire e-M.

INTEGRAÇÃO DE SISTEMAS DE GERENCIAMENTO EM EMPRESAS DO SETOR DE ENGENHARIA CONSULTIVA E DE PROJETOS: UMA REVISÃO DA LITERATURA

Marco Antonio Cortellazzi Franco, José Carlos Curvelo Santana

Historically, the approach of organizations to address the quality of its products, the impacts of their activities on society and the environment, the health and safety of its employees, is made in isolation, without integrating the activities involved. As organizations get different certifications becomes evident the need for an integrated management system (IMS) that integrates the elements common to each system and avoid redundancies. In this scenario, the objective of this study was analyze, using a systematic literature review and bibliometric techniques, how are the articles that deal with the application of the subject in Consulting Engineering and Project companies, its quantity, specialties addressed in publications and trends regarding the applicability of IMS in this sector. The results indicate some publications aimed at the construction companies and few that deal with the subject in companies dedicated to industrial projects.

ESTUDO DE CASO : APLICAÇÃO DOS CONCEITOS DO SISTEMA TOYOTA DE PRODUÇÃO NO PROCESSO DE MANUFATURA PARA MELHORIA DA QUALIDADE

José Carlos Curvelo Santana, Felipe Calarge, Fabiana Giusti Serra

The Toyota Production System implementation at Toyota's Brazilian Suppliers parts is called Jishuken and it is a voluntary practice of waste elimination in workflow. The Quality does not have a relevance approach, once it is intrinsic of process inside Toyota's plant. The main gains of Jishuken are productive resource available and cost reduction. In 2007 Toyota of Brasil started the Jishuken activities in their Supply parts chain looking for disseminating Toyota Production System. Through an analysis of correlation in a quantitative method between PPM indicator performance and quality relevance at Jishuken's activities that were implemented in the same time, in assembly and welding process. The relevance shows up in the PPM indicator evolution, for 2012; Analyzing too how the seven manufacturing wastes has an impact at product's quality.

A EXPERIMENTAÇÃO DE ALGUMAS REAÇÕES APLICÁVEIS À DISCIPLINA QUÍMICA NO ENSINO MÉDIO: LIMITES E CONTRIBUIÇÕES PARA O APRENDIZADO

Everaldo Costa, Marcel B. N. Quaresma, Simone de Fátima P. Pereira

Basic education seeks form critical and aware citizens able to interpret and transform reality. Thus, aim of this work is to foster student interest in the research and knowledge of chemicals elements used in everyday life. It is known that the theory is important for scientific knowledge, however, concrete implementation methods are necessary to ensure greater absorption of the contents. Justified the selection of the theme because that their use will ensure the integration of teaching strategies, promote learning and to make information more accessible. The survey was conducted by chemical experiments and directive questionnaires administered to high school students. The results are shown graphically and it shows the interest of students by subject and by the Chemistry laboratory practice focused on the social context. The work is composed of introduction, theoretical framework, methodology, discussion of results and final considerations.

DIAGNÓSTICO DA MATÉRIA-PRIMA ARGILOSA EMPREGADA NA PRODUÇÃO DE BLOCOS CERÂMICOS ESTRUTURAIS EM CAMPOS DOS GOYTACAZES-RJ, BRASIL

Neila Gondim de Azeredo, Jonas Alexandre, Afonso Rangel Garcez de Azevedo

This work dealt with the evaluation of the properties of the clay used in the production of structural clay brick masonry by a red-brick plant in Campos dos Goytacazes, RJ, Brazil. Structural clay brick masonry is used in buildings up to five floors providing a reduction on the total cost of their constructions and also a reduction on environmental impacts, once brick is made from abundant natural resources and is readily recycled for use in the manufacturing process or other uses, besides its reduced cost. Utilizing structural brick masonry buildings can help meet requirements for fire resistance, thermal comfort, durability, acoustic comfort, reduction in the use of wooden mold and still used in concrete conventional buildings, possibility of using the holes as cables conduits for electricity, among other advantages that turns the king of construction design attractive as cost reduction and reduction of other materials that cause environmental impacts.

Session PT3A

RECONHECIMENTO E CLASSIFICAÇÃO DE METAIS PESADOS EM ÁGUA ATRAVÉS DA MUDANÇA DE COR DA MOLÉCULA DIFENILTIOCARBOZONA

Edmilson Roberto Braga, Mauro Sérgio Braga, Walter Borysow, Osmar F. Gomes, Walter J. Salcedo

The present work reports a methodology of classification and recognition of metal ions of cadmium, chromium, mercury and zinc respectively. For this purpose we used a solution of Diphenylthiocarbazona in methanol as a sensitive system leveraging the photochrome property of this molecule when complexed with metal ions. The proposed classification method using principal component analysis of Fourier coefficients corresponding to the absorption curves fitting proved to be efficient. The read of the color shift of Diphenylthiocarbozona in methanol solution, after the addition of different concentrations of metal ions, was obtained with the RGB sensor integrated into a mobile system smartphone, the results of RGB levels reading by this process showed the possibility of using this system for in situ analysis of the concentration of metal ions in rivers.

SENSOR ÓPTICO MULTIFUNCIONAL PARA DETECÇÃO DE O2 E OXIGÊNIO DISSOLVIDO

Mauro Sérgio Braga, Victor F. Borges, Guilherme M. Gonçalves, Osmar F. Gomes, Walter J. Salcedo

Oxygen (O2) and dissolved oxygen (OD) sensors are of great importance to monitor the quality of water in rivers and in the environment. Conventionally sensors applied for this purpose are based on photoluminescent emission of dying molecules which require photoluminescent equipment. In this context, the present work reports the fabrication and response analysis of sensors based on photoluminescent emission of platinum octaethylporphyrin (PtOEP) molecules that were directly deposited on the active region of an optoelectronic detector. The sensors fabricated in this way showed excellent response to O2 and DO allowing great possibilities of application for in situ monitoring systems

RECONHECIMENTO DE PADRÕES DAS IMAGENS QUIMICAS GERADAS POR SENSOR DE GÁS TIPO CAPACITOR MOS

Walter Borysow, Filipe B. Magalhães, Mauro Sérgio Braga, Walter J. Salcedo

This paper reports the result of pattern recognition and classification of gas response of a MOS chemical image sensor. The chemical images were obtained by scanning pulsed light on the sensitive surface of the sensor. With this sensor were analyzed responses of H2 and NH3 gases at different concentrations. To perform pattern recognition analysis of images, two different chemical methods have been proposed, co-occurrence matrix and histogram of intensities of gray levels methods, from which they were extracted characteristic parameters of images. The final classification process was performed by principal component analysis (PCA) of the characteristic parameters. The proposed methods were satisfactory and robust to the concentration of the gases.

NR-32 E A PRÁTICA ACADÊMICA DE ENFERMAGEM RELACIONANDO SEGURANÇA E SAÚDE DOS ACADÊMICOS DO CURSO DE ENFERMAGEM

Nailde Melo Santos, José Nazareth Barbosa Filho, Isaura Letícia Tavares Palmeira Rolim, Ana Hélia de Lima Sardinha

This is a study of the experience report type, which has the objective of reporting the experience of a teacher of nursing verifying the application of the NR-32 with the nursing academics. It was used as methodology the theoretical foundation from the contents of the course of Management of Nursing Care of the graduation course in a private university of Maranhão, coupled with practical experience in laboratory and hospital environments. In the results, were discussed the aspects of NR-32 focused in the academics' practical experiences in application of the practice and focused in the precepts of regulamentation. It was concluded that academics of nursing have knowledge and availability to use the law in the accident prevention and health maintenance, in addition to extensive contribution of the subject content in academic practice.

CONDIÇÕES DE VIDA E SAÚDE DAS POPULAÇÕES DAS FLORESTAS PLANTADAS NA REGIÃO SUL DO BRASIL

Olga Maria Panhoca da Silva, Jane Kelly Oliveira Friestino

The purpose is to compare the living conditions of the areas whose main economic activity is the wood monoculture (Madeira) with regions that have continued with traditional economic activities (AET). Although southern Brazil has a privileged position in the Human Development there is a concomitant occurrence of poverty within areas of wood monoculture. To demonstrate the two areas outlined above, it was necessary to construct two algorithms; presence each one to show the intensity and presence of the respective activity in each area. The analysis began with a quantitative focus (health index) and continuous to a documentary approach. Reading documents showed generally big disadvantage of wood monoculture' area and their exclusion from the knowledge integrated into policy and science. At the conclusion were proven worse socioeconomic status and health in populations living with wood monoculture, highlighting problems like mortality from tuberculosis, violence and lower life expectancy.

IMPLEMENTAÇÃO DE UM APLICATIVO BASEADO EM ONTOLOGIAS PARA AUXILIAR ESPECIALISTAS NA SOLICITAÇÃO DE ANÁLISES ZOOSSANITÁRIAS

Silvia Maria Farani Costa, José Carlos Dos Santos, Karina Ramirez Starikoff, Francisco Javier Ramirez Fernandez

This article presents the development of a complementary module to the Epidemiological Risk Alert System that can assist users - clients and veterinarians - to identify which tests should be requested based on the symptoms reported by technical support in the field. The Computerized Management System of Epidemiological Risk Alerts (SARE) allows sending alerts to the relevant bodies, Agricultural and Stock-Breeding Defense Coordinator (CDA) and Ministry of Agriculture, Livestock and Supply (MAPA), so that they make sanitary arrangements, in order to add security and reliability to the data transmission. An ontological approach was used to formally specify the domain of this application, i.e., the representation of knowledge in the veterinary field, requiring the survey of the formal and informal terms used in order to model the system to assist the experts (clients and veterinarians) on the request via Web of the appropriate tests to situations verified in a field study.

PROTÓTIPO DE UM VEÍCULO COM ESTEIRAS A PARTIR DE MATERIAIS RECICLADOS

Falcondes J. M. Seixas, Francisco C. V. Malange, Claudiner M. Seixas, José Gabriel S. Farinassi, Priscila da Silva Oliveira

Small vehicles featuring treadmills, usually driven by DC motors and powered by batteries, can be applied to solve different problems in everyday life. For example, it can help a worker to carry a commodity, can be used as a model to build an electric wheelchair and even being part of "anti-bomb robot", it's all about creativity. For the control and operation of this vehicle the DC electric motors, which will drive the treadmill, need a robust and efficient circuit. Therefore this work proposes a rotation direction controller circuit of the DC motors, using components that emulate a switch, such as relays, BJT, MOSFETs, IGBTs or GTOs.

A PRODUÇÃO DE BIODIESEL POR MEIO DA ALOE VERA (BABOSA)

Marcelo Silva, André Escafura, Alessandro Ricardo Stange, Vitor Hugo Pereira Junior

Biofuels are fuels produced from organic material, called biomass, sourced from renewable sources, which can be vegetable oils and animal fat. Among the best-known sources are sugarcane, corn, soybeans, sunflower seed, wood, pulp, vegetable oil, and other materials that are being researched in universities and companies associated with the industry. The process of biodiesel through the aloe - known as Aloe - using as feedstock types of alcohol (methanol and/or ethanol), so that in case a catalyst bound to form an ester (trans esterification process) to obtain a product and byproduct (biodiesel and glycerin) shows a sustainable viability.

ANÁLISE DA CARGA MENTAL DE ESTUDANTES E PROFISSIONAIS DE TECNOLOGIA DA INFORMAÇÃO

Cristina Corrêa de Oliveira, Liliam Sayuri Sakamoto, Nelio Fernando Reis, Jair Minoro Abe, Andre Lira, Álvaro André Colombero Prado

The NASA-TLX is a multidimensional instrument used to measure mental workload. It will be used to conduct the evaluation of mental workload for the activities of the students of Information Technology in order to understand the difficulties and productivity to determine factors of cognitive and physical burden and future consequences at work. This is a cross-sectional, exploratory study observatory, using self-administered instrument in four groups of subjects dealing software development, and has already been applied in two classes on different occasions. Data is being collected through a questionnaire containing six dimensions with responses ranging from 1 to 20, with 1 being low and 20 very high. Are 79 respondents, 77.2% men, 48.1% are in the range 17-20 years old, 62% indicate that mental workload is high, 64% indicate that the temporal load is high.

Session PT3B

EFEITOS INERCIAIS E OS MÉTODOS DE ACOPLAMENTO PRESSÃO-VELOCIDADE NA OBTENÇÃO DAS SOLUÇÕES NUMÉRICAS PARA O ENSINO DE FLUIDODINÂMICA

Clauândria Ferreira Domingos Neris, Janaina Conversani Botari, Alexandre Botari

In the present work is employed the finite volume method to display a numerical solution by running the pressure-velocity coupling for three methods: PRIME, MAC and SOLA. It's considering fluid in a laminar flow, incompressible, two-dimensional, in permanent regime (with the profile of fully developed speeds) of a Newtonian isotropic Stokesian fluid, in the region of input between two flat plates, long, parallel, horizontal, of negligible thickness. Has as objective to establish the methods of pressure-velocity coupling and the inertial effects on obtaining the equations for a numerical solution by finite volumes as an example for teaching of numerical analysis computational fluid dynamics. The algorithm was developed in the visual basic language for Excel. Flow simulations were performed to Reynolds number in the range of values known as the Forchheimer Regime (Rey < 150) that characterizes laminar regime with the introduction of some initial inertial disturbance.

AVALIAÇÃO SAZONAL DO CONFORTO AMBIENTAL TÉRMICO EM ESPAÇOS PÚBLICOS ABERTOS NO MUNICÍPIO DE UMUARAMA-PR

Alexandre Botari, Janaina Conversani Botari, Guilherme Stevanato Araujo, Clauândria Ferreira Domingos Neris, Bruna Isabelle de Almeida

Having the user as "figure" inserted in the environment, the importance of open public spaces while landscapes built gains haste with the world trend to promote the sustainability of these spaces. The focus is on environmental variables of comfort which is the fundamental premise for the permanence and the multiple uses of these open spaces of local cultural and social references. However, research is scarce relating to environmental agents. Thermal well-being in these spaces is of fundamental importance. In the city of Umuarama-PR there are currently thirty public squares, the squares will be addressed in this work representative located in Avenida Brazil, a major axis of the city which covers the squares Santos Dumont, John Paul VI and Plaza Brasília. Will be presented an analysis of the seasonal evaluation in terms of measurements of the variables of luminous intensity and relative humidity at various points of the above mentioned squares.

EFICIÊNCIA DA FILTRAÇÃO DE EFLUENTES EM LEITO DE AREIA EM FUNÇÃO DA VARIAÇÃO DA GRANULOMETRIA E DA TAXA DE APLICAÇÃO SUPERFICIAL

Renato Rafael La Serra, Janaina Conversani Botari, Alexandre Botari

The process of wastewater treatment by filtration is considered a simplified technology of effluent treatment, however, its effectiveness in terms of removal of COD and TSS is well known. The objective of this work is to demonstrate the efficiency of the use of the filtering process in sand bed on removal of COD and TSS. Different size grains in the sand bed were employed and different application rates of effluent. This work seeks to develop technological proposals in the form of ditches or filtration filters more effective and simple operation and maintenance for the treatment of effluent by filtration. Removal values were obtained of COD to the tune of up to 60% at the premises in bench-scale simulating filters or filtration ditches used in this work. The effluent was synthetic, based on protein and/or glucose with or without cultures of bacteria and fungi.

ANÁLISE E MODELAÇÃO MATEMÁTICA DO RECRESCIMENTO DE FLOCOS EM ÁGUA COM TURBIDEZ ELEVADA

Vera Ramos dos Santos, Janaina Conversani Botari, Alexandre Botari

The correct dimensioning and operation of flocculation stage affects directly the performance of a water treatment plant. This process occurs after adding iron or aluminum salts and the rapid shaking of the mixture. In this step occurs slow agitation of that mix, if take place turbulence in the water can cause the rupture of the flakes, causing the phenomenon of re-flocculation or regrowing of the flakes. The re-flocculation can cause change in water features, such as, change of turbidity and alteration in the time of sedimentation. This work investigated the phenomenon of re-growing of the flakes and proposes mathematical modelling of flocculation and reflocculation, in order to compare if in fact there is a significant improvement between the processes. To do so was used the equipment jars type (jartest) and also water with high turbidity, around 100 uT, which was introduced in the study water using a kaolinite suspension.

UMA PROPOSTA DE ADEQUAÇÃO TERMO-ACÚSTICA AMBIENTAL PARA ESPAÇOS PÚBLICOS ABERTOS NO MUNICÍPIO DE UMUARAMA-PR

Alexandre Botari, Janaina Conversani Botari

The importance of open public spaces while landscapes built gains haste with the global trend in the use of vernacular architecture and function of social inclusion and sustainability of these spaces. However, research is rare relating to environmental agents. The acoustic and thermal well-being in these spaces is of fundamental importance. In the city of Umuarama-PR there are currently thirty public squares. This work will address the representative squares located in Avenida Brazil, a major axis of the city which covers the squares Santos Dumont, John Paul VI and Plaza Brasília. Proposed a set of urban and landscape interventions with an emphasis on sustainable techniques and elements of vernacular architecture in a historical and cultural perspective of open public spaces with a focus in environmental acoustic and thermal comfort.

ESTUDOS DO REGIME SAZONAL DE RUÍDO AMBIENTAL EM ESPAÇOS PÚBLICOS ABERTOS NO MUNICÍPIO DE UMUARAMA-PR

Alexandre Botari, Janaina Conversani Botari, Guilherme Stevanato Araujo, Clauândria Ferreira Domingos Neris, Bruna Isabelle de Almeida

Admittedly the metropolitan areas in development countries are environments that present numerous environmental problems of use and occupation land, among them: lack of wastewater treatment; irregular occupation of the grid; increased waterproofing; "heat islands"; intense levels of ambient noise, etc. Acoustic well-being in these spaces is of fundamental importance for the promotion of their use and permanence. In the city of Umuarama-PR there are currently thirty public squares. This work will address the representative squares located in Avenida Brazil, a major axis of the city which covers the squares Santos Dumont, John Paul VI and Plaza Brasília. Is presented an analysis of the seasonal regime of loudness and levels of environmental noise in multiple points of these squares, with a focus on exposure suffered by its users and regulars.

ANÁLISE DE MODELO MATEMÁTICO MONODISPERSO PARA A REMOÇÃO DE PARTÍCULAS NA FILTRAÇÃO UTILIZANDO MÉTODO DE LEVENBERG-MARQUARDT

Alexandre Botari, Janaina Conversani Botari

Mathematical modeling for models monodisperse suspensions removal constitutes a challenge in terms of both complexity algorithmic and computational performance depending on the complexity of the interrelationships between the particles of various sizes and spatial configurations. The present work analyzes the efficiency of particle removal by comparing the direct up and down filtration, a mathematical model of monodisperse particle removal in filtration, using the method of Levenberg-Marquardt. Double filtration tests were used on a pilot scale, with data filtering up and quick filter descendant to the sensitivity analysis and calibration of models. Disparate results were obtained with the regression coefficient for multivariate equations (R2) of the order of 50% up to 99% of adherence to experimental data. These results indicate the feasibility of models and the need for further studies in the subject.

ECONOMIA DE VOLUMES E ESPAÇOS UTILIZADOS PELOS RESÍDUOS SOLIDOS URBANOS DEPOSITADOS NO ATERRO SANITÁRIO DA CACHIMBA-CURITIBA PR

Adalberto Koodi Takeda, Inês J. M. Takeda, Alexandre Botari, Janaina Conversani Botari, Cintia Tiemi Misugi, Luis Celso Coelho da Silva

Between 1989 to 2011 were saved 85,778.86 m3 in space in the Cachimba landfill which 9,501.94 m3 from "Trush that is not junk" program that represents a percentage of 11.08%, of the program "Green Exchange", 2,281.89 m3 representing a percentage of 2.66% and recyclable material collectors with 73,995.03 m3 representing a percentage of 86.26%. The selective collection contributed 1.25% of materials that no longer go to the Cachimba's landfill since 1989 to 2011 in relation to safe spaces from domiciliary waste. In environmental terms the project of selective collection of Curitiba is considered that had its beginning in 1989 and after 23 years of activity resulted in an excellent level achieved by promoting the protection of soil, air and water sources. In addition to the volumes saved in the landfill must consider the reuse of materials, which resulted in direct energy savings and preservation of natural resources.

ESPAÇOS OCUPADOS PELOS RESÍDUOS SOLIDOS URBANOS DEPOSITADO NO ATERRO SANITÁRIO DA CACHIMBA-CURITIBA

Adalberto Koodi Takeda, Inês J. M. Takeda, Alexandre Botari, Janaina Conversani Botari, Cintia Tiemi Misugi, Luis Celso Coelho da Silva

In the period of 1989 to 2011 was occupied a space of 10,920,410.00 m3 of which 6,843,312.03 m3 domiciliary waste of Curitiba representing a percentage of 62.66%. The municipalities of the metropolitan region of Curitiba with 1.621049.03 m3 representing a percentage of 14.84 percent, private companies with 1,741,970.70 m3 representing a percentage of 15.95%, residues of the program "Buy the Trash" with 161,622.06 m3 representing a percentage of 1.48%, and the remaining waste 552,456.00 m3 representing a percentage of 5.07 percent. Faced with the new environmental order, the requirement for preservation of natural resources, the need to save energy and especially in abrupt change in composition of trash in recent years, as increased recyclable materials, it becomes imperative that not only the implementation of selective waste collection programs in municipalities, as its analysis.

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