

## Cytotoxic Activities of Extracts and Isolated Compounds of Some Potential Sumatran Medicinal Plants against MCF-7 and HSC-3 Cell Lines

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### Abstract

In continuation of our study of Sumatran plants and the bioactivity of their constituents, *Stereocaulon halei* Lamb (Stereocaulaceae) was extracted and isolated to obtain atranorin (1), lobaric acid (6), and methyl-beta-ornicnol carboxylate (9). We also prepared methanolic extracts of some Sumatran medicinal plants, i.e. *Alpinia denticulata*, *Alpinia malaccensis*, *Alpinia submutica*, *Curcuma zedoaria*, *Centella asiatica*, *Mangifera indica*, *Piper crocatum*, *Mussaenda frondosa*, together with previously isolated compounds, i.e. crocatin A (2) and crocatin B (3) from *P. crocatum*, curcumin (4) from *Curcuma longa*, demethoxymatteucinol (5) from *Sphaerostephanos polycarpus*, mangiferin (7) from *M. indica*, methyl caffeate (8) from *Balanophora elongata*, tiliroside (10) from *Guazuma ulmifolia*, and usnic acid from *Usnea* sp (11). These extracts and compounds were tested for their cytotoxicity against MCF-7 and HSC-3 cell lines by MTT assay (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide). It was found that the IC50 value of atranorin (1), lobaric acid (6), methyl-beta-ornicnol carboxylate (9), and methanolic extract of *A. submutica* towards the MCF-7 cell line was 208.20 mu M, 172.05 mu M, 382.60 mu M and 70.95 mu g/mL, respectively. The IC50 value of lobaric acid (6) and methyl-beta-ornicnol carboxylate (9) against the HSC-3 cell line was 88.92 mu M and 260.09 mu M, respectively. The other extracts did not show significant cytotoxicity.

### Keywords

**Author Keywords:** cytotoxic; extracts; HSC-3; isolated compounds; MCF-7; Sumatran medicinal plants  
**KeyWords Plus:** PIPER-CROCATUM RUIZ; CENTELLA-ASIATICA; BREAST-CANCER; USNIC ACID; LEAVES; LICHEN

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## Cited References: 36

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1. **extract** Times Cited: 42  
By: Abdullah, Al-Shwyeh Hussah; Mohammed, Abdulkarim Sabo; Abdullah, Rasedee; et al.  
BMC COMPLEMENTARY AND ALTERNATIVE MEDICINE Volume: 14 Article Number: 199 Published: JUN 25 2014
2. **CYTOTOXIC ACTIVITY OF LUVUNGA SCANDENS AGAINST HUMAN CANCER CELL LINES** Times Cited: 4  
By: Al-Zikria, Putri Nur Hidayah; Taher, Muhammad; Susanti, Deny; et al.  
JURNAL TEKNOLOGI Volume: 78 Issue: 10 Pages: 153-157 Published: OCT 2016
3. **The Characteristics of Breast Cancer Patients in ` Dharmais' Hospital National Cancer Center Jakarta Based on Occupational and Environmental Status** Times Cited: 1  
By: Amandito, R.; Viryawan, C.; Santoso, F.; et al.  
Indonesian Journal of Cancer Volume: 7 Issue: 2 Pages: 53-59 Published: 2013  
[\[Show additional data\]](#)
4. **The Study of Antimicrobial Bioactivities on Chemical Constituents of Paku Kuniyit (Sphaerostephanos polycarpus (Bl.) Copel)** Times Cited: 1  
By: Arbain, D.; Ismed, F.; Syafni, N.  
Research Report of Medicinal Raw Material (BBO and BOOT) Published: 2016  
Publisher: Andalas University-Ministry of Health Republic of Indonesia
5. **Inventory, Constituents and Conservation of Biologically Important Sumatran Plants** Times Cited: 5  
By: Arbain, Dayar  
NATURAL PRODUCT COMMUNICATIONS Volume: 7 Issue: 6 Pages: 799-806 Published: JUN 2012
6. **Bicyclo[3.2.1]octanoid neolignans from Indonesian red betle leaves (Piper crocatum Ruiz & Pay.)** Times Cited: 1  
By: Arbain, Dayar; Nofrizal; Syafni, Nova; et al.  
PHYTOCHEMISTRY LETTERS Volume: 24 Pages: 163-166 Published: APR 2018
7. **APOPTOSIS INDUCTION OF CENTELLA ASIATICA ON HUMAN BREAST CANCER CELLS** Times Cited: 23  
By: Babykutty, Suboj; Padikkala, Jose; Sathiadevan, Priya Prasanna; et al.  
AFRICAN JOURNAL OF TRADITIONAL COMPLEMENTARY AND ALTERNATIVE MEDICINES Volume: 6 Issue: 1 Pages: 9-16 Published: 2009
8. **Proactive Schema Based Link Lifetime Estimation and Connectivity Ratio** Times Cited: 9  
By: Bachir, Bouamoud; Ali, Ouacha; Ahmed, Habbani; et al.  
SCIENTIFIC WORLD JOURNAL Article Number: 172014 Published: 2014
9. **Variable responses of different human cancer cells to the lichen compounds parietin, atranorin, usnic acid and gyrophoric acid** Times Cited: 79  
By: Backorova, M.; Backor, M.; Mikes, J.; et al.  
TOXICOLOGY IN VITRO Volume: 25 Issue: 1 Pages: 37-44 Published: FEB 2011
10. **In vitro anticancer activity of methyl caffeate isolated from Solanum torvum Swartz. fruit** Times Cited: 26  
By: Balachandran, C.; Emi, N.; Arun, Y.; et al.  
CHEMICO-BIOLOGICAL INTERACTIONS Volume: 242 Pages: 81-90 Published: DEC 5 2015
11. **Cytotoxic Activity and Antioxidant Capacity of Purified Lichen Metabolites: An In Vitro Study** Times Cited: 65  
By: Brisdelli, Fabrizia; Perilli, Mariagrazia; Sellitri, Doriana; et al.  
PHYTOTHERAPY RESEARCH Volume: 27 Issue: 3 Pages: 431-437 Published: MAR 2013
12. **Centella asiatica in cosmetology** Times Cited: 32  
By: Bylka, Wieslawa; Znajdek-Awizen, Paulina; Studzinska-Sroka, Elzbieta; et al.  
POSTĘPY DERMATOLOGII I ALERGOLOGII Volume: 30 Issue: 1 Pages: 46-49 Published: 2013
13. **Antiproliferative properties of tiliroside from Guazuma ulmifolia lamk on T47D and MCF7 cancer cell lines** Times Cited: 5  
By: Dai, M.; Wikantyasning, E.; Wahyuni, A.; et al.  
National Journal of Physiology, Pharmacy and Pharmacology Volume: 6 Issue: 6 Pages: 627-633 Published: 2016  
URL: <https://doi.org/10.5455/njppp.2016.6.0617727072016>  
[\[Show additional data\]](#)
14. **Cytotoxic activity of kaempferol glycosides against human leukaemic cell lines in vitro** Times Cited: 33  
By: Dimas, K; Demetzos, C; Mitaku, S; et al.  
PHARMACOLOGICAL RESEARCH Volume: 41 Issue: 1 Pages: 85-88 Published: JAN 2000
15. **Isolation of Major Compounds in Polar Fraction of Methanolic Extract from Flowers of Balanophora elongata Blume and Their Antimicrobial Activities** Times Cited: 1  
By: Faroliu, G.  
THESIS Published: 2017  
Bachelor's Thesis in Pharmacy  
Publisher: Faculty of Pharmacy, Andalas University, Padang
16. **Medicinal plant diversity and their pharmacological aspects of Nepal Himalayas.** Times Cited: 19  
By: Gaire, B. P.; Subedi, L.  
Pharmacognosy Journal Volume: 3 Issue: 25 Pages: 6-17 Published: 2011

17. [Antidiabetic and anticancer activities of \*Mangifera indica\* cv. Okrong leaves](#) Times Cited: 11  
 By: Ganogpichayagrai, Aunyachulee; Palanuvej, Chanida; Ruangrungsi, Nijsiri  
 JOURNAL OF ADVANCED PHARMACEUTICAL TECHNOLOGY & RESEARCH Volume: 8 Issue: 1 Pages: 19-24 Published: JAN-MAR 2017
18. [Pharmacological Review on \*Centella asiatica\*: A Potential Herbal Cure-all](#) Times Cited: 120  
 By: Gohil, Kashmira J.; Patel, Jagruti A.; Gajjar, Anuradha K.  
 INDIAN JOURNAL OF PHARMACEUTICAL SCIENCES Volume: 72 Issue: 5 Pages: 546-556 Published: SEP-OCT 2010
19. [Changing Trends in oral cancer - a global scenario](#) Times Cited: 28  
 By: Gupta, Neha; Gupta, Ritu; Acharya, Arun Kumar; et al.  
 NEPAL JOURNAL OF EPIDEMIOLOGY Volume: 6 Issue: 4 Pages: 613-619 Published: 2016
20. Title: [not available] Times Cited: 1  
 By: Ismed, F.  
 Production of 10 (Ten) Major Isolated Compounds of Indonesian Traditional Medicinal Plants as Marker Compounds of Indonesian Herbal Pharmacopoeia, Research Report of Medicinal Raw Material (BBO and BOOT) Published: 2014  
 Publisher: Andalas University-Ministry of Health Republic of Indonesia
21. [Lobarin from the Sumatran lichen, \*Stereocaulon halei\*](#) Times Cited: 20  
 By: Ismed, Friardi; Lohezic-Le Devehat, Francoise; Delalande, Olivier; et al.  
 FITOTERAPIA Volume: 83 Issue: 8 Special Issue: SI Pages: 1693-1698 Published: DEC 2012
22. [Antimicrobial activity of some Sri Lankan Rubiaceae and Meliaceae](#) Times Cited: 22  
 By: Jayasinghe, ULB; Jayasooriya, CP; Bandara, BMR; et al.  
 FITOTERAPIA Volume: 73 Issue: 5 Pages: 424-427 Article Number: PII S0367-326X(02)00122-3 Published: AUG 2002
23. [Anticancer Activity of Curcumin on Human Breast Adenocarcinoma: Role of Mcl-1 Gene](#) Times Cited: 28  
 By: Koohpar, Zeinab Khazaei; Entezari, Maliheh; Movafagh, Abolfazl; et al.  
 IRANIAN JOURNAL OF CANCER PREVENTION Volume: 8 Issue: 3 Article Number: e2331 Published: 2015
24. [in vitro Modulation of P-glycoprotein, MRP-1 and BCRP Expression by Mangiferin in Doxorubicin-Treated MCF-7 Cells](#) Times Cited: 25  
 By: Louisa, Melva; Soediro, Tjahjani Mirawati; Suyatna, Frans Dhyanaagiri  
 ASIAN PACIFIC JOURNAL OF CANCER PREVENTION Volume: 15 Issue: 4 Pages: 1639-1642 Published: 2014
25. [RAPID COLORIMETRIC ASSAY FOR CELLULAR GROWTH AND SURVIVAL - APPLICATION TO PROLIFERATION AND CYTO-TOXICITY ASSAYS](#) Times Cited: 36,752  
 By: MOSMANN, T  
 JOURNAL OF IMMUNOLOGICAL METHODS Volume: 65 Issue: 1-2 Pages: 55-63 Published: 1983
26. [Comparison of Breast Cancer in Indonesia and Malaysia - A Clinico-Pathological Study Between Dharmas Cancer Centre Jakarta and University Malaya Medical Centre, Kuala Lumpur](#) Times Cited: 26  
 By: Ng, C. H.; Pathy, N. Bhoo; Taib, N. A.; et al.  
 ASIAN PACIFIC JOURNAL OF CANCER PREVENTION Volume: 12 Issue: 11 Pages: 2943-2946 Published: 2011
27. [Antioxidant and Antibacterial Constituents from Two Sumatran Ferns, \*Trichomanes javanicum\* and \*Oleandra pistillaris\*](#) Times Cited: 1  
 By: Nofrizal; Putra, Deddi P.; Arbain, Dayar  
 NATURAL PRODUCT COMMUNICATIONS Volume: 12 Issue: 8 Pages: 1263-1264 Published: AUG 2017
28. Title: [not available] Times Cited: 1  
 By: Putra, D.P.  
 Production of 10 (Ten) Isolated Compounds Used as Indonesian Medicinal Plants Marker Compounds, Research Report of Medicinal Raw Material (BBO and BOOT) Published: 2015  
 Publisher: Andalas University-Ministry of Health Republic of Indonesia
29. [Cytotoxic activity of Thai medicinal plants for cancer treatment](#) Times Cited: 25  
 By: Saetung, A; Itharat, A; Dechsukum, C.  
 Songklanakarin J Sci Technol Volume: 27 Pages: 469-78 Published: 2005
30. [Suppressive Effect of Curcuma zedoaria ROSCOE on Pulmonary Metastasis of B16Melanoma Cells \(View record in KCI-Korean Journal Database\)](#) Times Cited: 1  
 By: Seo, Un-Kyo  
 By: 황재철; 김미량; 정용재; et al.  
 Journal of Korean Medicine Volume: 26 Issue: 1 Pages: 1-10 Published: 2005  
 대한한의학회지 Volume: 26 Issue: 1 Pages: 1-10 Published: 2005

