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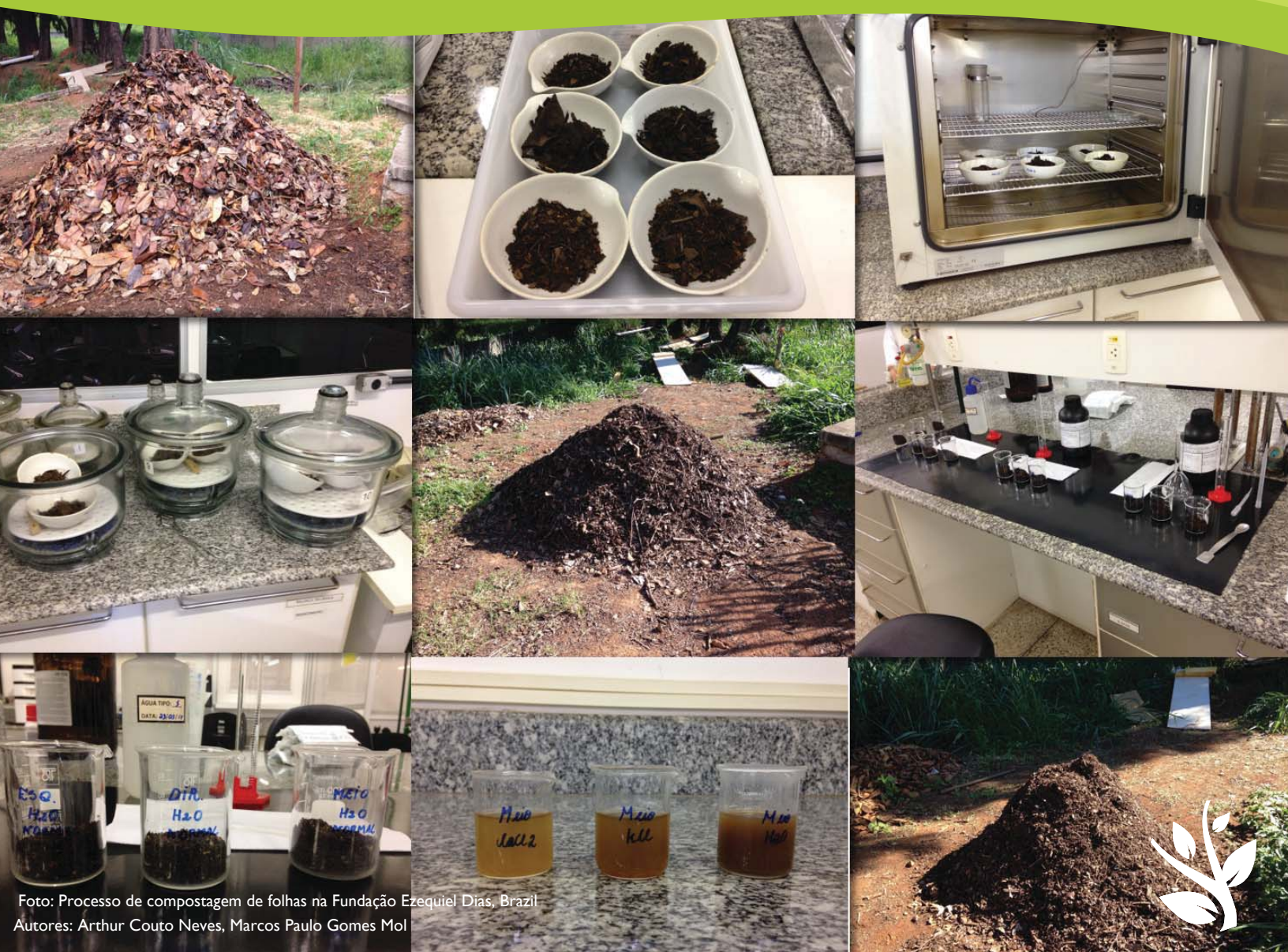

Foto: Processo de compostagem de folhas na Fundação Ezequiel Dias, Brazil
Autores: Arthur Couto Neves, Marcos Paulo Gomes Mol

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Temática y alcance

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. Publica contribuciones originales de calidad y actualidad evaluadas por pares, dentro de su área de competencia. Se presentan trabajos que abarcan aspectos relacionados con el conocimiento científico y práctico, tanto tecnológico como de gestión, dentro del área de Ingeniería y Ciencias Ambientales en Latinoamérica.

El enfoque es multidisciplinario, 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, educación, legislación y política ambiental, gestión ambiental, sostenibilidad y participación social, entre otros.

Cada edición muestra los trabajos que derivan del arbitraje académico estricto de carácter internacional. También se publican números especiales de temas particulares 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.

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CALIDAD DE INFORMACIÓN Y DETECCIÓN DE LOS DISPOSITIVOS PRESENTES EN CÁMARAS ESTÁTICAS PARA COLECTAR GASES TRAZA EN SUELOS DE HUMEDAL

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INFORMATION AND DETECTION QUALITY OF DEVICES PRESENT IN STATIC CHAMBERS FOR COLLECTING TRACE GASES IN WETLAND SOILS

Recibido el 15 de junio de 2016; Aceptado el 16 de noviembre de 2017

Abstract

The aim of the present study was to explore in the field the effect of laboratory devices and static chambers to obtain trace gas information during the measurement of flows. The gases were collected from two wetlands of Lake Patzcuaro, Michoacan. Gas samples were collected in vial glasses using static chambers and their results showed statistically acceptable values of the gas capture system. The chromatograph showed a strong correlation between the observed values and the expected ones. The working protocol was efficient to prevent noise from the water's entrance in the gas detector. Statistical evidence suggests the possibility of reducing the number of samples in the estimated flow without modifying significantly the results. The pressurization effect was minimized by replacing the initial concentration (C1), for the atmospheric concentration that had been measured outside the chamber. There are important differences when estimating the flow models of linear, quadratic and Hutchinson-Mosier. Finally, a great degree of underestimation of the gas flow was found using a linear regression (52.3%) respected to a quadratic regression (33.8%) and contrasting it against the theoretical values of a flow model.

Keywords: chromatograms, dynamic chambers, gas fluxes, hydromorphic soil, vadose zone.

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MOC–BASED SECOND–ORDER EXPLICIT SCHEME FOR WATER HAMMER ANALYSIS

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MÉTODO DE LAS CARACTERÍSTICAS DE 2° ORDEN PARA EL ANÁLISIS DEL GOLPE DE ARIETE

Recibido el 30 de junio de 2016; Aceptado el 20 de noviembre de 2017

Abstract

Method of Characteristics (MOC) needs to fulfil the Courant condition (C_n = 1.0) in order to guarantee the stability and convergence on the results. Otherwise, whenever C_n < 1.0 is necessary to apply interpolation processes to calculate the state variables Q and H at the discretization nodes. In many cases, the application of MOC with first-order accuracy is more convenient due to its minor complexity, even if its principal disadvantage is the introduction of significant numerical attenuation as C_n value decreases away from 1.0, being necessary to have numerical schemes with higher accuracy in these cases. This paper introduces a MOC-based second-order explicit scheme useful to solve the transient flow when Courant is different from 1.0. It verifies that MOC 2nd-order is more accuracy than MOC 1st-order in a wide range of Courant numbers, even when C_n > 1.0, where with the help of numerical filters or artificial viscosities MOC can continue to function without to affect its accuracy or numerical stability. This feature allows get a greater time step which helps to reduce significantly the computation time.

Keywords: interpolation scheme, Method of Characteristics, numerical oscillations, order of interpolation, water hammer.

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REVISTA AIDIS

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A INFLUÊNCIA DOS COEFICIENTES DE DESCARGA DE ORIFÍCIOS AFOGADOS NO DIMENSIONAMENTO DOS FLOCULADORES DE BANDEJAS PERFURADAS EM ESTAÇÕES DE TRATAMENTO DE ÁGUA

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Camila de Oliveira Ribeiro[3]
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THE INFLUENCE OF SUBMERGED ORIFICE DISCHARGE COEFFICIENTS IN PROJECT OF PERFORATED TRAY-TYPE HYDRAULIC FLOCCULATOR IN WATER TREATMENT PLANTS

Recibido el 26 de septiembre de 2016; Aceptado el 15 de febrero de 2018

Abstract

In this study, we tested submerged orifices with diameters ranging from 8 to 22 mm in the laboratory, in order to determine their discharge coefficients to work with flow rates corresponding to Reynolds numbers not exceeding 16000. Justifies the choice of these diameters due to the fact being diameters commonly found in water treatment plants. It diameters and conditions applicable to tray-type hydraulic flocculator, used in prefab water treatment plants designed to treat small flows. At the same time, with the objective of comparing the values verified in the laboratory with the values that occur in real situations, data were obtained from a water treatment plant with nominal capacity of 5.0 L / s located in the metropolitan area of Belo Horizonte - MG. The data obtained in the laboratory and in the water treatment plant were compiled and compared with the value indicated in the literature - usually indicates the value of 0.61 for the discharge coefficients - and in other studies. The obtained results show that the value 0.61 does not apply to this range of diameters when operating under the conditions tested.

Keywords: discharge coefficients, flocculator, orifices, water treatment plants.

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EFEITOS DA ADIÇÃO DE CEPAS BACTERIANAS LIOFILIZADAS NA COMPOSTAGEM DE RESÍDUOS SÓLIDOS URBANOS

*Mariele Fioreze[1]
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Keila Fernanda Soares Hedlund[1]
Francéllwika Catharine Gomes de Azevedo[1]
Tainara Casa Nova Silva[1]
Clovis Orlando Da Ros[1]

EFFECTS OF ADDING OF LYOPHILIZED BACTERIAL STRAINS IN COMPOSTING URBAN SOLID WASTE

Recibido el 10 de octubre de 2016; Aceptado el 16 de marzo de 2018

Abstract

The growth of solid waste generation is one of the major problems faced by modern society. In this aspect, composting presents itself as a major alternative for the treatment of the organic fraction of domestic waste. The aim of this study was to evaluate the effects of adding bacterial strains in composting solid organic waste from households. The composting was created from alternating layers of wood sawdust untreated, organic waste and dried straw of soybeans and corn. Two treatments were tested, with and without the addition of lyophilized bacterial strains between the layers of organic waste. The commercial mixture of bacterial strains used was composed of Bacillus subtilis, Bacillus licheniformis and Bacillus polymyxa in the form of spores, the application being performed through manual high pressure spraying. The addition of lyophilized bacterial strains reduced the time required for the maturation of the compost and allowed the elimination of Escherichia coli in the final compound, but was not efficient in the reduction of dry mass. In terms of nutrients in the final compound, there was no statistical difference between the two treatments employed.

Keywords: bioaugmentation, household waste, organic waste.

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POR QUE EMPRESAS PARTICIPAM DE INICIATIVAS EMPRESARIAIS EM CLIMA NO BRASIL?

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WHY DO COMPANIES PARTICIPATE IN CORPORATE CLIMATE INITIATIVES IN BRAZIL?

Recibido el 14 de octubre de 2016; Aceptado el 1 de febrero de 2018

Abstract

The aim of this study is to investigate the main reasons, from managers' point of view, for a company to participate in the Corporate Climate Initiatives (CCI) in Brazil. To do so, we carried out a descriptive research that aimed to observe phenomena such as they occur in their natural context for further analysis, providing an insight into the problem investigated. The subjects of this study were organizations of the Carbon Efficient Index (CEI2) of B3 S.A. (Brasil, Bolsa, Balcão), as well as organizations of CDP (Carbon Disclosure Project) and of the Brazilian GHG Protocol Programme. From the 29 companies identified, only 14 managers of the sustainability field chose to participate. The primary data was obtained from interviews with managers representing the companies, through a semi-structured questionnaire. From the respondents' answers, it can be concluded that the two main initiatives adopted by companies to tackle climate change were CDP and the Corporate Sustainability Index. These initiatives are regarded, respectively, as a management and disclosure instrument on climate change, able to bring about changes and reflections in the internal corporate processes. Concerning CEI2, all companies reported that it did not bring about changes and/or internal reflections.

Keywords: corporate climate initiatives, climat change, legitimacy theory, Brazil.

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IMUNIZAÇÃO CONTRA O VÍRUS DA HEPATITE B EM TRABALHADORES DA COLETA DE RESÍDUOS SÓLIDOS EM BELO HORIZONTE, BRASIL

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IMMUNIZATION AGAINST HEPATITIS B VIRUS AMONG WASTE COLLECTORS FROM BELO HORIZONTE, BRAZIL

Recibido el 23 de octubre de 2016; Aceptado el 6 de noviembre de 2017

Abstract

The hepatitis B virus (HBV) is a liver inflammation due to a viral infection, distributed in virtually every country in the world. Waste collectors are especially vulnerable to this infection because of the high frequency of needlestick accidents. This study aims to verify the immunization status against HBV of waste collectors, including domestic and healthcare waste workers, in Belo Horizonte (Brazil). Blood samples were collected from 522 workers, 61 exposed to healthcare waste and 461 to domestic waste, between November 2014 and January 2015. All samples were tested (ELISA) for Anti-HBs, to identify immunity against HBV. Four hundred (86.8%) workers (340 exposed to domestic waste and 60 to healthcare waste) reported being previously vaccinated against hepatitis B. However, Anti-HBs serology showed that only 252 (54.7%) workers (207 exposed to domestic waste and 45 to healthcare waste) were effectively immunized. In particular, 153 (33.2%) exposed to domestic wastes reported needlestick accident during work, versus 16 (26.2%) of those exposed to healthcare waste. Adequate HBV immunization is critical to prevent hepatitis B. Thus, access to vaccination with a complete three-dose schedule and serology confirmation is a right for these workers and should be implemented worldwide.

Keywords: hepatitis B, immunization, occupational risk, solid wastes.

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SENSIBILIDAD AMBIENTAL ANTE UN POSIBLE DERRAME OFFSHORE APLICANDO TECNOLOGÍAS GEOESPACIALES, COSTA CARIBE COLOMBIANA

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ENVIRONMENTAL SENSITIVITY OF A POSSIBLE SPILL OFFSHORE APPLYING GEOSPATIAL TECHNOLOGIES, COLOMBIAN CARIBBEAN COAST

Recibido el 21 de noviembre de 2016; Aceptado el 9 de noviembre de 2017

Abstract

In recent years, the energy sector in Colombia has focused on exploring and exploiting oil and gas deposits in the continental area. Some studies show that the country currently has an energetic mining potential in its maritime zones. However, the Colombian government in 2014 defined a normative instrument with the purpose of extending and developing activities of the hydrocarbon sector in maritime offshore areas, in order to guarantee energy security in the medium and long term. Exploration and exploitation areas were opened, opening the way to the operating industries; however the interest of the private sector has minimized the environmental concern in the face of a possible oil spill. Under this scenario, in the present work an environmental sensitivity analysis is performed in blocks 1 and 2 of the Colombian Caribbean round implementing geospatial tools, and criteria described by the International Petroleum Industry Environmental Conservation Association, with the objective of establishing possible damages environmental risks that may occur in the presence of a hydrocarbon spill. It is estimated that the area affected is 268.87 Km^2 causing environmental damage in some coverings such as vegetation banks, mangroves, swamps and sandy beaches (areas with high ecosystem diversity) and generating economic losses in the region

Keywords: environment sensitive, geographical space, geospatial technologies, simulation of pollutants, spill of hydrocarbon

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ANALISE DO COMPORTAMENTO DA ONDA DIFUSIVA EM FUNÇÃO DE SEUS PARÂMETROS HIDRAÚLICO SOBRE UMA ABORDAGEM FUZZY

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ANALYSIS OF THE BEHAVIOUR OF DIFFUSION WAVE AND HYDRAULIC PARAMETERS BY FUZZY APPROACH

Recibido el 31 de enero de 2017; Aceptado el 6 de octubre de 2017

Abstract

Environmental problems such as climate change, droughts, erosion, biodiversity reduction and floods are typical examples of problems that are unlikely to have a single solution, and increasingly more critical, requiring continuous monitoring, in order to ensure an appropriate environment for the community. In this context, the Fuzzy theory emerges as a viable solution to study the uncertainties of a flood propagation prevention system. This study, seeks to understand the fuzzy diffusive wave flood routing as well as to identify the influence of the hydraulic parameters like Manning number and slope, in the membership functions form, both in space and time. Finite Differences Method was used to find the solution of "fuzzy" partial differential equations contained in the model, by using an implicit scheme. It was elaborated a computational program for its mathematical solution. From the results generated, it can be observed that the use of fuzzy theory in the fuzzy diffusive wave models can become a viable alternative for the evaluation of uncertainties in regions susceptible to flood propagation.

Keywords: flood routing, Fuzzy theory, diffusive wave models.

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