

[< Back to results](#) | 1 of 1[Export](#) [Download](#) [Print](#) [E-mail](#) [Save to PDF](#) [Add to List](#) [More... >](#)Journal of Sustainability Science and Management
Volume 12, Issue 2, 1 December 2017, Pages 96-102

Wound healing properties of biotransformed asiaticoside by *Aspergillus niger* (Article)

Omar, M.N.^a, Alfarra, H.Y.^{ab}, Ichwan, S.J.A.^c^aFaculty of Science, International Islamic University Malaysia (IIUM), Kuantan, Pahang, Malaysia^bDepartment of Microbiology and Immunology, Dalhousie University, Halifax, NS, Canada^cFaculty of Dentistry, International Islamic University Malaysia (IIUM), Kuantan, Pahang, Malaysia

Abstract

[View references \(21\)](#)

Biotransformation is extensively used to create useful metabolites from various natural products and as an alternative to chemical synthesis for the preparation of pharmacologically-active compounds. This study investigated the effects of asiaticoside and its biotransformed product on wound healing activities. Asiaticoside, the bioactive constituent of *Centella asiatica* has been reported to possess wound healing properties. Microbial transformation of asiaticoside using *Aspergillus niger* was carried out to produce an asiaticoside biotransformed product and the wound healing activities of asiaticoside and its biotransformed product were investigated. Their effects on transforming growth factor-beta 1 (TGFβ1) and tissue inhibitor of metalloproteinase 1 (TIMP1) gene expression were examined to understand the mode of action and on the cell proliferation and wound healing using human keratinocytes. Results of in vitro study showed that asiaticoside concentrations between 7.5 and 120 µg/mL gave higher value of cell proliferation than the negative control. On the other hand, the biotransformed product concentrations between 0.058 and 3.75 µg/mL exhibited high cell viability but the viability was lowest at 15.0 µg/mL, suggesting cytotoxic effects on the cells. In wound healing assays, there were significant differences on wound closure in comparison to the negative control ($P < 0.05$). Both asiaticoside and the biotransformed product increased the expression of TGFβ1 and TIMP1 respectively, with the latter showing more enhanced expressions of both genes. The biotransformed product also showed faster migration and healing rate under microscopic observation. © Penerbit UMT.

Reaxys Database Information

[View Compounds](#)

Author keywords

Asiaticoside Biotransformation *Centella asiatica* Wound healing

Funding details

Funding number	Funding sponsor	Acronym	Funding opportunities
EDW B14-109-0994	International Islamic University Malaysia	IIUM	See opportunities by IIUM
	International Islamic University Malaysia	IIUM	See opportunities by IIUM

Funding text

This research was supported by International Islamic University Malaysia (IIUM) under EDW B14-109-0994.

ISSN: 18238556

Source Type: Journal

Original language: English

Document Type: Article

Publisher: Universiti Malaysia Terengganu

References (21)

[View in search results format >](#)

Metrics

0 Citations in Scopus

0 Field-Weighted

Citation Impact



PlumX Metrics

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

The comparative steady-state bioavailability of the active ingredients of madecassol

Rush, W.R. , Murray, G.R. , Graham, D.J.M. (1993) *European Journal of Drug Metabolism and Pharmacokinetics*

Determination of content of asiaticoside in thermo-sensitive films by HPLC

Zhang, H.-Y. , Ni, S.-H. , Tang, Y. (2015) *Chinese Journal of Pharmaceutical Biotechnology*Wound-healing effect of electrospun gelatin nanofibres containing *Centella asiatica* extract in a rat modelYao, C.-H. , Yeh, J.-Y. , Chen, Y.-S. (2017) *Journal of Tissue Engineering and Regenerative Medicine*[View all related documents based on references](#)

□ 1 Alfarrá, H.Y., Omar, M.N.
Centella asiatica: From Folk Remedy to the Medicinal Biotechnology-A State Revision
(2013) *International Journal of Biosciences*, 3, pp. 49-67. Cited 5 times.

Find more related documents in
Scopus based on:

Authors > Keywords >

□ 2 Alfarrá, H.Y., Omar, M.N.
HPLC Separation and Isolation of Asiaticoside from Centella asiatica and Its Biotransformation by
Aspergillus niger
(2014) *International Journal of Pharma Medicine and Biological Sciences*, 3, pp. 2278-5221.

□ 3 Andriani, Y., Effendy, A.W.M., Habsah, M., Sifzizul, T.M.T.
Antibacterial, Radical Scavenging Activities and Cytotoxicity Properties of *Phaleria macrocarpa* (Scheff.) Boerl
(2011) *Leaves in HepG2 Cell Lines. International Journal of Pharmaceutical Sciences and Research*, 2 (7), pp.
1700-1706. Cited 14 times.

□ 4 Chen, G., Chen, J.
A novel cell modification method used in biotransformation of glycerol to 3-HPA by
Lactobacillus reuteri
(2013) *Applied Microbiology and Biotechnology*, 97 (10), pp. 4325-4332. Cited 8 times.
doi: 10.1007/s00253-013-4723-2

[View at Publisher](#)

□ 5 Chomczynski, P., Mackey, K.
Modification of the TRI Reagent(TM) procedure for isolation of RNA from
polysaccharide- and proteoglycan-rich sources
(1995) *BioTechniques*, 19 (6), pp. 942-945. Cited 344 times.

□ 6 Diegelmann, R.F., Evans, M.C.
Wound healing: An overview of acute, fibrotic and delayed healing
(2004) *Frontiers in Bioscience*, 9, pp. 283-289. Cited 916 times.

[View at Publisher](#)

□ 7 De Oliveira, C.B., Comunello, L.N., Maciel, É.S., Giubel, S.R., Bruno, A.N., Chiela, E.C.F., Lenz,
G., (...), Gosmann, G.
The inhibitory effects of phenolic and terpenoid compounds from *Baccharis trimera* in
SiHa cells: Differences in their activity and mechanism of action
(2013) *Molecules*, 18 (9), pp. 11022-11032. Cited 11 times.
<http://www.mdpi.com/1420-3049/18/9/11022/pdf>
doi: 10.3390/molecules180911022

[View at Publisher](#)

□ 8 Grimaldi, R., De Ponti, F., D'Angelo, L., Caravaggi, M., Guidi, G., Lecchini, S., Frigo, G.M., (...), Crema, A.
Pharmacokinetics of the total triterpenic fraction of Centella asiatica after single and
multiple administrations to healthy volunteers. A new assay for asiatic acid
(1990) *Journal of Ethnopharmacology*, 28 (2), pp. 235-241. Cited 37 times.
doi: 10.1016/0378-8741(90)90033-P

[View at Publisher](#)

- 9 Kimura, Y., Sumiyoshi, M., Samukawa, K.-i., Satake, N., Sakanaka, M.
Facilitating action of asiaticoside at low doses on burn wound repair and its mechanism
(2008) *European Journal of Pharmacology*, 584 (2-3), pp. 415-423. Cited 51 times.
doi: 10.1016/j.ejphar.2008.02.036
View at Publisher
-
- 10 Leask, A., Abraham, D.J.
TGF- β signaling and the fibrotic response
(2004) *FASEB Journal*, 18 (7), pp. 816-827. Cited 1438 times.
doi: 10.1096/fj.03-1273rev
View at Publisher
-
- 11 Lee, J.-H., Kim, H.-L., Lee, M.H., You, K.E., Kwon, B.-J., Seo, H.J., Park, J.-C.
Asiaticoside enhances normal human skin cell migration, attachment and growth in vitro wound healing model
(2012) *Phytomedicine*, 19 (13), pp. 1223-1227. Cited 29 times.
doi: 10.1016/j.phymed.2012.08.002
View at Publisher
-
- 12 Lopez-García, J., Lehocký, M., Humpolíček, P., Sába, P.
HaCaT Keratinocytes Response on Antimicrobial Atelocollagen Substrates: Extent of Cytotoxicity, Cell Viability and Proliferation
(2014) *Journal of Functional Biomaterials*, 5, pp. 43-57. Cited 23 times.
-
- 13 Monti, D., Candido, A., Cruz Silva, M.M., Křen, V., Riva, S., Danieli, B.
Biocatalyzed generation of molecular diversity: Selective modification of the saponin asiaticoside
(2005) *Advanced Synthesis and Catalysis*, 347 (7-8), pp. 1168-1174. Cited 34 times.
doi: 10.1002/adsc.200505047
View at Publisher
-
- 14 Mosmann, T.
Rapid colorimetric assay for cellular growth and survival: Application to proliferation and cytotoxicity assays
(1983) *Journal of Immunological Methods*, 65 (1-2), pp. 55-63. Cited 34150 times.
doi: 10.1016/0022-1759(83)90303-4
View at Publisher
-
- 15 O'Connor, J.W., Gomez, E.W.
Cell adhesion and shape regulate TGF-beta1-induced epithelial-myofibroblast transition via MRTF-A signaling
(2013) *PLoS ONE*, 8 (12), art. no. e83188. Cited 33 times.
<http://www.plosone.org/article/fetchObject.action?uri=info%3Adoi%2F10.1371%2Fjournal.pone.0083188&representation=PDF>
doi: 10.1371/journal.pone.0083188
View at Publisher
-
- 16 Omar, M.N., Khan, N.T., Hasali, N.H.M., Moin, S.F., Alfara, H.Y.
Microbial Transformations of Artemisinin-anti-malaria drug
(2012) *Advances in BioResearch*, 3, pp. 27-31. Cited 3 times.

- 17 Roy, N., Saha, N., Humpolicek, P., Saha, P.
Permeability and biocompatibility of novel medicated hydrogel wound dressings

(2010) *Soft Materials*, 8 (4), pp. 338-357. Cited 24 times.
doi: 10.1080/1539445X.2010.502955

[View at Publisher](#)

- 18 Tang, B., Zhu, B., Liang, Y., Bi, L., Hu, Z., Chen, B., Zhang, K., (...), Zhu, J.
Asiaticoside suppresses collagen expression and TGF- β /Smad signaling through inducing Smad7 and inhibiting TGF- β RI and TGF- β RII in keloid fibroblasts

(2011) *Archives of Dermatological Research*, 303 (8), pp. 563-572. Cited 56 times.
doi: 10.1007/s00403-010-1114-8

[View at Publisher](#)

- 19 Tomasek, J.J., Gabbiani, G., Hinz, B., Chaponnier, C., Brown, R.A.
Myofibroblasts and mechano: Regulation of connective tissue remodelling

(2002) *Nature Reviews Molecular Cell Biology*, 3 (5), pp. 349-363. Cited 2098 times.
doi: 10.1038/nrm809

[View at Publisher](#)

- 20 Wu, F., Bian, D., Xia, Y., Gong, Z., Tan, Q., Chen, J., Dai, Y.
Identification of major active ingredients responsible for burn wound healing of *Centella asiatica* herbs

(2012) *Evidence-based Complementary and Alternative Medicine*, 2012, art. no. 848093. Cited 22 times.
doi: 10.1155/2012/848093

[View at Publisher](#)

- 21 Yang, X., Wang, J., Guo, S.-L., Fan, K.-J., Li, J., Wang, Y.-L., Teng, Y., (...), Yang, X.
miR-21 promotes keratinocyte migration and re-epithelialization during wound healing

(2011) *International Journal of Biological Sciences*, 7 (5), pp. 685-690. Cited 59 times.
<http://www.biolsci.org/v07p0685.pdf>
doi: 10.7150/ijbs.7.685

[View at Publisher](#)

🔍 Alfarra, H.Y.; Faculty of Science, International Islamic University Malaysia (IIUM), Kuantan, Pahang, Malaysia;
email:helmi.alfarra@dal.ca

© Copyright 2018 Elsevier B.V., All rights reserved.

< Back to results | 1 of 1

^ Top of page

About Scopus

What is Scopus
Content coverage
Scopus blog
Scopus API
Privacy matters

Language

日本語に切り替える
切换到简体中文
切换到繁體中文
Русский язык

Customer Service

Help
Contact us

