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Productos de las LGAC 1: Procesos, tecnologías y nanomateriales para sistemas ambientales.

La productividad de los investigadores en artículos científicos que fortalecen a la LGAC 1 “Procesos, tecnologías y nanomateriales para sistemas ambientales” del programa de Maestría en su segunda parte se presenta en la siguiente tabla.

Profesor	Producto
Arroyo Rodríguez Francisco José	MODELOS MATEMÁTICOS EN INGENIERÍA CIVIL. Francisco José Arroyo Rodríguez, Mauricio Arroyo Terrazas. Año ISSN 2594-018X. Año 4, Núm.2, Vol. VII, 57-65 pp. Revista: Revista AvaCient editada por el Tecnológico Nacional de México. Indexada: Latindex, EBSCOThost, LivRe, LatinREV, MIAR, PERIODICA, DRJI.
Torres Rivero Ligia Adelayda	Características de la Glicerina obtenida del proceso de la reacción del metóxido de sodio en la producción del Biodiesel. Revista de energía química y física, V6, N-18, Pág 18-28, ISSN: 74103934. Journal edited by ECOREAN-México SC
Torres Rivero Ligia Adelayda	Caracterización de los parámetros fisicoquímicos de los aceites comestibles usados para la generación de biodiesel en la planta piloto del IT Cancún L-TORRES*†, BEN-YOUSSEF, D-EK y R-ESCALANTE. Revista de Investigación y Desarrollo Diciembre 2016 Vol.2 No.6 92-108 ISSN-2444-4987 ECORFAN
Torres Rivero Ligia Adelayda	INFORME TÉCNICO FINAL PARA PROYECTOS FINANCIADOS POR EL TECNOLÓGICO NACIONAL DE MÉXICO MC LIGIA ADELAYDA TORRES RIVERO





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	<p>Clave del Proyecto 5251.14-P Título del Proyecto Caracterización de los parámetros Fisicoquímicos de los aceites comestibles usados para la generación de biodiesel en la planta DEL ITCANCUN. 18 06 2016</p>
Torres Rivero Ligia Adelayda	<p>TORRES-RIVERO, Ligia A., BEN-YOUSEFF, Cherif, ALCOGER-T, L. Beatriz., y DE LA ROSA-G, Darany "Efecto de la temperatura y del tiempo de reacción sobre la esterificación y la transesterificación de aceites comestibles usados", in Volume 4 Number 13 with ISSN: 2419 -356X, at pages 19-35 segment. Revista de Ciencias Naturales y Agropecuarias www.ecorfan.org/bolivia</p>
Torres Rivero Ligia Adelayda	<p>HOZ-ZAVALA, Ma. Elia Esther†* & TORRES-RIVERO, Ligia Adelayda Impacto ambiental que se ejerce en los cuerpos de agua naturales de Quintana Roo y Tamaulipas, México Environmental impact exerted on the natural water bodies of Quintana Roo and Tamaulipas, Mexico. Revista de Investigación y Desarrollo septiembre 2018 Vol.4 No.13 14-28 © ECORFAN-Spain</p>
Torres Rivero Ligia Adelayda	<p>TORRES-RIVERO, Ligia Adelayda UGARTE-OLLARVES, Yohana Desiree ,HERNADEZ-CHAVEZ, Silvero ,BEN-YOUSEFF, Brants Cherif "Implementation of the use of condensed water from air conditioners in the development of chemical laboratory practices at the Instituto Tecnológico de Cancún as an alternative in the consumption of distilled water.</p>





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	. Has been published on pages 26-38 in "ECORFAN Journal-Republic of Nicaragua", V-4, N-6, with ISSN: 2414-8830. Journal edited by ECORFAN-Mexico, S.C. Holding Republic of Nicaragua. (2018).
Torres Rivero Ligia Adelayda	Ligia Adelayda Torres R1, MC Silverio Hernández Chávez2, C. Ma. Fernanda Pérez Gasca 3 y MC Juan A. Ruiz de la Garza Agua condensada de los aires acondicionados una alternativa para el ahorro de consumo de agua potable en la preparación y proceso del Biodiesel. Memorias del Congreso Internacional de Investigación Academia Journals Chetumal 2018 © Academia Journals 2018 Chetumal, Quintana Roo, México 23 al 25 de mayo, 2018 ISSN 1946-5351 Vol. 10, No. 4, 2018 Páginas 2397 a 2402 126 pag compendio https://www.ebscohost.com/academic/fuente-academica-plus https://www.ebscohost.com/titleLists/fap-subject.htm o https://www.ebscohost.com/titleLists/fap-subject.pdf
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	pag.1532-1542 © Academia Journals 2019 Elibro Online con ISBN 978-1-939982-44-5
Ben Youssef Brants Cherif	Simultaneous esterification/transesterification of waste cooking oil and Jatropha curcas oil with MOF-5 as a heterogeneous acid catalyst, Ben Youssef C., Chávez-Yam A., Zepeda A., Rivera JM., Rincón S. (2020), International Journal of Environmental Science and Technology (en revisión).
Ben Youssef Brants Cherif	González Z, Valenzuela-Muñiz A. M., Ben-Youssef C., Miki Yoshida M., Brodusch N., Gauvin R., Verde Gómez Y. (2017) Parametric study on the influence of synthesis variables in the properties of nitrogen-doped carbon nanotubes. International Journal of Hydrogen Energy, 42:30318-30329, ISSN: 0360-3199.
Ben Youssef Brants Cherif	Rivera J.M., Rincón S., Ben Youssef C., Zepeda A. (2016), Highly efficient adsorption of aqueous Pb(II) with mesoporous metal-organic framework-5: an equilibrium and kinetic study. Journal of Nanomaterials, vol. 2016, Article ID 8095737, 9 pages, ISSN: 1687-4110.
Ben Youssef Brants Cherif	Características de la Glicerina obtenida del proceso de la reacción del metóxido de sodio en la producción del Biodisel. Revista de energía química y física, V6, N-18, Pág 18-28, ISSN: 74103934. Journal edited by ECOREAN-México SC



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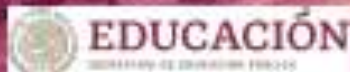
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MODELOS MATEMÁTICOS EN INGENIERÍA CIVIL

Francisco José Arroyo Rodríguez¹, Mauricio Arroyo Terrazas²

ARTÍCULO DE DIVULGACIÓN

Recibido: 30/05/2019 Aceptado: 10/08/2019 Publicado: 03/12/2019

Resumen.- En muchos textos de Métodos Numéricos se presentan situaciones abstractas o modelos alejados al área de conocimiento en la que se van a aplicar; es importante dirigir el curso en el contexto en el cual se va a emplear, y con esto motivar a los alumnos e inducirlos al mismo tiempo a las asignaturas específicas de Ingeniería Civil como Análisis Estructural, Resistencia de Materiales, materias donde existen variadas aplicaciones de sistemas de ecuaciones y matrices e interpolación polinomial. En este trabajo se presentan problemas de aplicación y se presentan las conclusiones al presentarlos en el aula.

Palabras clave: Ingeniería civil, métodos numéricos.

MATHEMATICAL MODELS IN CIVIL ENGINEERING

Abstract.- In many texts of Numerical Methods, abstract situations or models that are far from the area of knowledge in which they are applied are presented; it is important to direct the course in the context in which it is going to be used, and with this to motivate the students and induce them at the same time to the specific subjects of Civil Engineering as Structural Analysis, Mechanics of Materials, subjects where there are varied applications of systems of equations and matrices and polynomial interpolation. In this paper problems of application are presented and the conclusions presented when presented in the classroom.

Keywords: Civil engineering, numerical methods.

Introducción

La sociedad cambia de manera vertiginosa, la vida de las Instituciones de Educación Superior (IES) deben estar acorde a estas transformaciones. (Arroyo, F, 1999). Para estar *ad-hoc* a estos cambios y mejorar el aprovechamiento de los alumnos en la asignatura Métodos Numéricos dado que el profesor de manera general no incluye aplicaciones prácticas para solucionar problemas o éstos se presentan en forma abstracta fuera del contexto de Ingeniería Civil (IC), que para el estudiante de dicha carrera no tiene significado, ni mucho menos aplicación real, además que de manera general en las IES solo existe un curso de Métodos Numéricos en la curricula de la carrera, por lo que es recomendable que durante la estancia de esta asignatura se aproveche al máximo para conocer y dar sentido a los métodos y a las aplicaciones propuestas.

En diversas IES como se describe en el estudio de Ángeles, L., *et al* 2017 del Instituto Tecnológico de Altamira y Arroyo F., Cano J., Arroyo, M. en el Instituto Tecnológico de Cancún, se ha observado que en las diferentes carreras de Ingeniería, los índices de reprobación más elevados se tienen en los primeros años, muchas veces debido a que los nuevos estudiantes carecen de las competencias y aptitudes para desarrollarse académicamente de manera óptima aunado que no le encuentran sentido o aplicación real a las asignaturas; a pesar de que algunos llegan a obtener las puntuaciones más altas en el examen del CENEVAL (1300 puntos ICNE) .

Para revertir los altos índices de reprobación es esta asignatura se pusieron en marcha varias acciones, una de éstas es dar un significado más real a los problemas planteados en el aula y enfocados al ámbito de la carrera en cuestión, que para este caso es IC. Para lo cual se presentan a continuación algunos ejemplos desarrollados durante el curso. (Arroyo, F., 2019)

Metodología

En la asignatura Métodos Numéricos la cual está dentro de la retícula de la carrera de IC del TecNM, los alumnos regulares la cursan en el 4º semestre; esta materia aporta al perfil del Ingeniero Civil estrategias para resolver problemas de aplicación matemática. Y se debe de hacer un análisis referente a las matemáticas aplicadas, identificando los temas

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Subdiscipline: Natural Resources Chemistry

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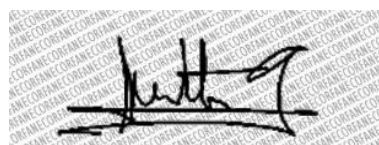
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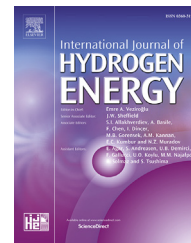
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Parametric study on the influence of synthesis variables in the properties of nitrogen-doped carbon nanotubes

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ABSTRACT

Nitrogen doped carbon nanotubes (N-CNT) were synthesized by a Modified Chemical Vapor Deposition method, using pyridine as carbon and nitrogen source, and ferrocene as catalytic agent for the nanotubes growth. The influence of synthesis parameters as the temperature, carrier gas flow rate, concentration of the reactants and preheating temperature over the morphology and physical properties of the N-CNT, were investigated by high-resolution scanning electron microscopy, transmission electron microscopy and X ray diffraction. The statistical analysis for the length of the N-CNT forest revealed that the synthesis temperature and carrier gas flow rate have significantly influenced on the physical properties of the material. The synthesis temperature not only affected the length of N-CNT forest, but also influenced the mass production, as well as, in diameter and the nitrogen content in the nanotubes. This is an important step towards the high yield production of N-CNT for applications in hydrogen storage, electrocatalysts for fuel cells and other electrochemical devices.

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Introduction

The exceptional properties of carbon nanotubes, such as good electrical conductivity, chemical and mechanical stability, high thermal conductivity, light weight, and physicochemical compatibility make them an ideal material to be utilized in electrochemical devices [1]. However, in certain applications,

it is necessary to modify the nanotubes characteristics to improve their electrochemical properties. One way to enhance such properties is by adding different heteroatoms to their structure (i.e. N, S, B, and Si). Nitrogen atoms have been used as dopant in the carbon structure [2], the so-called nitrogen doped carbon nanotubes (N-CNT) have different potential applications in various areas, such as hydrogen storage [3–5], field emission devices [6,7] and catalysis [8,9]. One of the

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Through this letter we state that **TORRES-RIVERO, Ligia A., BEN-YOUSEFF, Cherif, ALCOCER-T, L. Beatriz., y DE LA ROSA-G, Darani** has been published in Revista de Ciencias Naturales y Agropecuarias, with an article entitled "**Efecto de la temperatura y del tiempo de reacción sobre la esterificación y la transesterificación de aceites comestibles usados**", in Volume 4 Number 13 with ISSN: **2419 -356X**, at pages 19-35 segment.

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Regards.



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International Journal of Environmental Science and Technology

Simultaneous esterification/transesterification of waste cooking oil and *Jatropha curcas* oil with MOF-5 as a heterogeneous acid catalyst

--Manuscript Draft--

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Full Title:	Simultaneous esterification/transesterification of waste cooking oil and <i>Jatropha curcas</i> oil with MOF-5 as a heterogeneous acid catalyst	
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Abstract:	<p>Metal-organic framework MOF-5 was used for the first time as a heterogeneous acid catalyst for the simultaneous esterification/transesterification of two nonedible oils, waste cooking oil and <i>Jatropha curcas</i> oil. Fatty acid methyl ester (biodiesel) production was evaluated using an experimental central composite design. A surface response methodology allowed the determination of optimal reaction conditions in terms of methanol/oil molar ratio (3:1–45:1), reaction time (1–15 h), temperature (118–152 °C) and catalyst amount (0.1–0.9 wt %) with a variation lower than 10 % with respect to the experimental yield value. The best oil to biodiesel yield conversions were 90.8 % (36:1 M/O molar ratio, 12 h, 145 °C, and 0.75 wt% catalyst amount) for waste cooking oil and 88.3 % (36:1 M/O molar ratio, 9.59 h, 145 °C, and 0.75 wt% catalyst amount) for <i>Jatropha curcas</i> oil together with respective 93.3 % and 94.8 % decreases of the free fatty acid content respectively. It was also verified that the produced biodiesel meets the ASTM D6751 quality standard for some properties of the biofuel.</p>	
Suggested Reviewers:	<p>Abdullah Ahmad, Ph D. Professor, Universiti Sains Malaysia chzuhairi@eng.usm.my The Ph D. Ahmad has worked in the biodiesel production and optimization of this process using response surface methodology.</p> <p>Maheria Kalpana, Ph D.</p>	

Research Article

Highly Efficient Adsorption of Aqueous Pb(II) with Mesoporous Metal-Organic Framework-5: An Equilibrium and Kinetic Study

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Mesoporous metal-organic framework-5 (MOF-5), with the composition $Zn_4O(BDC)_3$, showed a high capacity for the adsorptive removal of Pb(II) from 100% aqueous media. After the adsorption process, changes in both morphology and composition were detected using a scanning electron microscope (SEM) equipped with an energy dispersive X-ray (EDX) system, Fourier transform infrared spectroscopy (FTIR), and X-ray photoelectron spectroscopy (XPS) analysis. The experimental evidence showed that Zn(II) liberation from MOF-5 structure was provoked by the water effect demonstrating that Pb(II) removal is not due to ionic exchange with Zn. A kinetic study showed that Pb(II) removal was carried out in 30 min with a behavior of pseudo-second-order kinetic model. The experimental data on Pb(II) adsorption were adequately fit by both the Langmuir and BET isotherm models with maximum adsorption capacities of 658.5 and 412.7 mg/g, respectively, at pH 5 and 45°C. The results of this work demonstrate that the use of MOF-5 has great potential for applications in environmental protection, especially regarding the removal of the lead present in industrial wastewaters and tap waters.

1. Introduction

As a result of intensive industrial activity, wastewaters have been increasingly contaminated by heavy metals capable of causing severe health and environmental problems. These undesired wastes are principally formed in the industrial production of fertilizers, batteries, paints, ceramics, glass, explosives, and photography products, as well as metal-extractive industries [1, 2]. Once heavy metals are introduced into living organisms (including humans), they tend to accumulate and promote a variety of physiological disorders [1]. Lead, in particular, is one of the most disturbing metals in the environment and is considered highly dangerous in terms of environmental risk. Exposure to lead can cause mental deficiency, convulsions, and reduction in hemoglobin production, which may cause anemia [3, 4]. To prevent environmental exposure,

the US Environmental Protection Agency [5] has established a maximum concentration of Pb(II) in drinking water of 0.015 mg/L. As a consequence, industrial effluents containing high lead concentrations must be treated before being discharged into water bodies.

Different techniques are used to eliminate Pb(II) from wastewaters, including chemical precipitation, membrane filtration, ion-exchange resins, solvent extraction, adsorption, and coprecipitation [6–8]. However, the applications of these methods in some cases are costly with disadvantages such as incomplete removal and the generation of toxic wastes that require further treatment [7]. Adsorption, in particular, has shown promising results in water treatment in terms of easy operation, high removal efficiency, and its applicability for various pollutants. So far, different materials for removal