



Download Print Save to PDF Add to List Create bibliography

Revista de Toxicología • Volume 32, Issue 2, Pages 121 - 126 • 2015

Document type

Article

Source type

Journal

ISSN

02127113

View more

Chemical characterization and study of the genotoxicity and induction of oxidative stress of particulate material pm₁₀ from the urban area of cuenca –ecuador

[Caracterización química del material particulado PM₁₀ de la zona urbana de Cuenca- Ecuador e investigación de su genotoxicidad e inducción de estrés oxidativo en células epiteliales alveolares A549]

[Astudillo Alemán A.L.](#)^a ; [Ramírez Orellana M.I.](#)^b; [García Alvear N.B.](#)^a; [González Arévalo G.J.](#)^b; [Gutiérrez Valle I.A.](#)^b; [Bailón Moscoso N.C.](#)^b

Save all to author list

^a Centro de Estudios Ambientales, Universidad de Cuenca (CEA), Cuenca, Ecuador

^b Departamento de Ciencias de la Salud, Sección de Genética Humana Microbiología y Bioquímica Clínica de la Universidad Técnica Particular de Loja, Loja, Ecuador

1 30th percentile
Citation in Scopus

View all metrics

Full text options Export

Abstract

Author keywords

Indexed keywords

Sustainable Development Goals

SciVal Topics

Chemicals and CAS Registry Numbers

Metrics

Abstract

Exposure to environmental particles is a risk factor that causes damage to human health, such as respiratory and cardiovascular diseases and cancer. The toxicity and inflammatory effects of these particles is related to their size and chemical characteristics. The aim of this study was to determine the chemical characteristics of the aqueous fraction of Particulate Matter PM₁₀, collected in three monitoring sites Cuenca-Ecuador, and to evaluate their genotoxic activity and induction of reactive oxygen species (ROS) in human alveolar epithelial cell line A-549. Samples were collected using a low volume equipment. Particulate matter concentrations determined by gravimetric analysis in the three study points exceeded the 50 ug / m³ limit stated in the Ecuadorian legislation. In the characterization of the aqueous solution the presence of anions (Cl⁻, NO₃⁻, SO₄⁻²) and heavy metals (Cr, Fe, Ni, Zn, Cu, Mn) was determined by ion chromatography techniques and atomic absorption spectroscopy, respectively;

Cited by 1 document

Overview and Seasonality of PM₁₀ and PM_{2.5} in Guayaquil, Ecuador

Moran-Zuloaga, D. , Cáceres, J. , Cornejo, M.H. (2021) *Aerosol Science and Engineering*

View details of this citation

Inform me when this document is cited in Scopus:

Set citation alert

Related documents

Heart failure: Air pollution linked with heart-failure-related hospitalization and mortality

Mearns, B.M. (2013) *Nature Reviews Cardiology*

Luffföroreningar kopplade till hjärtsvikt

Hansen, A. (2013) *Lakartidningen*

An integrative modeling approach for predicting exposures to traffic-related air pollution during commuting

Michael, R. , Stuart, A.L. , Dagne, G. (2015) *Proceedings of the Air and Waste Management Association S Annual Conference and Exhibition Awma*

View all related documents based on references


Find more related documents in Scopus based on:

Authors Keywords

SO₄⁻² and Fe showed the highest concentrations. The A-549 cells were exposed to different concentrations (0.82, 1.25 and 1.63 m³ / mL) fraction of water-soluble PM₁₀, in order to observe the possible genotoxic effect by the comet assay and the amount inducing reactive oxygen species by fluorimetry. It was finally determined that the aqueous -soluble extracts of PM₁₀ induce cell damage under (type I), and increase the production of ROS in cells A-549, which could pose a risk to the health of the exposed population of the city of Cuenca © 2015, Asociacion Espanola de Toxicologia. All rights reserved.

Author keywords

Comet Assay; Cuenca-Ecuador; Genotoxicity; PM₁₀; ROS

Indexed keywords 

Sustainable Development Goals  

SciVal Topics  

Chemicals and CAS Registry Numbers 

Metrics 

References (23)

[View in search results format >](#)

All

[Export](#)  [Print](#)  [E-mail](#)  [Save to PDF](#) [Create bibliography](#)

-
- 1 Shah, A.S.V., Langrish, J.P., Nair, H., McAllister, D.A., Hunter, A.L., Donaldson, K., Newby, D.E., (...), Mills, N.L.

Global association of air pollution and heart failure: A systematic review and meta-analysis

(2013) *The Lancet*, 382 (9897), pp. 1039-1048. Cited 1024 times.

<http://www.journals.elsevier.com/the-lancet/>

doi: 10.1016/S0140-6736(13)60898-3

[View at Publisher](#)

-
- 2 Gutiérrez-Praena, D., Jos, A., Pichardo, S., Puerto, M., Sánchez-Granados, E., Grilo, A., Cameán, A.M.

New toxic risks due to nanoparticles exposure

(2009) *Revista de Toxicologia*, 26 (2-3), pp. 87-92. Cited 8 times.

[http://redalyc.uaemex.mx/redalyc/src/inicio/ArtPdfRed.jsp?](http://redalyc.uaemex.mx/redalyc/src/inicio/ArtPdfRed.jsp?iCve=91913002002)

[iCve=91913002002](http://redalyc.uaemex.mx/redalyc/src/inicio/ArtPdfRed.jsp?iCve=91913002002)

-
- 3 Callén, M.S., Iturmendi, A., López, J.M., Mastral, A.M.

Source apportionment of the carcinogenic potential of polycyclic aromatic hydrocarbons (PAH) associated to airborne PM₁₀ by a PMF model

(2014) *Environmental Science and Pollution Research*, 21 (3), pp. 2064-2076. Cited 41 times.

doi: 10.1007/s11356-013-2116-9

[View at Publisher](#)

- 4 Pope III, C.A., Burnett, R.T., Thun, M.J., Calle, E.E., Krewski, D., Ito, K., Thurston, G.D.
- Lung cancer, cardiopulmonary mortality, and long-term exposure to fine particulate air pollution

(2002) *Journal of the American Medical Association*, 287 (9), pp. 1132-1141. Cited 7122 times.

<http://jama.jamanetwork.com/journal.aspx>

doi: 10.1001/jama.287.9.1132

[View at Publisher](#)

- 5 Li, N., Xia, T., Nel, A.E.
- The role of oxidative stress in ambient particulate matter-induced lung diseases and its implications in the toxicity of engineered nanoparticles

(2008) *Free Radical Biology and Medicine*, 44 (9), pp. 1689-1699. Cited 799 times.

doi: 10.1016/j.freeradbiomed.2008.01.028

[View at Publisher](#)

- 6 Sahagún, M.A.
- Efecto genotóxico de las partículas urbanas
(2010) *Tesis Doctoral*
Centro Interdisciplinario de Investigaciones y estudios sobre medio ambiente y desarrollo CIIEMAD Instituto Politécnico Nacional, México

- 7 (2014) *Ambient Air Pollution Database, 2014*. Cited 63 times.
World Health Organization
www.who.int/phe/health_topics/outdoorair/databases/cities/en/
-

- 8 Tice, R.R., Agurell, E., Anderson, D., Burlinson, B., Hartmann, A., Kobayashi, H., Miyamae, Y., (...), Sasaki, Y.F.
- Single cell gel/comet assay: Guidelines for in vitro and in vivo genetic toxicology testing

(2000) *Environmental and Molecular Mutagenesis*, 35 (3), pp. 206-221. Cited 4357 times.

doi: 10.1002/(SICI)1098-2280(2000)35:3<206::AID-EM8>3.0.CO;2-J

[View at Publisher](#)

- 9 Wardman, P.
- Fluorescent and luminescent probes for measurement of oxidative and nitrosative species in cells and tissues: Progress, pitfalls, and prospects

(2007) *Free Radical Biology and Medicine*, 43 (7), pp. 995-1022. Cited 769 times.

doi: 10.1016/j.freeradbiomed.2007.06.026

[View at Publisher](#)

-
- 10 Jachero, L., Moscoso, D.
(2009) *Evaluación Del Riesgo De exposición a Sustancias tóxicas Procedentes De La contaminación atmosférica En La Ciudad De Cuenca. Contaminación Del Aire*
Centro de Estudios Ambientales de la Universidad de Cuenca, Cuenca
-
- 11 Balcarce, E.
(2009) *Manual De Procedimientos Para determinación De Material Particulado*
<http://web.minsal.cl/portal/url/item/80bf098d5a137083e04001011e015e8d.pdf>
-
- 12 (2011)
Ministerio del Ambiente República del Ecuador Registro oficial No 464
[http://www.efficacitas.com/efficacitas_es/assets/AM%20050%20Norma%20Ocalidad%20aire%20ambiente%20\(2\).pdf](http://www.efficacitas.com/efficacitas_es/assets/AM%20050%20Norma%20Ocalidad%20aire%20ambiente%20(2).pdf)
-
- 13 L'vov, B.V.
The analytical use of atomic absorption spectra

(1961) *Spectrochimica Acta*, 17 (7), pp. 761-770. Cited 209 times.
doi: 10.1016/0371-1951(61)80141-0

[View at Publisher](#)
-
- 14 Hautman, D.P., Munch, D.J.
Method 300.1 Determination of inorganic anions in drinking water by ion chromatography
(1997) *US Environmental Protection Agency*. Cited 639 times.
Cincinnati, OH. 300.1-1-300.1-36
-
- 15 Jones, K.H., Senft, J.A.
An improved method to determine cell viability by simultaneous staining with fluorescein diacetate-propidium iodide ([Open Access](#))

(1985) *Journal of Histochemistry and Cytochemistry*, 33 (1), pp. 77-79. Cited 1019 times.
doi: 10.1177/33.1.2578146

[View at Publisher](#)
-
- 16 Carballo, M.A., Cortada, C.M., Gadano, A.B.
Riesgos y beneficios en el consumo de plantas medicinales
(2005) *Theoria*, 14, pp. 95-108. Cited 10 times.
-