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REDUÇÃO DE SALINIDADE EM CULTIVO HIDROPÔNICO DE CAPIM VETIVER (*Vetiveria zizanioides*) E AGUAPÉ (*Eichhornia crassipes*)

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Liséte Celina Lange [1]
Marcel Giovanni Costa França [2]

SALINITY REDUCTION IN A HYDROPONIC GROWING OF VETIVER GRASS (Vetiveria zizanioides) AND WATER HYACINTH (Eichhornia crassipes)

Recibido el 31 de enero de 2012; Aceptado el 7 de septiembre de 2012

Abstract

This study aimed to evaluate the ion extraction capacity of two plant species, the vetiver grass (*Vetiveria zizanioides*) and water hyacinth (*Eichhornia crassipes*), grown in experimental hydroponic units simulating a Floating System. The hydroponic system used nutrient solutions (A1 and A2) composed of fixed concentrations of macro and micronutrients that had been added to two different concentrations of sodium chloride, resulting in initial electrical conductivities of 1.89 and 5.12 dS m^{-1}, respectively. Physicochemical and quantitative changes in the salinized solutions, as well as visual symptoms of stress were compared in the plants, after experimental treatments. Despite the significant volume reduction in solution A1 (31.5%), the water hyacinth was distinct in its estimated extraction of calcium (52.2%), magnesium (47.6%), sodium (16.5%) and cloride (14.1%) meanwhile, at the same conditions, the vetiver grass and control group had similar performance. The increasing salinity of the A2 solution only promoted significant removal of calcium and magnesium (on average, the water hyacinth reached 27.7 and 26.2% of estimated extraction and the vetiver grass, 13.0 and 11.9%, respectively).

Key Words: nutrient removal, soilless cultivation, vetiver grass, water hyacinth.

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FOTOCATÁLISE HETEROGÊNEA ASSOCIADA A ELETRO-OXIDAÇÃO NO PRÉ-TRATAMENTO DE ÁGUA EUTROFIZADA EM UMA ESTAÇÃO PILOTO DE TRATAMENTO DE ÁGUA

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Marisete Dantas de Aquino [1]

HETEROGENEOUS PHOTOCATALYSIS ASSOCIATED WITH ELECTRO-OXIDATION IN THE PRE-TREATMENT OF EUTROPHIC WATER IN A PILOT STATION OF WATER TREATMENT

Recibido el 8 de febrero de 2012; Aceptado el 7 de septiembre de 2012

Abstract

The pre-chlorination is a practice performed in many water treatment plants in order to reduce the organic load. However, this practice leads to the formation of chlorinated products considered carcinogenic. This fact has raised interest in the development or improvement of techniques that can eliminate or reduce the use of chemical pre-oxidation. In this context, the aim of this research was to study the electrooxidation performance associated with heterogeneous photocatalysis (photoreactor) comparing to the employment of chlorine and chlorine dioxide, evaluating the quality of treated water in terms of chemical oxygen demand, chlorophyll a, turbidity and trichlormethane formation. After the pre-oxidation of the samples, they were subjected to coagulation with HCA (5.4 $mg.l^{-1}$), cationic polymer (2.0 $mg.l^{-1}$), descending direct filtration and post chlorination (5.0 $mg.l^{-1}$). Samples were collected at 30 and 90 minutes after the beginning of the career filtration and were analyzed according to Standard Methods for Examination of Water and Wastewater. The average results for turbidity removal reached 95.57% (chlorine), 96.23% (chlorine dioxide) and 99.5% (with the photoreactor). For COD removal was obtained an average of 37.45% (chlorine), 49.45% (chlorine dioxide) and 65.5% (photoreactor). The average of chlorophyll removal was 91.94% (chlorine), 94.04% (chlorine dioxide) and 98.97% (photoreactor). TTHM produced reached concentrations of 104.07 $\mu g.l^{-1}$ (chloro), 88.85 $\mu g.l^{-1}$ (chlorine dioxide) and 77.20 $\mu g.l^{-1}$ (photoreactor). The photoreactor was capable of producing water within the standards established for water quality. In the meantime, the photoreactor is presented as a technology which enhances coagulation, by increasing the precipitation capacity of dissolved compounds, thus increasing the filtration efficiency, and minimizes by-products of chlorination.

Key Words: electro-oxidation; heterogeneous photocatalysis; pre-treatment of eutrophic water

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DETERMINAÇÃO DE METANOL EM ÁGUAS DE LAVAGEM PROVENIENTES DA PURIFICAÇÃO DO BIODIESEL DE ÓLEO DE TILÁPIA POR CROMATOGRAFIA GASOSA

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Carlos Márcio Soares Rocha [1]
Fernando Pedro Dias [1]
Marcelo Monteiro Parente Valente [2]
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DETERMINATION OF METHANOL IN WASHING WATERS PROCEEDING FROM THE PURIFICATION OF TILAPIA OIL BIODIESEL THROUGH GAS CHROMATOGRAPHY

Recibido el 20 de marzo de 2012; Aceptado el 7 de septiembre de 2012

Abstract

Derived from renewable energy and considered an environmentally friendly biodiesel is an alternative to replace petroleum fuels. The raw materials used to produce biodiesel may be of vegetable or animal origin. The oil extracted from the fish viscera, appears as an interesting resource to be used in the production of biodiesel in the state of Ceará, the Castanhão dam, has one of the largest farms of tilapia. As a disadvantage the disposal of the fish viscera in soils and waters, causes serious environmental problems. Aiming to minimize the aforementioned problem, the Center for Industrial Technology Foundation of Ceará (NUTEC) conducted a survey aiming the utilization of such organs to produce biodiesel, has shown to be practicable. However, during the purification step of biodiesel, washing waters are generated and, when the alcohol used in the transesterification reaction is methanol, the launch these washing waters, makes the environmental impacts more aggravated. Because methanol is a toxic compound, the research aimed to determine its content by gas chromatography, according to European Standard EN-14110/2001. Based on the results obtained, it was concluded that the washing waters cannot be discarded, second (CONAMA 430/11).

Keywords: Biodiesel, water washing, methanol.

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DISTRIBUCIÓN DE CADMIO POR SEDIMENTOS URBANOS EN ÁREAS IMPERMEABLES DE PORTO ALEGRE (BRASIL)

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CADMIUM DISTRIBUTION BY URBAN SEDIMENTS ON IMPERMEABLE AREAS OF PORTO ALEGRE (BRAZIL)

Recibido el 8 de mayo de 2012; Aceptado el 7 de septiembre de 2012

Abstract

Urban environments may be considered as sources of pollution and, consequently, important agents in degradation of bodies of water due to the input of a large quantity of substances, which are transported from the drainage basin through surface run-off. Heavy metals, as cadmium (Cd), are subproducts of industrial activities; however, in recent years, studies have shown that even in residential areas results have indicated high concentrations of this element. This study measured the Cd concentrations in 20 composed samples of urban sediments samples collected from an urban basin of 5 km² with three kinds of soil occupation (residential, commercial and industrial) located in the city of Porto Alegre – RS. Concentrations of metal were determined by acid digestion (EPA 3050) in 209, 150, 63 e 45 µm grain size fractions followed by atomic emission spectrophotometry with inductively coupled plasma.

Mean values of 0.5 (± 0.5); 0.62 (± 0.75); 0.87 (± 1.17); 1.12 (± 1.5) e 1.69 (± 2.37) $\mu g.g^{-1}$ were obtained for 209, 150, 90, 63 and 45 µm grain size fraction, respectively. Cd concentrations were interpolated (Inverse Distance Weight) and represented geographically using Idrisi© Andes software. The results of the interpolations have permitted to observe high concentrations in the commercial and residential areas, characterized by high fluxes of vehicles most part of the day, so considered a potential source of cadmium. This study is important because it allows the establishment of control objectives within sustainable management of water resources, concerning future cenarios of local water resources.

Key words: Cadmium, diffuse pollution, GIS, urban sediment.

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BIOFILTRO ANAERÓBIO UTILIZADO NO PÓS-TRATAMENTO DE EFLUENTES DE REATOR UASB – UM ESTUDO EM ESCALA REAL

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ANAEROBIC BIOFILTER USED FOR POST-TREATMENT OF THE EFFLUENT OF AN UASB REACTOR – A FULL-SCALE STUDY

Recibido el 11 de noviembre de 2011; Aceptado el 7 de septiembre de 2012

Abstract

There are several technologies for the treatment of domestic wastewater. The anaerobic reactors and waste stabilization ponds are used in wastewater treatment in tropical regions. The most common alternatives used for post-treatment of effluents from anaerobic reactors are maturation pond, anaerobic biofilter, aerated ponds and activated sludge. The aim of this study was to evaluate the applicability of an anaerobic process (anaerobic filter) for post-treatment of effluent from the UASB reactor treating domestic wastewater in the city of Palmas, Tocantins state, northern Brazil. The bamboo has been used as a means of support of the anaerobic filter. The studies were based on analysis of samples taken during the treatment system. Samples were collected weekly at three points of the experimental system: (1) raw sewage, (2) the anaerobic reactor effluent and (3) final effluent of the anaerobic filter with bamboo. The study carried out in anaerobic filter confirmed the applicability of the anaerobic filter unit as post-treatment process. The system has high efficiency in removing suspended solids. In the case of variable BOD, the effluent of the experimental system met the discharge standards throughout the monitored period, according to the Brazilian resolution, CONAMA No. 430/2011. However, the experimental system showed low removal of nutrients (nitrogen and phosphorus), indicating that the anaerobic reactors have a poor ability to remove these elements in the treatment process.

Key Words: anaerobic filter, bamboo, UASB reactor, wastewater.

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ELECTROCOAGULACIÓN: UNA ALTERNATIVA PARA DEPURACIÓN DE LACTOSUERO RESIDUAL

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ELECTROCOAGULATION: AN ALTERNATIVE FOR TREATMENT OF RESIDUAL WHEY

Recibido el 25 de abril de 2012; Aceptado el 12 de octubre de 2012

Abstract

The aim of this study was to gather the most relevant and current affairs has on the applicability of the technique of electrocoagulation in removing pollutants in aqueous solutions, as well as the potential to be applied in reducing the very high organic loads presented by the serum derived from the dairy industry in cheese making. A review of electrocoagulation, discussing the challenges and opportunities of this technology, showing its potential application, their advantages and ultimately raised the reaction mechanisms and the design and operation of the reactors. From this perspective, electrocoagulation becomes an electrochemical process that can have successful results in their application by optimizing the factors that shape it, reaching the challenge to protect, conserve and restore water resources. When the whey is also called economic advantage and becomes an aqueous waste is discharged to the canals of sewage, environmental impact magnified by the increase in COD. Apply new techniques to reduce organic loads with high efficiency in this type of waste is a challenge today.

Keyword: electrocoagulation; liquid effluents; chemical oxygen demand; zeta potential; efficiency.

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ESTUDO DE TRATABILIDADE DE EFLUENTES GERADO NA ANÁLISE DE ESPECTROMETRIA DE ABSORÇÃO ATÔMICA POR PRECIPITAÇÃO SELETIVA, ADIÇÃO DE COAGULANTE, ADIÇÃO DE COAGULANTE MAIS ADSORÇÃO COM CARVÃO ATIVADO E SOMENTE CARVÃO ATIVADO

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Aline Garcia [1]
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TREATABILITY STUDY OF WASTEWATER GENERATED IN THE ANALYSIS OF ATOMIC ABSORPTION SPECTROMETRY BY SELECTIVE PRECIPITATION, ADDITION OF COAGULANT, ADDITION OF COAGULANT MORE ADSORPTION WITH ACTIVATED CHARCOAL AND ACTIVATED CHARCOAL ONLY

Recibido el 16 de mayo de 2012; Aceptado el 15 de octubre de 2012

Abstract

The study evaluated the removal of the metals cadmium (Cd), copper (Cu), Lead (Pb), Chromium (Cr), nickel (Ni) and zinc (Zn) present in the effluent generated in the analysis of atomic absorption spectrometry using the four treatments: selective precipitation, precipitation by addition of coagulant, coagulant precipitation by adding more and activated carbon adsorption treatment by activated carbon adsorption. The treatments were 100% removal of bands of pH above 8. In this case, to release the effluent, the pH should be adjusted to meet current legislation.

Key words: coagulation, adsorption, heavy metals.

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PERCEPÇÃO AMBIENTAL DO CONSUMIDOR QUANTO A IMPLANTAÇÃO DO SELO VERDE NOS POSTOS REVENDEDORES DE COMBUSTÍVEIS DE NATAL-RN

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CONSUMER PERCEPTION OF ENVIRONMENTAL SEAL FOR DEPLOYMENT IN GREEN FUEL STATIONS DEALERS OF NATAL-RN

Recibido el 9 de mayo de 2012; Aceptado el 12 de noviembre de 2012

Abstract

This paper presents the results of a survey administered to consumers of fuel service stations in the city of Natal-RN, and perception of environmental factors involved: the existence of a green label to the segment in that city, degree of impact environmental activity, provision of measures to society more environmentally attractive but with higher cost and design of an index to measure such results. The survey was administered to 300 popular, in 10 different stations in the city of Natal-RN, during the process of supply. We heard 80% of consumers of gasoline and 20% diesel fuel. The results point to an appropriate environmental perception index of 60% and it was a strong tendency for a linear inversely proportional to age of respondents. The disclosure of this issue is a point of improvement to foster the concept of environmentally friendly consumer, since the deviations observed with the search results.

Keywords: environmental perception, fuels and fuel stations.

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REVISTA AIDIS

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CORREÇÕES NO PROJETO EXECUTIVO DO ATERRO METROPOLITANO OESTE DE CAUCAIA – ASMOC, COM VISTAS A SOLUCIONAR PROBLEMAS DE CONCEPÇÃO DA DRENAGEM DOS LIQUIDOS PERCOLADOS

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Marisete Dantas de Aquino [1]
Alisislet Dantas de Aquino [1]
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CORRECTION IN THE LANDFILL PROJECT EXECUTIVE METROPOLITAN WEST CAUCAIA - ASMOC, WITH A VIEW TO RESOLVING DRAINAGE PROBLEMS OF DESIGN PERCOLATING LIQUIDS

Recibido el 9 de julio de 2012; Aceptado el 12 de noviembre de 2012

Abstract

In some landfills in place in Brazil in the 1980s, although having met the standards and laws in force in Brazil, with over the years, had problems as leakage of leachate by the edges of the cells, forming a belt to your surroundings. In the design of executive projects, landfills should be waterproof as possible and including the internal division between layers. In addition to these models in a sealed landfill, also did not imagine that the solid waste would alter so quickly to their type. The aim of this study is the implementation of mitigation measures to solve problems in ASMOC - Metropolitan Landfill West Caucaia, which receives the waste of Municipalities of Fortaleza and Caucaia. Implemented some mitigation measures, the problems were solved. It is recommended, then the importance of using semi-permeable material within the cells of landfills and use of new technologies for drainage of leachate in landfills.

Keywords: Sanitary landfills, Solid waste, Leachate.

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MODELOS INSTITUCIONAIS DE PRESTAÇÃO DOS SERVIÇOS DE ESGOTAMENTO SANITÁRIO: UM ESTUDO COMPARATIVO DOS MUNICÍPIOS BRASILEIROS.

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INSTITUTIONAL MANAGEMENT MODELS FOR SANITATION PROVISION: A COMPARATIVE STUDY OF BRAZILIAN MUNICIPALITIES

Recibido el 4 de abril de 2012; Aceptado el 22 de noviembre de 2012

Abstract

Efforts focused on evaluations of public policies and management of water and sanitation services are incipient in Brazil, a field still to be explored by studies and academic research. Specifically on the different modalities of water supply and sanitation services, comparative studies may contribute to the ability to discuss the performance offered by the different managers. In this context, the paper develops a performance comparative assessment of the different institutional models for sanitation provision in Brazil. The paper compares the services of about 3,000 Brazilian municipalities, by a nonparametric analysis of variance. In this analysis, the services were grouped based on the following classification: (i) services provided with direct municipal administration, (ii) services provided with indirect municipal administration (local autarchy), (iii) private companies and (iv) regional companies. The survey was conducted for the 2008 base year, using secondary data. In order to characterize and compare the different groups, performance indicators were constructed to represent the extension of interceptors, treatment index, main coverage and number of complaints about the quality of the sanitation services. The results showed significant differences between the models. The regional companies stood out with high level of interception and treatment of sanitation, and the indirect municipal administration was responsible for the highest values of main coverage.

Key Words: sanitation, indicators, provision.

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Marcos von Sperling
Oscar González Barceló
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Pedro Gasparini Heller
Pilar Tello
Raúl Martín Ortega Borges
Rodrigo Navia
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Sergio Francisco de Aquino
Simón González Martínez
Sonia Rosa Briceño Viloria
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