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Investigación, desarrollo y práctica.

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La Revista AIDIS de Ingeniería y Ciencias Ambientales. Investigación, desarrollo y práctica, es una publicación electrónica cuatrimestral, coeditada por AIDIS y el Instituto de Ingeniería UNAM, que publica contribuciones evaluadas por pares originales, de calidad y actualidad, dentro de su área de competencia. De esta forma se presentan trabajos que abarcan aspectos relacionados con el conocimiento científico y práctico, tanto tecnológico como de gestión, dentro del área de la Ingeniería Sanitaria y Ambiental en Latinoamérica.

El enfoque es interdisciplinario buscando contribuir en forma directa a la generación de conocimiento, al desarrollo de tecnologías y a un mejor desempeño profesional. Entre los temas cubiertos por la revista están los siguientes: agua potable, calidad de agua, aguas residuales, residuos sólidos, energía, contaminación, reciclaje, cambio climático, salud ambiental, nuevas tecnologías, ética, legislación y política ambiental, gestión ambiental, gestión de empresas de servicios de saneamiento, sustentabilidad y participación social, entre otros.

Cada edición muestra los trabajos que derivan del arbitraje académico de carácter internacional. También se publican números especiales de trabajos destacados que fueron presentados en los diversos Congresos Interamericanos realizados por la Asociación Interamericana de Ingeniería Sanitaria y Ambiental (AIDIS) y que en forma adicional fueron sometidos al proceso de revisión interno de la Revista AIDIS. La Revista AIDIS está indizada en Latindex 2006 y en Periódica (DGB-UNAM).

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PANORAMA DA SUSTENTABILIDADE AMBIENTAL NAS MELHORES UNIVERSIDADES DA AMÉRICA LATINA

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OVERVIEW OF ENVIRONMENT SUSTAINABILITY IN TOP UNIVERSITIES IN LATIN AMÉRICA

Recibido el 12 de agosto de 2013; Aceptado el 24 de enero de 2014

Abstract

There are many kinds of rankings in the world for universities, according to specific criteria. One of these is the Quacquarelli Symonds (QS), which ranks the top universities in Latin America (LA). This research aims to identify whether these universities, considered the best in Latin America, utilize environmentally sustainable practices in their campuses. In order to identify the environmental practices of these universities, two approaches were undertaken at the top 200 universities: I) a survey of the university websites to evaluate action related to: air, water, wastewater, transportation, solid waste, energy, environmental practices and environmental management. II) a questionnaire mailing to universities about their environmental practices related to the same points. For analysis of the data from the university websites we applied the technique of content analysis. The results show a lack of data information in the university websites with a higher incidence of action in environmental education and waste management and presents an overview, showing that, though considered models in education, these universities still need to focus attention on issues related to environmental sustainability in university campuses.

Keywords: Environment Sustainability; Practices; Latin America Universities; Ranking.

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BIORREMEDIAÇÃO DO EFLUENTE DE CULTIVO DE TILÁPIA DO NILO PELA MICROALGA *Spirulina platensis*

*BIOREMEDIATION OF WASTEWATER OF NILE TILAPIA
CULTIVATION BY MICROALGAE *Spirulina platensis**

Recibido el 29 de septiembre de 2013; Aceptado el 26 de febrero de 2014

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Hudson Damasceno Maia²
José William Alves da Silva¹
João Henrique Cavalcante Bezerra²
Renato Teixeira Moreira²
Wladimir Ronald Lobo Farias²

Abstract

The potential environmental impacts from intensive aquaculture have increased public concern about the sustainability of the activity. This study aimed to evaluate the production of algal biomass and removal rate of nitrogen compounds by *Spirulina platensis* in effluent of juvenile Nile tilapia (*Oreochromis niloticus*). The experiment was conducted at the Biotechnology Centre Applied Aquaculture (CEBIAQUA) of the Department of Fisheries Engineering, Ceará Federal University. For the cultivation of *S. platensis*, initially the inoculum was cultivated in alternative chemical medium and later adapted to the effluent of Nile tilapia. After the full development of *S. platensis*, collection of the microalgae was performed by filtering the water 60 micrometers screens. We monitored the levels of ammonia, nitrate and nitrite during the trial period of 29 days. The results showed that the microalgae easily adapted and developed in the effluent of Nile tilapia and there was a significant bioremediation of effluent, reducing the concentrations of ammonia, nitrate and nitrite.

Keywords: *Spirulina platensis*, Nile tilapia, bioremediation.

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AMMONIACAL NITROGEN REMOVAL FROM SANITARY LANDFILL LEACHATE BY STRIPPING PROCESS USING A BAFFLED REACTOR

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Recibido el 5 de octubre de 2013; Aceptado el 26 de febrero de 2014

Abstract

Ammoniacal nitrogen in Sanitary Landfill Leachate may reach concentrations up to 2000 mg/L, which, if discharged into the environment under such concentrations, may cause severe environmental and public health impacts. The stripping process is a technical highlight among the alternatives for leachate ammoniacal nitrogen removal employed worldwide. The comparison of the analyses performed at inflow and outflow, at the São Leopoldo/Brazil Leachate Treatment Plant wastewater (lagoons), showed an ammoniacal nitrogen removal rate that ranged between 38% and 65% in 90 days of HRT. On the other hand, the Baffled Reactor yielded a 73% removal rate in 12 days. Statistically, the “temperature” variable affected Ammoniacal nitrogen removal, such that the higher removal rates were associated to environmental temperatures above 20°C, thus rendering this technology as useful in tropical countries. The Baffled Reactor demonstrated to be applicable for use in sanitary landfills that produce 0.33 m³ of leachate per day. This value corresponds to service provided to a small scale municipality with a population of up to 10.000 inhabitants. Treatment operational cost using the reactor was estimated to be US\$ 30.25/m³ of treated leachate, which is an interesting result if compared with other ammoniacal nitrogen removal units, as well as with ex situ treatment processes.

Key Words: Landfill, Leachate treatment, Ammoniacal nitrogen removal.

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FACTIBILIDAD DEL USO DE *BIOGÁS* COMO COMBUSTIBLE EN LA INDUSTRIA LADRILLERA DEL MUNICIPIO DE CHIAPA DE CORZO, CHIAPAS, MÉXICO.

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Neín Farrera¹
Joel Moreira²

*FEASIBILITY OF USING BIOGÁS AS A FUEL, IN THE BRICK
INDUSTRY IN THE MUNICIPALITY OF CHIAPA DE CORZO,
CHIAPAS, MEXICO.*

Recibido el 27 de noviembre de 2013; Aceptado el 28 de febrero de 2014

Abstract

This article reports the feasibility study results to contribute to the sustainable development of Chiapa de Corzo, Chiapas. Mexico, by means of the introduction of a *biogás* system produced in anaerobic digesters fed by cattle excreta so that such *biogás* can be used as fuel at the brick industry in Chiapa de Corzo. Data concerning the fuel used and the number of people involved were recorded, as well as the amount of analyzed kiln carbon dioxide (CO₂) emitted. Additionally, an anaerobic digester installed at a nearby ranch was assessed to determine potential *biogás* production. Furthermore, a purification and compression prototype designed at Universidad del Valle de México, Tuxtla campus was subject to test in order to determine the potential *biogás* use when stored and shipped.

Key Words: *Biogás*, Brick Industry, Compression of *Biogás*, *Biogás* Purification.

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QUANTIFICAÇÃO DOS PARÂMETROS FÍSICO- QUÍMICOS DOS EFLUENTES ORIUNDOS DA PURIFICAÇÃO DO BIODIESEL DE ÓLEO VEGETAL E GORDURA ANIMAL

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Erika Almeida Sampaio Braga²

*MEASUREMENTS OF PHYSICAL AND CHEMICAL
PARAMETERS IN THE WASTEWATER PURIFICATION
ARISING OUT OF THE BIODIESEL PLANT OIL AND
ANIMAL FAT*

Recibido el 5 de julio de 2013; Aceptado el 24 de marzo de 2014

Abstract

Biofuels represent a potential to reduce environmental impacts, promote social inclusion, generation of employments and income, diversifying energy sources, boosting agribusiness, among other benefits. However, the minimization of environmental impacts related to the production of the biodiesel, is a real need to avoid overshadowing the benefits already mentioned above. This study is aimed to produce the biodiesel with several types of oils and subjecting them to wash damps with distilled water, thus, assessing and quantifying contaminants in effluents from the purification of biodiesels and determining the physical and chemical parameters of the aforesaid effluents. We observed that the effluents duly studied, showed high values in the parameters analyzed when compared to the discharged standards, established by the Brazilian environmental legislation. The water used to wash all the raw materials duly investigated, showed values from the chemical oxygen demand (COD) with a very high decrease in subsequent washings. With reference to the parameters pH and turbidity, it was also observed that a significant reduction in the values of the effluent from the first through the third wash in all the raw materials, were properly used.

Keywords: Biodiesel, environmental legislation, purification, wastewater.

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EFEITOS DA VARIAÇÃO DE SÍLICA NO DESENVOLVIMENTO DA MICROALGA DIATOMÁCEA *Thalassiosira fluviatilis*

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Francisco Farley Vasconcelos de Sousa¹
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*EFFECT OF SILICA CHANGES IN THE DEVELOPMENT OF
DIATOMACEOUS MICROALGAE *Thalassiosira fluviatilis**

Recibido el 8 de septiembre de 2013; Aceptado el 30 de marzo de 2014

Abstract

Microalgae are important to the environment because they constitute an important link in the aquatic food chain and can still be used as bioindicators of water quality and regulators of nutrients level in the water column. This study aimed to evaluate the development of diatom microalgae *Thalassiosira fluviatilis* in culture media Conway and Guillard f / 2, with different concentrations of sodium silicate and its influence on cultures of diatoms. The cultures were monitored by direct cell counts in a Neubauer chamber and the culture absorbance at 700 nm using a spectrophotometer. The best result was obtained with the Conway medium, using a low concentration of sodium silicate, followed by the Guillard medium, with the same silicate concentration. The cultures performed with twice the concentration of sodium silicate, showed a very short and lethargic development, resulting in excessive formation of precipitated material and depigmented cells, leading to the death of cultures. Thus, high concentrations of sodium silicate inhibit algal growth in cultures of *T. fluviatilis*.

Keywords: diatoms, sodium silicate, *Thalassiosira fluviatilis*.

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SERVIÇOS DE ÁGUA E ESGOTO DISPONIBILIZADO POR CONCESSIONÁRIAS REGIONAIS NO BRASIL

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*WATER AND SEWAGE SERVICES PROVIDED BY
BRAZILIAN REGIONAL COMPANIES*

Recibido el 27 de abril de 2013; Aceptado el 31 de marzo de 2014

Abstract

Well-organized and universalized water and sewage services are key to regional development as directly impact the quality of life and economic growth. In this sense the work shown and analyzed its results for the year 2009 six basic indicators: average tariff, distribution losses index, service with treated water, service with sewage treatment, sewage treatment rate and metering rate, relative to Brazilian regional water and sewage providing companies. We used Geographic Information System (GIS) as technique, with the software Philcarto for generating the maps. This study enabled us to observe differences in the actions and investments in sanitation (water and sewage) in each Brazilian state and the urgent need for approval and implementation of the National Sanitation Plan to solve public problems of this industry so important to national health, human rights, infrastructure, environment and economic issues.

Key Words: public policy, regional services providers, sanitation indicators, water and sewage services.

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