"Año del Centenario de la Promulgación de la Constitución Política de los Estados Unidos Mexicanos"

Oficina: RECURSOS HUMANOS
D.R.H. 141/17.
ASUNTO: Carta de adscripción

MTRO. MANUEL QUINTERO QUINTERO
DIRECTOR GENERAL DEL TECNOLÓGICO
NACIONAL DE MÉXICO
PRESENTE

El que suscribe Jefe del Departamento de Recursos Humanos del Instituto Tecnológico de Durango, por este conducto hace **CONSTAR** que de acuerdo a la documentación existente en los archivos del Dpto de Recursos Humanos, la **C. Dra. Martha Rocío Moreno Jiménez**, con RFC **MOJM800429688** y con clave presupuestal **E381700.0142238**, con status **(10)**, y fecha de ingreso al SNIT el **1 DE OCT DE 2012**, cuenta con **4 años** de adscripción a este Instituto.

Se extiende la presente a petición del interesado para los fines legales a que hubiera lugar, en la ciudad de Durango Dgo. a 13 de Marzo de 2017

ATENTAMENTE

"La Técnica al Servicio de la Patria"

ING. JUAN VANEGAS RENTERÍA
JEFE DEL DEPARTAMENTO DE
RECURSOS HUMANOS

CONACYT

Consejo Nacional de Ciencia y Tecnología

El Sistema Nacional de Investigadores otorga a la

DRA. MARTHA ROCIO MORENO JIMENEZ

la distinción de

INVESTIGADOR NACIONAL NIVEL I

Durante el periodo del 1 de enero de 2017 al 31 de diciembre de 2019 en virtud de sus logros en la realización de trabajo de investigación original.

Dra. Julia Tagüeña Parga
Secretaria Ejecutiva del SNI

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Documento firmado electrónicamente.

9 de septiembre de 2016

"2015, Año del Generalísimo José María Morelos y Pavón"

México, D. F., 21 de Julio de 2015
Oficio No. DSA/103.5/15/8557

Moreno Jimenez Martha Rocio
Instituto Tecnológico de Durango
Presente

Me complace informarle que el Comité Evaluador externo al PRODEP, de acuerdo con las Convocatorias 2015, resolvió positivamente su solicitud de Reconocimiento a Perfil Deseable.

En consecuencia, la SES acredita que usted tiene el perfil deseable para profesores de tiempo completo.

La acreditación tiene validez por 3 años a partir de esta fecha y servirá para los fines establecidos en la propia convocatoria, en el entendido de que dejar de laborar en esta institución conlleva la cancelación del reconocimiento.

Sin otro particular, aprovecho la oportunidad para enviarle un saludo.

Atentamente

M. en C. Guillermina Urbano Vidales

Directora

Recibí 6 de P

Declaro que es copia Fiel de la Original
Da Martha Roa Moreno Jimenez

Calle Vicente García Torres # 235, Col. El Rosedal, Delegación Coyoacán, Distrito Federal, CP. 04330,
Tel. (55) 3601-1000 Extensión: 65934 http://dsa.sep.gob.mx

SECRETARÍA DE EDUCACIÓN PÚBLICA
DIRECCIÓN GENERAL DE PROFESIONES

CÉDULA 7722921

EN VIRTUD DE QUE

MARTHA ROCIO
MORENO
JIMENEZ

CURP: MOJM800429MDGRMR03

CUMPLIÓ CON LOS REQUISITOS EXIGIDOS POR LA LEY REGLAMENTARIA DEL ARTÍCULO 5o. CONSTITUCIONAL RELATIVO AL EJERCICIO DE LAS PROFESIONES EN EL DISTRITO FEDERAL Y SU REGLAMENTO SE LE EXPIDE

EN EDUCACIÓN DE TIPO SUPERIOR LA

CÉDULA

PERSONAL CON EFECTOS DE PATENTE PARA EJERCER PROFESIONALMENTE EN EL NIVEL DE

DOCTORADO EN
CIENCIAS (BIOLOGÍA)

VÍCTOR EVERARDO BELTRÁN CORONA
DIRECTOR GENERAL DE PROFESIONES

CÉDULA 7722921

SEP

México D.F. 20 de Septiembre del 2012

FIRMA DEL TITULAR

México, D.F., 09 de Abril del 2015
Oficio N° DSA/103.5/15/2779

Integrantes
José Alberto Gallegos Infante
Martha Roció Moreno Jiménez
Nuria Elizabeth Rocha Guzmán
Rubén Francisco González Laredo

Instituto Tecnológico de Durango
Presentes

Me complace informarles que el Comité Evaluador externo al Programa, de acuerdo con lo establecido en las Reglas de Operación 2014, ha dictaminado que el Cuerpo Académico "**Alimentos funcionales y nutracéuticos**" con clave **ITDUR-CA-5** se encuentra **CONSOLIDADO**.

En consecuencia, la Subsecretaría de Educación Superior (SES), a través de este Programa, acredita el registro de este Cuerpo Académico por **5** años a partir de esta fecha, por lo que será evaluado nuevamente en el año **2020** o cuando le sea requerido por la Dirección de Superación Académica con el propósito de valorar los avances en su desarrollo.

Sin otro particular, aprovecho la oportunidad para reiterarle la seguridad de mis más distinguidas consideraciones.

A t e n t a m e n t e

M. en C. Guillermina Urbano Vidales
Directora

Ciudad de México, 25 de Noviembre de 2016
Oficio No. DSA/103.5/16/15091

Ing. Mecán Pérez Jesús Astorga
Director
Instituto Tecnológico de Durango
Presente

Acerca del informe de resultados del tercer año presentado por la red temática de colaboración académica aprobada en el marco de la convocatoria 2011, le informo el resultado del proyecto en el que participa un cuerpo académico de su Institución:

I. Red con informe aprobado:

Nombre de la Red	Cuerpo Académico iniciador	Integrantes	Institución de los Integrantes
Nanotecnología y Omics para el Estudio de Nutracéuticos	ITDUR-CA-5 - Alimentos Funcionales y Nutracéuticos	Calidad, Seguridad y Bioactividad de Alimentos Vegetales (Responsable:ITDUR-CA-5)	Centro de Edafología y Biología Aplicada del Segura - CSIC
		ITCEL-CA-2 - Biotecnología Molecular	Instituto Tecnológico de Celaya
		Grupo de Investigación en Metabolismo, Microbiota Intestinal y Salud (Responsable:ITCEL-CA-2)	Universidad Europea de Madrid, España
		Reologia y Nanomateriales de Liberación Controlada (Responsable:ITDUR-CA-5)	Universidad Nacional Autónoma de México, México

II. Grupos de investigación externos al PRODEP que se encuentran bajo la responsabilidad del cuerpo académico de su Institución:

Nombre de la Red	Cuerpo Académico responsable de las actividades del grupo de investigación externo	Grupo de investigación externo	Institución
Nanotecnología y Omics para el Estudio de Nutracéuticos	ITDUR-CA-5 - Alimentos funcionales y nutracéuticos	Calidad, Seguridad y Bioactividad de Alimentos Vegetales	Centro de Edafología y Biología Aplicada del Segura - CSIC
		Reología y Nanomateriales de Liberación Controlada	Universidad Nacional Autónoma de México, México

El dictamen y el acuse que debe firmar el responsable del cuerpo académico han sido enviados por correo electrónico al Representante Institucional con la solicitud de que el acuse se entregue en esta Dirección a más tardar el **24 de enero de 2017**.

Por último, le comento que para finalizar el compromiso adquirido por el cuerpo académico es necesario que se envíe a esta Dirección, a más tardar el 24 de febrero de 2017, el reporte financiero sobre el ejercicio de los recursos recibidos. Este reporte debe entregarse desglosado por cada uno de los tres años de apoyo y de acuerdo con los rubros y montos autorizados, tanto para el cuerpo académico de su Institución como para los grupos de investigación externos que hayan tenido a su cargo.

Sin otro particular, aprovecho la oportunidad para reiterarle la seguridad de mis más distinguidas consideraciones.

Atentamente

M. en C. María de Jesús Guillermina Urbano Vidales
Directora

C.c.p. **Mtro. Manuel Quintero Quintero**, Director General del Tecnológico Nacional de México. Presente.
C.c.p. **L.E. Rosario Otilia Salazar Herrera**, Representante Institucional ante el Programa. Para su conocimiento.

MJGUV/MEGR/PRR

El **Gobierno del Estado de Durango** a través de la **Secretaría de Salud** otorga la presente

Constancia

A:

Villegas Novoa Cecilia, Rocha Guzmán Nuria Elizabeth, Moreno Jiménez Martha Rocío, Gallegos Infante José Alberto, González Laredo Rubén Francisco.

Por haber obtenido **PRIMER LUGAR** con el trabajo: "***EFECTO DE UN EXTRACTO DE SALVILLA (Buddleja scordioides K.) SOBRE LA EXPRESIÓN DIFERENCIAL DE MEDIADORES INFLAMATORIOS INDUCIDOS CON LIPOPOLISACÁRIDO EN CÉLULAS EPITELIALES DE HUMANO"***

en la categoría: *INVESTIGACIÓN EN BIOTECNOLOGÍA E INNOVACIÓN*

en el XV Concurso de Trabajos de Investigación en Salud

realizado en el marco I Jornada Nacional de Investigación en Salud Durango 2017

José Rosas Aispuro Torres

Gobernador del Estado de Durango

Dr. César Humberto Franco Mariscal

Secretario de Salud y Dir. Gral. de los Servicios de Salud

Victoria de Durango, Dgo. a Agosto de 2017

El **Gobierno del Estado de Durango** a través de la **Secretaría de Salud** otorga la presente

Constancia

A:

Reyna-Rojas, J.A., Moreno-Jimenez, M.R., Rocha-Guzmán, N.E., Gallegos-Infante, J.A., Gonzalez-Laredo, R.F., y Rojas-Contreras, J.A.

Por haber obtenido **SEGUNDO LUGAR** con el trabajo: "***POTENCIAL PREBIÓTICO DE FRIJOL (Phaseolus vulgaris L.) BAYO VICTORIA PROCESADO***"
en la categoría: *INVESTIGACIÓN EN BIOTECNOLOGÍA E INNOVACIÓN*
en el XV Concurso de Trabajos de Investigación en Salud
realizado en el marco I Jornada Nacional de Investigación en Salud Durango 2017

José Rosas Aispuro Torres
Gobernador del Estado de Durango

Dr. César Humberto Franco Mariscal
Secretario de Salud y Dir. Gral. de los Servicios de Salud

Victoria de Durango, Dgo. a Agosto de 2017

DURANGO
GOBIERNO DEL ESTADO

EL GOBIERNO ESTADO DE DURANGO

Y LA SECRETARÍA DE EDUCACIÓN DEL ESTADO

A TRAVÉS DEL

CONSEJO DE CIENCIA Y TECNOLOGÍA DEL ESTADO DE DURANGO

DURANGO
Consejo de Ciencia y Tecnología

Otorgan el presente

RECONOCIMIENTO

A: Dra. Nuria Elizabeth Rocha Guzmán
Dr. José Alberto Gallegos Infante
Dr. Rubén Francisco González Laredo
Dra. Martha Rocío Moreno Jiménez
Dr. Luis Medina Torres

PREMIO ESTATAL DE CIENCIA, TECNOLOGÍA E INNOVACIÓN DURANGO 2015

EN EL ÁREA DE:

INGENIERÍAS, DESARROLLO INDUSTRIAL Y TECNOLÓGICO

CON EL TRABAJO DE INVESTIGACIÓN:

Desarrollo tecnológico para obtener nanopartículas bioactivas de poli-(DLLactida- Co-Glicolida) cargadas con lupeol de hojas de encino

Victoria de Durango, Dgo. Noviembre de 2015

ING. HECTOR E. VELA VALENZUELA
Secretario de Educación
del Estado de Durango

C.P. JORGE HERRERA CALDERA
Gobernador Constitucional del Estado de Durango

DR. ELISEO MEDINA ELIZONDO
Director General del Consejo de Ciencia
y Tecnología del Estado de Durango

ASOCIACIÓN MEXICANA DE CIENCIA DE ALIMENTOS

CERTIFICADO DE MEMBRESÍA

El presente documento acredita que:

Dr. Rocío Moreno Jiménez

forma parte de la asociación en el período de octubre del 2016 a octubre del 2018 en calidad de

MIEMBRO ACTIVO

Dr. J. Hugo Sergio García Galindo
(Presidente)

Dr. Nicolás Oscar Soto Cruz
(Secretario)

SEP
SECRETARÍA DE EDUCACIÓN PÚBLICA

TECNOLÓGICO NACIONAL DE MÉXICO
Dirección General

Ciudad de México, 16/marzo/2016
Oficio MOO/644/2016

ING. JESÚS ASTORGA PÉREZ
DIRECTOR DEL INSTITUTO TECNOLÓGICO DE DURANGO
PRESENTE

Con referencia a su oficio ITD DSE 12/16, donde solicita la Comisión al Extranjero a nombre de la profesora MARTHA ROCÍO MORENO JIMÉNEZ, me permito comunicarle que dicha comisión ha sido autorizada, de acuerdo con los siguientes datos:

Evento	Estancia de Investigación
Tipo de evento	Estadía
Período de comisión	Del 01 al 30 de abril 2016
No. de días	30
Lugar de comisión	Madrid, España
Motivo / Justificación	Evaluar los avances del Proyecto "Efectos del consumo de fermentados de infusiones de encino con el hongo Kombucha: conversión metabólica de flavonoides y su efecto modulador en la función endotelial y enfermedad cardiovascular"
Cobertura de gastos	Los gastos de traslado, hospedaje y alimentación serán cubiertos por el Proyecto CONACyT 220614

No omito mencionar, que la profesora comisionada deberá entregar en su plantel de adscripción un informe de las actividades realizadas al término de dicha comisión.

Aprovecho la oportunidad para enviarle un cordial saludo.

ATENTAMENTE
Excelencia en Educación Tecnológica

MTRO. MANUEL QUINTERO QUINTERO
DIRECTOR GENERAL

SECRETARÍA DE EDUCACIÓN PÚBLICA
TECNOLÓGICO NACIONAL
DE MÉXICO
DIRECCIÓN GENERAL

JOAG/IM

Arcos de Belén Núm. 79, PH, Col. Centro, Deleg. Cuauhtémoc, 06010, Ciudad de México.
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Industrial Crops & Products xxx (xxxx) xxx–xxx

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Industrial Crops & Products

journal homepage: www.elsevier.com/locate/indcrop

Psacalium paucicapitatum has *in vitro* antibacterial activity

D. Jasso de Rodríguez[a,*], L.C. García-Hernández[a], N.E. Rocha-Guzmán[b], M.R. Moreno-Jiménez[b], R. Rodríguez-García[a], M.L.V. Díaz-Jiménez[c], A. Sáenz-Galindo[d], J.A. Villarreal-Quintanilla[a], F.M. Peña-Ramos[a], M.L. Flores-López[a], D.A. Carrillo-Lomelí[a]

[a] Universidad Autónoma Agraria Antonio Narro, Calzada Antonio Narro 1923, Col. Buenavista, CP 25315 Saltillo, Coahuila, Mexico
[b] Instituto Tecnológico de Durango, Blvd. Felipe Pescador 1830 Ote., Col. Nueva Vizcaya, 34080 Durango, Durango, Mexico
[c] Cinvestav-Saltillo Carretera Saltillo-Monterrey Km 13, CP 25900 Ramos Arizpe, Coahuila, Mexico
[d] Universidad Autónoma de Coahuila, Facultad de Ciencias Químicas, CP 25280 Saltillo, Coahuila, Mexico

ARTICLE INFO

Keywords:
Psacalium paucicapitatum
Corms aqueous extract
Antibacterial activity
Chemical composition
Total content of phenols and flavonoids
Antioxidant activity

ABSTRACT

In Mexico, in 2010, urinary tract infection (UTI) occupied third place in morbidity. *Enterobacter aerogenes*, *Escherichia coli, Proteus hauseri*, *Proteus mirabilis*, *Proteus vulgaris*, and *Staphylococcus epidermidis* are included among the bacteria that cause UTIs. Currently, there is an urgent need to develop new alternatives to control antibiotic-resistant bacteria. The secondary metabolites of plants have traditionally been used to remedy the illnesses caused by bacteria. *Psacalium paucicapitatum* [(B.L. Rob. & Greenm.) H. Rob. & Brettell] is an endemic plant that grows in the state of Oaxaca, Mexico, which is used to relieve diseases such as gastric ulcers, diabetes and hypertension, with excellent results. The aims of this study were to evaluate the *in vitro* antibacterial activity of aqueous extracts of *P. paucicapitatum* corms against six bacteria as well as to determine the chemical composition of the extracts in order to identify bioactive molecules inhibiting bacterial reproduction. The extract inhibited six bacteria evaluated in a range of MIC_{90} at 2034–5238 mg/L. The antibacterial activity of aqueous extract is attributed to the identified compounds, which are: ethyl *iso*-allocholate; imidazole-4-carboxylic acid, 2-fluoro-1-methoxymethyl-, ethyl ester and tetra acetyl-D-xylonic nitrile. The extract of *P. paucicapitatum* represents an alternative to be used as a new antibacterial botanical drug which could substitutes the use of synthetic drugs.

1. Introduction

In Mexico, in 2010, the urinary tract infection (UTI) occupied third place in morbidity, mainly affecting pediatric patients, but also adults, particularly pregnant women who require special treatment for UTI (SINAVE/DGE/SALUD, 2009; Calderón-Jaimes et al., 2013). The bacteria which produce UTI are generally Gram negative of intestinal origin: *Escherichia coli* causes 75–95% of the infections, the rest is produced by *Klebsiella* sp, *Proteus* sp., and *Enterobacter* sp., and others such as *Enterococcus*, *Staphylococcus saprophyticus*, and *Streptococcus agalactiae*, (Gupta et al., 2011; Calderón-Jaimes et al., 2013). It is important to remark that most *E. coli* strains are normally innocuous; however, some of them such as Shiga toxin-producing *E. coli* may become pathogenic when the body's immunological defenses are compromised, causing septicemia and death (Organización Mundial de la Salud, 2016).

To control the UTIs, high concentrations of antibiotics have been used, originating multidrug resistant (MDR) bacteria and causing a serious clinical problem (Mishra et al., 2015). Due to this, there is an urgent need to develop new alternatives to control MDR bacteria, focusing on secondary metabolites of plants that have been traditionally used to remedy the illnesses caused by bacteria (Ramírez-Rueda and Mojica-Ávila, 2014).

In Mexico, plants of the *Psacalium* genus (Asteraceae family, Senecioneae tribe) have been used as traditional medicine by the Yaquis, Seris, and Raramuris (Tarahumara) tribes, as well as by inhabitants of rural areas, to relieve the discomforts caused by gastrointestinal infections, diabetes and muscle pains (Barkley et al., 1996; Heinrich, 1996). Several *Psacalium* species have reported antimicrobial activity, such as *P. decompositum* which showed antibacterial activity against *S. aureus*, *E. coli*, *Pseudomonas aeruginosa*, and *P. mirabilis*. This activity was attributed to the plant's isolated cacalol (Jiménez et al., 1992). Besides, Anaya et al. (1996) reported that the aqueous extract of the roots of this plant showed inhibition of the mycelial growth of phytopathogenic fungi. Moreover, more than 10 sesquiterpenoides compounds were identified in the roots of *P. decom-*

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Antioxidant, anti-inflammatory and apoptotic effects of *Flourensia microphylla* on HT-29 colon cancer cells

D. Jasso de Rodríguez[a,*], D.A. Carrillo-Lomelí[a], N.E. Rocha-Guzmán[b], M.R. Moreno-Jiménez[b], R. Rodríguez-García[a], M.L.V. Díaz-Jiménez[c], M.L. Flores-López[a], J.A. Villarreal-Quintanilla[a]

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Flourensia microphylla
Antioxidant and anti-inflammatory activities
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ABSTRACT

Colon cancer is one of the most common cancer types, causing major health problems worldwide. In Mexico, colon cancer occupies the third place on incidence among all cancer types. *Flourensia* species have been used in traditional medicine, and recently, these have been studied due to their biological properties such antibacterial and antifungal. Therefore, the aims of this work were to study the antioxidant, anti-inflammatory, and apoptotic effects of two extracts (ethanol and acetone) of *Flourensia microphylla*. The leaves of *F. microphylla* were collected in the wild site (25°07′13″ N latitude and 101°07′24″ W longitude, 2383 m asl altitude) at Southeast of Coahuila, Mexico. The phenolic content and antioxidant activity were determined in ethanol and acetone extracts. Chemical composition was analyzed with LC–MS/MS and GC–MS. Cellular viability were analyze by 3-(4,5-di-methylthiazol-2-yl)-2,5,-dephenyl-2 tetrazolium bromide (MTT) assay and evaluated on HT-29 cells. Western blot assay was carried out to measure the inflammatory markers expression and apoptotic assay was conducted with a human apoptosis antibody array. Results showed that *F. microphylla* extracts are a great source of phenolic compounds with antioxidant activity. Acetone extract presented anti-inflammatory effect due to the inhibition of interleukin 8 (IL-8). Also, acetone extract showed activation of the intrinsic pathway of apoptosis by the increment of the Bax/Bcl-2 ratio. Ethanol extract activated the extrinsic pathway as the expression of the TNF family proteins, such as Fas and TRAIL, was observed. Both extracts demonstrated apoptotic activity by the expression of caspase 3 (Cas-3), the initiator caspase of apoptosis. Thus, *F. microphylla* extracts can be a potential natural alternative to prevent colon cancer.

1. Introduction

Cancer is a genetic disease resulting from dynamic changes that involves the transformation of a normal cell to a malignant, which begins to grow uncontrollably invading organs (Hanahan and Weinberg, 2000). Nowadays, cancer is one of the main causes of mortality in the world (Bayala et al., 2014); among which, colon cancer is the most important public health problem (Altobelli et al., 2014). In Mexico, colon cancer ranks third place on incidence with 4656 and 3995 reported cases in men and women, respectively (World Health Organization, 2014).

The important role that inflammation plays on the development and progression of cancer has been widely reported (Candido and Hagemann, 2013; Elinav et al., 2013). Inflammation is a biological process of defense and repair by the human's immune system. This allows to protect an organism against noxious agents such as pathogens, toxins, and damaged cells (Jungbauer and Medjakovic, 2012). But, the deregulation of this immune system' component (e.g. chronic inflammation) predisposes the organism to diverse cancer types (Colotta et al., 2009). In fact, the chronic inflammatory bowel disease has been known in the past as ulcerative colitis, a risk factor for colon cancer development (Grivennikov, 2013).

Apoptosis is a type of programmed cell death characterized by the control of the cell autodigestion; it is regulated by molecular mechanisms that activate a stereotyped program causing cell death (Manosroi et al., 2012). But cancer cells apoptosis mechanism is blocked allowing the cancer cells to multiply indefinetily. Apoptosis

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0926-6690/

Herrera-Carrera et al., *Cogent Food & Agriculture* (2015), 1: 1059033
http://dx.doi.org/10.1080/23311932.2015.1059033

cogent food & agriculture

FOOD SCIENCE & TECHNOLOGY | RESEARCH ARTICLE

Phenolic composition of selected herbal infusions and their anti-inflammatory effect on a colonic model *in vitro* in HT-29 cells

Elda Herrera-Carrera[1], Martha Rocío Moreno-Jiménez[1]*, Nuria Elizabeth Rocha-Guzmán[1], José Alberto Gallegos-Infante[1], Jesús Omar Díaz-Rivas[1], Claudia Ivette Gamboa-Gómez[1] and Rubén Francisco González-Laredo[1]*

Received: 05 February 2015
Accepted: 02 June 2015

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E-mails: mrmoreno@itdurango.edu.mx (Martha Rocío Moreno-Jiménez); gonzalezlaredo@gmail.com (Rubén Francisco González-Laredo)

Reviewing editor:
Fatih Yildiz, Middle East Technical University, Turkey

Additional information is available at the end of the article

Abstract: Some herbal infusions used in folk medicine in Mexico to treat gastrointestinal disorders were evaluated. Antioxidant activity and phenolic compounds were analyzed on the lyophilized aqueous crude extracts (LACE) of arnica (*Aster gymnocephalus*), chamomile (*Chamaemelum nobile*), cumin (*Cominum cyminum*), desert resurrection plant (DRP) (*Selaginella lepidophylla*), laurel (*Listea glaucescens*), marjoram (*Origanum majorana*), mint (*Mentha spicata*), salvilla (*Buddleia scordioides*) and yerbaniz (*Tagetes lucida*). Total phenolic content ranged from 8.0 to 70.7 µg GAE/mg for DRP and laurel respectively. Major phenolic compounds were identified by gas chromatography–mass spectrometry and high-performance liquid chromatography. The IC_{50} determined by the degradation of the deoxy-D-ribose ranged from 2,452.53 to 5,097.11 µg/mL. The cytoprotective effect of the LACE alone and on indomethacin-induced oxidative stress in HT-29 cells was tested. The tetrazolium dye MTT assay was performed in concentrations of 0.125–10 mg/mL allowing choosing the lowest concentration for this experimentation. Inflammation markers were measured by

Elda Herrera-Carrera

ABOUT THE AUTHORS

The authors are part of the "Functional Foods and Nutraceuticals Academic Group", a research team at the Technological Institute of Durango (TNM-ITD). Their endeavor is to educate specialists as graduate students and to perform research on the subject. Their search focuses on scientific and technological options to use and convert local natural resources into bioactive and functional products, which may contribute to health and diet solutions for the general population. Among their current investigation topics are local plants with known biological activity such as Quercus and guava leaves, which also are tested as kombucha analog products. They also pursue the utilization of natural polymers from mucilages of "nopal" (*Opuntia* spp.) and Aloe vera plants. Another matter of interest is the development of nanomaterials and organogels to encapsulate natural principles and nutraceuticals.

PUBLIC INTEREST STATEMENT

Stomach pain and gastrointestinal inflammation are common conditions in people with bad diets or eating disorders. Another cause is the unsupervised consumption of non-steroidal anti-inflammatory drugs (NSAIDs). Traditionally, herbal teas, infusions, and decoctions of many plants have been used to treat such complications with no exact knowledge on what phytochemicals and metabolic mechanisms are involved. Arnica, chamomile, cumin, desert resurrection plant, laurel, marjoram, mint, salvilla, and yerbaniz are typical examples of herb infusions consumed in Mexico to alleviate these ailments. In this paper, the herbal infusions were freeze dried and analyzed for polyphenols as bioactive antioxidant compounds present in plants that might be responsible for the protective role of these beverages. Extracts were also tested in a colonic cell model and inflammation markers determined, comparing against a positive control from a NSAID like indomethacin. It follows that salvilla, chamomile, and laurel have shown promising and explainable anti-inflammatory effects.

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Antioxidant, anti-inflammatory and anticarcinogenic activities of edible red oak (*Quercus* spp.) infusions in rat colon carcinogenesis induced by 1,2-dimethylhydrazine

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ABSTRACT

Red oak (*Quercus* spp.) leaves are traditionally used as food in Mexico, and some of their infusions have potential anticarcinogenic and anti-inflammatory effects; however, these properties have not yet been scientifically tested. The aim of this work was to explore the anti-inflammatory activity in HT-29 cells and anticarcinogenic effect in 1,2-dimethylhydrazine (DMH)-induced colon carcinogenesis of red oak infusions. *Quercus* infusions were prepared and administered as the sole source of drink to male Sprague-Dawley rats (1% w/v) for the entire 26-week experimental period. On week 4, rats received 8 subcutaneous injections of DMH (21 mg/kg body weight) once a week. The results showed that mean tumor (0.9 ± 0.2 vs. 2.6 ± 0.3) and multiplicity (1.2 ± 0.1 vs. 2.0 ± 0.23), and β-catenin protein level (2.2-fold) in adenocarcinomas were significantly lower in *Quercus sideroxyla*-treated group compared with DMH group. By contrast, *Quercus durifolia* and *Quercus eduardii* infusions had no protective effect. Additionally, the experiments in HT-29 cells confirmed that *Q. sideroxyla* infusion effectively decreased the levels of the inflammatory markers COX-2 and IL-8 by modulating the expression of NF-κB. These results highlight some of the molecular mechanisms related to the chemopreventive effect of *Q. sideroxyla* infusion and its potential value as a source of bioactive compounds.

1. Introduction

Colorectal cancer (CRC) is the third most common malignant neoplasm worldwide (Altobelli et al., 2014; Matsuda and Machii, 2013). In Mexico, according to the 1998–2002 cancer registry data, CRC represents 3.8% of new cancer cases, a 36% increase during this period; furthermore, CRC mortality has also increased over the same period (Verastegui and Mohar, 2010). CRC is the end result of a stepwise process involving transition of preneoplastic lesions (polyps) to more advanced stages (adenocarcinomas) (Tanaka, 2009). Colonic malignant transformation involves activating mutations in proto-oncogenes, such as K-*ras* and *CTNNB1*, the gene coding for β-catenin, and genetic alterations in tumor suppressor genes, including the *APC* gene, a suppressor of β-catenin signaling (Bos et al., 1987; Morin et al., 1997). Mutations in the K-*ras* gene and in *CTNNB1* can also be detected in colonic tumors of rats induced with the colonic procarcinogen 1,2-dimethylhydrazine (DMH), or its proximate metabolite, azoxymethane (AOM) (Perše and Cerar, 2011; Takahashi and Wakabayashi, 2004).

Inflammation-related processes have also been shown to be involved in the development of both human and DMH/AOM-induced colon carcinogenesis (Rogler, 2014; Takahashi and Wakabayashi, 2004). Nuclear factor kappa B (NF-κB) is a transcription factor that plays a crucial role in regulation of pro-inflammatory cytokines, such as tumor necrosis factor α (TNF-α), chemokines, anti-apoptotic proteins and growth factors (Shen and Tergaoankar, 2009); therefore, NF-kB modulation by dietary constituents is of major importance in cancer chemoprevention.

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Phenolic composition changes of processed common beans: their antioxidant and anti-inflammatory effects in intestinal cancer cells

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ABSTRACT

Four varieties of common beans, Negro 8025 (N), Bayo Victoria (BV), Pinto Durango (PD), and Pinto Saltillo (PS) were evaluated and compared for phenolic composition, antioxidant activity and anti-inflammatory effects by *in vitro* human intestinal cell model. Beans were processed by canning and boiling in open pot. Acetone/Water extracts were analyzed for phenolic composition by HPLC-PAD and HPLC-MS, screened for antioxidant activities, as lipid peroxidation inhibition and chelating capacities by inhibition of deoxi-D-ribose degradation. It was investigated their anticarcinogenic effect by inhibiting cell proliferation, decreasing interleukin-8 (IL-8), modulating interleukin-10 (IL-10), inhibiting tumor necrosis factor alpha (TNFα) and regulating nuclear factor kappa-light-chain-enhancer of activated B cells (NF-κβ). Canning induced antioxidant compounds in order N > PD > BV > PS associated with potential for scavenging hydroxyl radicals and metal chelating capacities. Effect of cooking on bioactive compounds was cultivar dependent, being more quantitative than qualitative due to release of bonded phenolics. Inhibition of cyclooxygenase-2 (COX-2), TNFα and NF-κβ was observed, and the induced expression of IL-10. Both effects were also cultivar and process dependent, particularly in PD beans.

1. Introduction

Legumes have become important in the human diet because of their nutritional properties, low cost and the physiological effects associated with its intake. The major legumes consumed in Latin America are common bean (*Phaseolus vulgaris* L.).

Currently, the consumption of this legume has changed due to different factors such as increasing availability of common bean varieties, regional and cultural changes associated with modern life as the lack of domestic time to cook them at home. The latter has led to the developing of convenience foods by the industry based on the four more preferred common bean varieties: Bayo, Pinto, Black and Peruvian. The most commercially offered presentation of common beans and the most requested by the consumers is the canned form (82.3%), and from these 52% are processed as whole seeds, being black beans the most demanded variety (Rodríguez-Licea, García-Salazar, Rebollar-Rebollar, & Cruz-Contreras, 2010).

Commercial acceptance of industrial products such as common beans depends directly on the adequate thermal processing and determination of the optimal cooking time. A well-designed thermal process, improves the palatability, texture and increased bioavailability of nutrients as a result of gelatinization of the starch, as well as to protein denaturation. Hence the importance of the type of bean processing, since it can significantly determine the effectiveness of its natural biological action, due to the release of bioactive compounds that play an important role in the antioxidant system of the organism (Champ, 2002; Rocha-Guzmán, González-Laredo, Ibarra-Pérez, Nava-Berumen, & Gallegos-Infante, 2007; Wolosiak et al., 2010). The antioxidant activity of polyphenols is the functional property of interest, as has been the target of numerous studies. Their chemical structure encloses in key positions a variable number of reactive hydroxyl groups, which allow the antioxidant to react and stabilize free radicals. Consequently, it is extremely important to determine the amount of polyphenols in legume species. The number of natural polyphenols has been estimated at almost half a million, and many of them occur as glycosides and polymers. However, the polyphenols bioactivity is attributed to aglycone fragments of its metabolites and not to sugars (Sakakibara, Honda, Nakagawa, Ashida, & Kanazawa, 2003).

Although there is a major emphasis on the antioxidant properties of phenolics, there are evidences (Williams, Spencer, & Rice-Evans, 2004) that flavonoids, as precursors and their *in vivo* metabolism products,

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"2015, Año del Generalísimo José María Morelos y Pavón"

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Asunto: **Constancia de Vigencia**

DRA. ROCIO MORENO JIMENEZ
PRESENTE.-

Con fundamento a la normatividad vigente, tomando en cuenta su trayectoria, su perfil profesional y académico, con las atribuciones que se establecen en el Manual de Organización de los Institutos Tecnológicos y demás disposiciones aplicables a los servidores públicos me permito por este medio expedir su ratificación como:

JEFA DE LABORATORIO BIOTERIO

Dependiente del Departamento de las Ingenierías Química y Bioquímica, debiendo presentarse con el Dr. Jesús Bernardo Páez Lerma a efecto de recibir instrucciones y coordinar sus funciones y actividades.

En el desempeño de su encargo deberá observar, respetar y promover el cumplimiento de las leyes, acuerdos, programas y disposiciones que norman la vida institucional del Instituto Tecnológico de Durango y la Secretaría de Educación Pública.

Sin otro particular y deseándole éxito en sus funciones, me despido de Usted.

ATENTAMENTE.
"La Técnica al Servicio de la Patria"

ING. JESÚS ASTORGA PÉREZ
DIRECTOR

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