

[< Back to results](#) | 1 of 1[Export](#) [Download](#) [Print](#) [E-mail](#) [Save to PDF](#) [Add to List](#) [More... >](#)[View at Publisher](#)Journal of Ethnopharmacology
Volume 236, 23 May 2019, Pages 466-473

Antiproliferative activity of ionic liquid-graviola fruit extract against human breast cancer (MCF-7) cell lines using flow cytometry techniques (Article)

Daddiouaissa, D.^a, Amid, A.^b, [Kabbashi, N.A.^a](#), [Fuad, F.A.A.^a](#), [Elnour, A.M.^a](#), [Epandy, M.A.K.M.S.^c](#) [ORCID](#)^aBiotechnology Engineering, Kulliyah of Engineering, International Islamic University, Malaysia (IIUM), P. O. Box 10, Gombak, Kuala Lumpur, 50728, Malaysia^bInternational Institute for Halal Research and Training (INHART), International Islamic University Malaysia (IIUM), Level 3, KICT Building, Jalan Gombak, Kuala Lumpur, 53100, Malaysia^cAdikafirdaus Resources, Lot 24, Jalan Klebang Selatan, 2/5 Kampung Tersusun, Batu 6 Klebang Selatan, Ipoh, Perak 31200, Malaysia

Abstract

[View references \(46\)](#)

Ethnopharmacological relevance: Medicinal plants have been used for ages by indigenous communities around the world to help humankind sustain its health. Graviola (*Annona muricata*), also called soursop, is a member of the Annonaceae family and is an evergreen plant that is generally distributed in tropical and subtropical areas of the world. Graviola tree has a long history of traditional use due to its therapeutic potential including anti-inflammatory, antimicrobial, antioxidant, insecticide and cytotoxic to tumor cells. Aim of the study: This study aimed to investigate the in vitro antiproliferative effects and apoptotic events of the ionic liquid extract of Graviola fruit (IL-GFE) on MCF-7 breast cancer cells and their cytokinetics behaviour to observe their potential as a therapeutic alternative in cancer treatment. Materials and methods: The cell viability assay of the extract was measured using tetrazolium bromide (MTT assay) to observe the effects of Graviola fruit extract. Then the cytokinetics behaviour of MCF-7 cells treated with IL-GFE is observed by plotting the growth curve of the cells. Additionally, the cell cycle distribution and apoptosis mechanism of IL-GFE action on MCF-7 cancer cells were observed by flow cytometry. Results: IL-GFE exhibited anti-proliferative activity on MCF-7 with the IC50 value of 4.75 µg/mL, compared to Taxol with an IC50 value of 0.99 µg/mL. IL-GFE also reduced the number of cell generations from 3.71 to 1.67 generations compared to 2.18 generations when treated with Taxol. Furthermore, the anti-proliferative activities were verified when the growth rate was decreased dynamically from 0.0077 h to 1 to 0.0035 h-1. Observation of the IL-GFE-treated MCF-7 under microscope demonstrated detachment of cells and loss of density. The growth inhibition of the cells by extracts was associated with cell cycle arrest at the G0/G1 phase, and phosphatidylserine externalisation confirms the anti-proliferation through apoptosis. Conclusions: ionic liquid Graviola fruit extract affect the cytokinetics behaviour of MCF-7 cells by reducing cell viability, induce apoptosis and cell cycle arrest at the G0/G1 phase. © 2019 Elsevier B.V.

SciVal Topic Prominence [i](#)

Topic: [Annona](#) | [Acetogenins](#) | [annonaceous acetogenins](#)Prominence percentile: 89.398 [i](#)

Reaxys Database Information

[View Compounds](#)

Author keywords

[Apoptosis](#) [Breast cancer](#) [Flow cytometry](#) [Graviola](#) [Ionic liquid](#)

Metrics [?](#)

0 Citations in Scopus

0 Field-Weighted
Citation Impact

PlumX Metrics [v](#)

Usage, Captures, Mentions,
Social Media and Citations
beyond Scopus.

Cited by 0 documents

Inform me when this document
is cited in Scopus:[Set citation alert >](#)[Set citation feed >](#)

Related documents

Anticancer activity of acetogenins
from *Annona muricata* fruitDaddiouaissa, D. , Amid, A.
(2018) *International Medical
Journal Malaysia*Pedagogic aspects in nursing
education: Integrative review |
Aspectos pedagógicos na
formação de enfermagem:
Revisão integrativa | Aspectos
pedagógicos en la formación de
enfermería: Revisión integrativa
Reyes, J.R. , Álvarez, L.N.R. ,
Pomarede, M.J.M.
(2018) *Investigacion y Educacion
en Enfermeria*Annona species (Annonaceae): a
rich source of potential antitumor
agents?Tundis, R. , Xiao, J. , Loizzo, M.R.
(2017) *Annals of the New York
Academy of Sciences*View all related documents based
on referencesFind more related documents in
Scopus based on:

Indexed keywords

EMTREE drug terms: [Annona muricata extract](#) [ionic liquid](#) [paclitaxel](#) [phosphatidylserine](#)EMTREE medical terms: [Annona muricata](#) [antiproliferative activity](#) [apoptosis](#) [Article](#) [breast cancer](#) [cell cycle G0 phase](#) [cell cycle G1 phase](#) [cell cycle progression](#) [cell kinetics](#) [cell viability](#) [cell viability assay](#) [controlled study](#) [cytometry](#) [fruit](#) [growth inhibition](#) [growth rate](#) [human](#) [human cell](#) [IC50](#) [in vitro study](#) [MCF-7 cell line](#) [Vero cell line](#)

Chemicals and CAS Registry Numbers:

paclitaxel, 33069-62-4

ISSN: 03788741

CODEN: JOETD

Source Type: Journal

Original language: English

DOI: 10.1016/j.jep.2019.03.003

PubMed ID: 30853648

Document Type: Article

Publisher: Elsevier Ireland Ltd

References (46)

[View in search results format >](#) All [Export](#) [Print](#) [E-mail](#) [Save to PDF](#) [Create bibliography](#)

- 1 Agu, K.C., Okolie, N.P., Falodun, A., Engel-Lutz, N.
In vitro anticancer assessments of *Annona muricata* fractions and in vitro antioxidant profile of fractions and isolated acetogenin (15-acetyl guanacone)
(2018) *Journal of Cancer Research and Practice*, 5 (2), pp. 53-66.

- 2 Badrie, N., Schauss, A.G.
Soursop (*Annona muricata* L.): Composition, nutritional value, medicinal uses, and toxicology

(2010) *Bioactive Foods in Promoting Health*, pp. 621-643. Cited 29 times.<http://www.sciencedirect.com.ezproxy.um.edu.my/science/book/9780123746283>

ISBN: 978-012374628-3

doi: 10.1016/B978-0-12-374628-3.00039-6

[View at Publisher](#)

- 3 Betancur-Galvis, L.A., Saez, J., Granados, H., Salazar, A., Ossa, J.E.
Antitumor and Antiviral Activity of Colombian Medicinal Plant Extracts [\(Open Access\)](#)

(1999) *Memorias do Instituto Oswaldo Cruz*, 94 (4), pp. 531-535. Cited 72 times.<http://memorias.ioc.fiocruz.br>

doi: 10.1590/S0074-02761999000400019

[View at Publisher](#)