REVISTA AIDIS

de Ingeniería
y Ciencias Ambientales:

Investigación, desarrollo y práctica.

http://www.journals.unam.mx/index.php/aidis/index

Vol. 8 No. 2
6 de agosto de 2015

ISSN 0718-378X

Con el patrocinio de:

INSTITUTO DE INGENIERÍA UNAM

Foto: Germán Buitrón
Sistema de purificación de biogás por membranas

REVISTA AIDIS

de Ingeniería y Ciencias Ambientales: Investigación, desarrollo y práctica.

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Editor en Jefe de la revista
Dr. Germán Buitrón Méndez
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Ciudad Universitaria, Coyoacán, México D.F.; C.P. 04360
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La Revista AIDIS de Ingeniería y Ciencias Ambientales: Investigación, desarrollo y práctica es una publicación electrónica cuatrimestral, editada en el Instituto de Ingeniería, UNAM.
Editor responsable: Germán Buitrón Méndez.
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04-2011-011413271800-203

ISSN
0718-378X

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ISSN 0718-378X

Directorio

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Investigación, desarrollo y práctica. ISSN 0718-378X

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Investigación, desarrollo y práctica. ISSN 0718-378X

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de Ingeniería y Ciencias Ambientales:
Investigación, desarrollo y práctica.

DETERMINACIÓN DE HEXACLOROCICLOHEXANO Y ENDOSULFAN EN SUELOS AGRICOLAS DEL ESTADO DE CHIAPAS

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José A. Figueroa Gallegos[2]

ENDOSULFAN HEXACHLOROCYCLOHEXANE DETERMINATION IN THE AGRICULTURAL SOILS OF CHIAPAS, MEXICO

Recibido el 19 de marzo de 2014; Aceptado el 30 de septiembre de 2014

Abstract

The classification of persistent organic compounds include 12 highly toxic compounds harmful to humans and the environment. The following pesticides are included into the previous classification: The hexachlorocyclohexane, specifically gamma-HCH isomer (lindane), and endosulfan. Both are organochlorines compounds which are banned in other countries, but they are still used in Mexico. These compounds have physicochemical characteristics that allow them to have affinity for solid particles (adsorption), which will provide a permanence in different environmental matrices. Simultaneous exposure to organochlorine pesticides can cause health effects on remote areas where health systems are few or absent. Consequently, health systems do not track cases of malformations, presence of cancer or others diseases, which sometimes they may result from using of these substances. Rural communities are examples of this situation. The use of these substances in these areas are commonplace due to the fact that they are agricultural regions, or they have been malaria-Irrigation District No. 101, Cuxtepeques, Chiapas in order to assess the extent of the exposure of populations living in these areas. The determination of HCH and endosulfan in agricultural soils was performed by gas chromatography, coupled to an electron capture detector. The results from soils showed levels of these contaminants in the range of 159,357 ppm ND for HCH, and ND to 133.79 ppm for endosulfan. These results are higher than those reported for other agricultural regions in the Mexican republic, so that the knowledge of this situation shows the potential risk for the residents of the study areas.

Key Words: Irrigation District, Persistent compounds, Soils.

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Revista AIDIS de Ingeniería y Ciencias Ambientales:
Investigación, desarrollo y práctica. ISSN 0718-378X

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6 de agosto de 2015

REVISTA AIDIS

de Ingeniería y Ciencias Ambientales:
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AVALIAÇÃO DA RIQUEZA BACTERIANA PRESENTE EM DIFERENTES INÓCULO UTILIZADOS NA DEGRADAÇÃO DE SURFACTANTE ANIÔNICO

DEGRADATION OF ANIONIC SURFACTANTS WITH DIFFERENT INOCULA: EFFECT OF THE ADDITION OF CO-SUBSTRATES AND ELECTRON ACCEPTORS

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Recibido el 25 de julio de 2014; Aceptado el 25 de marzo de 2015

Abstract

The synthetic surfactants are widely used in various domestic and industrial cleaning products and due to this it can be found in different wastewater. The degradation of these compounds by chemical processes may occur, but the biological degradation is currently considered a promising option. The aim of this paper was to evaluate the potential of different inocula and nutritional conditions for the biological degradation of anionic surfactants (AS). The inoculants were extracted from activated sludge treating domestic sewage, anaerobic sludge upflow sludge blanket (UASB) used to treat chicken slaughterhouse, cattle dung, soil and commercial septic tank sludge. The degradation of SA was assessed using different co-substrates and final electron acceptors. The experiments were performed in vials reactors facultative conditions. The experiment lasted 10 days, where they were monitored pH, dissolved and adsorbed. It was observed that the inocula had different behaviors with respect to degradation in the presence of AS co-substrates and electron acceptors through PCR / DGGE technique. The inoculum from commercial garden soil showed the largest AS degradation efficiencies at all the nutritional conditions, and the best performances obtained was using sucrose and yeast extract (77.0 and 73.1%, respectively), as these results co-substrates that signal to an optimization option.

Keywords: linear alkylbenzene sulphonate, inocula, methylene blue, PCR/DGGE, soil.

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Revista AIDIS de Ingeniería y Ciencias Ambientales:
Investigación, desarrollo y práctica. ISSN 0718-378X

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REVISTA AIDIS

de Ingeniería y Ciencias Ambientales: Investigación, desarrollo y práctica.

REMOCIÓN DEL COLORANTE IRIS NEGRO N° 24 POR ELECTROCOAGULACIÓN

REMOVAL OF DYE BLACK IRIS NO. 24 BY ELECTROCOAGULATION

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Recibido el 11 de septiembre de 2014; Aceptado el 19 de junio de 2015

Abstract

Iris removal of black dye in water, electrocoagulation (EC) was performed in batch mode, using a glass container for up to five liters with 4 electrodes Aluminum (Al) used as anode electrodes and 4 Iron (Fe) used as cathodes in various tests with currents of 2, 6, 10 A, for 24 minutes, sampled every 3 min for 8 data representative of the process and change variables during electrolysis as response variables were studied pH , temperature, conductivity, turbidity, energy consumption, potential, total dissolved solids (TDS), and removal of color, in order to find the best settings removing the dye, both in terms of time and current as the type electrode used as anode; the best color removal was obtained at a current of 2 A, to a time of 24 minutes with anode being 98.1% Fe fading, however at 6 min a percentage of 88.65% is obtained making the difference between these figures is not statistically significant but in terms of time whether it would be useful to reduce the cost of treatment, using the anode At one color removal of 97.68% was obtained at a time of 9 min with a current of 2 A, suggesting that although Fe as greater removal is achieved anode this would involve increased time and production EC waters with iron residues resulting from wear sacrificial electrode, decreasing in turbidity it is achieved by 64.1% of Fe with the anode 6 A treatment 15 min while anode is Al achieves a 70.45% removal also at 6 A treatment 12 min .

Key Words: Conductivity, Dyes, Electrocoagulation, Electrolysis, Turbidity.

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Revista AIDIS de Ingeniería y Ciencias Ambientales:
Investigación, desarrollo y práctica. ISSN 0718-378X

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APLICAÇÃO DA LÓGICA FUZZY NO MODELO DE STREETER-PHELPS PARA ANALISAR O RISCO DE CONTAMINAÇÃO DAS ÁGUAS DE RIOS QUE RECEBEM FONTES PONTUAIS DE LANÇAMENTO

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APPLICATION OF FUZZY LOGIC TO THE STREETER-PHELPS MODEL TO ANALYZE THE CONTAMINATION RISK IN RIVERS THAT RECEIVE SPECIFIC DISCHARGE SOURCES

Recibido el 18 de septiembre de 2014; Aceptado el 25 de marzo de 2015

Abstract

A mathematical model based on the Fuzzy Streeter-Phelps equations was developed to analyze the river contamination risk receiving punctual source release. The Streeter-Phelps model was transformed into a differential fuzzy model, with a closed and bounded interval having lower and upper bounds well defined, but with unknown distribution information. For the analysis, it was defined an scenario in which punctual BOD loads were released with different concentration values, ranging from 100 through 500 mg / L. The concentrations, as well as the behavior of risk of the BOD, DO deficit and DO was verified. It was observed that any change in the BOD concentration released influenced the mass dilution in the system in such a way as the bigger is the released; the smaller is the dilution.

Key words: Fuzzy Set Theory; Risk Analysis; Streeter-Phelps Model.

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Revista AIDIS de Ingeniería y Ciencias Ambientales:
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REVISTA AIDIS

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USO DE FUNGO DA PODRIDÃO BRANCA NA BIODEGRADAÇÃO DE CORANTE TÊXTIL EM REATOR EM BATELADAS SEQUENCIAIS

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USE OF WHITE ROT FUNGI IN BIODEGRADATION OF THE TEXTILE DYE IN SEQUENCING BATCH REACTOR

Recibido el 6 de octubre de 2014; Aceptado el 25 de marzo de 2015

Abstract

Was evaluated the application of immobilized biomass of *Phanerochaete chrysosporium* in removal of Congo Red (20 mg/L) in sequencing batch reactor, in cycles of 48 h, in the presence of glucose, added to the medium at concentrations of 5 g/L (Stage I) and 1 g/L (Step II). Removals were recorded averages 86% and 97% dye, respectively, in Stages I and II in relation to chromophore; and mean removal of organic matter from 56% (Stage I) and 76% (Stage II). There was formation of by-products and difficulty of rupture of the dye molecule, particularly, to a wavelength related to benzene, checking it if still greater production of manganese peroxidase enzyme in the presence of low concentration of glucose (1 g/L). Was obtained mean removal of 83% and 65% for ammonia and 74%, and 56% for nitrate, respective steps I and II. The fungi population on reactor was predominated in biofilm during the experiment, and was shown to be viable as the removal of color, being necessary the study of strategies that promote greater mineralization of the dye.

Key Words: co-substrate, ligninolitc enzymes, enzymatic inhibition, *Phanerochaete chrysosporium*, sequencing batch reactor, congo red.

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Investigación, desarrollo y práctica. ISSN 0718-378X

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REVISTA AIDIS

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SELEÇÃO DE ÁREAS PARA A CONSTRUÇÃO DE UM ATERRO SANITÁRIO EM PORTO VELHO/RO

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SITE SELECTION FOR A SANITARY LANDFILL CONSTRUCTION IN PORTO VELHO/RO

Recibido el 29 de enero de 2015; Aceptado el 2 de junio de 2015

Abstract

Many Brazilian cities dispose their waste in an inappropriate way, causing serious environmental impacts. Porto Velho, capital of Rondonia state (Brazil), is no different, and is under pressure for the selection of an appropriated place for the construction of a sanitary landfill. Thus, the goal of this work consisted on the identification of suitable areas for the installation of a landfill in Porto Velho/RO. The study was developed through analysis of spatial information and geoprocessing techniques. Results showed that Porto Velho has a large territory, but a small area that could be used as a sanitary landfill. It was selected 8 (eight) polygons with areas ranging from 318 ha to 3.199 ha, considering environmental and legal technical criteria. These areas still depend of an in loco environmental impact assessment, and economical and financial aspects evaluation.

Keywords: Sanitary Landfill. Site Selection. Geoprocessing.

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Revista AIDIS de Ingeniería y Ciencias Ambientales:
Investigación, desarrollo y práctica. ISSN 0718-378X

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de Ingeniería y Ciencias Ambientales: Investigación, desarrollo y práctica.

EFFECT OF BIOSOLIDS ON THE PHYSICOCHEMICAL PROPERTIES OF AN INCEPTISOL OF THE MUNICIPALITY OF PUEBLA, MEXICO

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Abel Cruz Montalvo[1]

Recibido el 30 de enero de 2015; Aceptado el 2 de junio de 2015

Abstract

Biosolids are an option for improving the physical characteristics and chemical of soils of low fertility since they can incorporate organic matter and nutrients. Therefore, the objectives of this study were to assess how modify the properties of fertility and also to determine if biosolids application represents an environmental hazard. Biosolids increased the content of organic matter, nitrogen, phosphorus and exchangeable bases of soil, potassium and magnesium; while sodium and calcium decreased, the textural class was modified by sandy clay loam to loam due to the incorporation of smaller particles. It was concluded that the biosolids are materials capable of application to agricultural soils to improve their physical and chemical properties if adequated evaluations are carried out to ensure the safety of soils and the trophic network. However, it is necessary to monitor the soils that are incorporated since there is a risk of contamination by a high concentration of nutrients and heavy metals.

Key words: macronutrients, soil texture, soil monitoring.

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Revista AIDIS de Ingeniería y Ciencias Ambientales:
Investigación, desarrollo y práctica. ISSN 0718-378X

Vol. 8, No. 2, 257 – 269
6 de agosto de 2015

REVISTA AIDIS

de Ingeniería y Ciencias Ambientales: Investigación, desarrollo y práctica.

PROJETOS DE ENERGIA RENOVÁVEL LOCALIZADOS NO BRASIL REGISTRADOS NO PRIMEIRO E NO SEGUNDO PERÍODO DO PROTOCOLO DE QUIOTO

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RENEWABLE ENERGY PROJECTS LOCATED IN BRAZIL REGISTERED IN THE FIRST AND SECOND OF THE KYOTO PROTOCOL PERIOD

Recibido el 2 de febrero de 2015; Aceptado el 18 de mayo de 2015

Abstract

As an attempt to reduce emissions of greenhouse gases (GHG) in the year 2005 entered into force the Kyoto Protocol. This agreement aims to reduce GHGs from flexibility mechanisms, among them, the one that is applied to developing countries such as Brazil, the Clean Development Mechanism (CDM). Given the current importance of the theme climate change and uncertainty to which it refers, this agreement was extended for 7 years (2013-2017). Brazil is among the countries with the largest number of CDM projects registered in the first period of the Protocol. Thus, this paper aims to conduct a comparative analysis of the renewable energy projects located in Brazil, recorded in the first and second period of the Kyoto Protocol, which was developed according to the methodology ACM0002. Available data were used to conduct the study in the United Nations Framework Convention Climate Changes (UNFCCC) and the Ministry of Science, Technology and Innovation (MCTI) sites, entities responsible for the registration and approval of projects, respectively, in addition to research articles and books. From this, it was observed that the first year of the second period of global climate agreement (2013) obtained eight records in the UNFCCC where all projects present period of sale of renewable carbon credit. Following what happened in the first period of the agreement in 2013 most registered projects used as an energy source to power the existing winds, particularly in the state of Rio Grande do Norte.

Keywords: Clean Development Mechanisms, Kyoto Protocol, Renewable Energy.

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Revista AIDIS de Ingeniería y Ciencias Ambientales:
Investigación, desarrollo y práctica. ISSN 0718-378X

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REVISTA AIDIS

de Ingeniería y Ciencias Ambientales: Investigación, desarrollo y práctica.

TRATAMENTO DE ESGOTOS DOMÉSTICOS EM REATOR ANAERÓBIO HÍBRIDO SEGUIDO DE REATOR COM ALGAS IMOBILIZADAS

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SEWAGE TREATMENT IN DOMESTIC REACTOR ANAEROBIC REACTOR OF HYBRID FOLLOWED WITH ALGAE IMMOBILISED

Recibido el 4 de febrero de 2015; Aceptado el 19 de junio de 2015

Abstract

This study was performed aiming to evaluate the fecal contamination indicator and nutrient removals in immobilized algae reactor in post-treatment of anaerobic effluent. An Hybrid Anaerobic Reactor (HAR) fed with sewage was installed and its effluent post treated with Immobilized Algae Reactor (IAR). The RAI operated with moving-bed biofilm characteristics, and the support medium was polyurethane foam cut in cubes. The experiments were operated in three distinct phases at a greenhouse. The first one was characterized by a low insolation and temperature at a range from 22.4 to 30.2 ºC. At second phase ammonium sulfate was added to stimulate the nitrification. At the third phase the reactor was exposed to a greater insolation with temperature between 23.4 and 33.3ºC. The HAR provided an expressive organic matter and suspended solids removals, with 77 and 88% efficiency respectively. The IAR the N-NTK removal efficiency were respectively 96, 79 and 62% for the three phases. Nitrification occurred at first and second phases, at these phases the phosphorus removal was not efficient. On the other hand the third phase obtained a removal efficiency of 87% for orthophosphate and 99.98% for *E. coli.* The polyurethane was revealed as a good support medium for algae immobilization, being possible to efficiently remove the nutrients and the fecal contamination indicator organisms.

Key Words: indicares faecal contamination, nutrients, reactor immobilized algae.

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Revista AIDIS de Ingeniería y Ciencias Ambientales:
Investigación, desarrollo y práctica. ISSN 0718-378X

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6 de agosto de 2015

REVISTA AIDIS

de Ingeniería y Ciencias Ambientales:
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ANÁLISE SAZONAL DA TOXICIDADE DE METAIS PESADOS NO SEDIMENTO SUPERFICIAL DE UM CÓRREGO URBANO (MATO GROSSO DO SUL, BRASIL)

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SEASONAL ANALYSIS OF THE TOXICITY OF HEAVY METALS IN THE SURFACE SEDIMENT OF AN URBAN STREAM (MATO GROSSO DO SUL, BRAZIL)

Recibido el 19 de febrero de 2015; Aceptado el 2 de junio de 2015

Abstract

The Imbirussu Stream, located in the northwestern region of the city of Campo Grande/MS, passes through several densely populated neighborhoods and an Industrial Park, receiving a large intake of potentially toxic substances, including heavy metals. These substances end up being deposited in the sediment and may return to the water column, causing many impacts to the aquatic ecosystem. Thus, this study aimed to: a) assess the concentrations of heavy metals (Cd, Cr, Cu, Fe, Mn, Ni, Pb and Zn) in the sediment; b) perform acute ecotoxicological tests using Daphnia similis and Danio rerio as bioindicators and c) evaluate the effects of seasonality on the obtained results. The samples were collected in February/2013 (Rainy period) and August/2013 (Dry period) from the source to near its mouth in the Anhanduí River. Cultivation of organisms and toxicity tests were performed according to NBR 12.713/2009 and NBR 15.088/2011. The analysis of sediment samples were performed according to the methods described in the manual Standard Methods for the Examination of Water and Wastewater, 22nd ed. With the values obtained in the analysis it became clear the input of heavy metals into the stream due to the effluents discharged by the industries installed in the Industrial Park. The obtained results showed the influence of seasonality, because the metal concentrations were higher in the dry period than they were in the rainy one. These results were confirmed by the tests, since acute toxic effects to the organisms occured only in the dry season.

Key Words: Acute toxicity, Danio rerio, Daphnia similis, heavy metals, sediment pollution.

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