

[< Back to results](#) | 1 of 1[Export](#) [Download](#) [Print](#) [E-mail](#) [Save to PDF](#) [Add to List](#) [More... >](#)[Full Text](#) [View at Publisher](#)Pigment and Resin Technology
Volume 47, Issue 6, 5 November 2018, Pages 490-495

Anthocyanin as potential source for antimicrobial activity in *Clitoria ternatea* L. and *Dioscorea alata* L. (Article)

Mahmad, N.^a [✉](#), Taha, R.M.^a [✉](#), Othman, R.^b [✉](#), Abdullah, S.^a [✉](#), Anuar, N.^a [✉](#), Elias, H.^a [✉](#), Rawi, N.^a [✉](#) [👤](#)^aInstitute of Biological Sciences, Faculty of Science, University of Malaya, Kuala Lumpur, Malaysia^bDepartment of Landscape Architecture, International Islamic University Malaysia, Kuala Lumpur, Malaysia

Abstract

[View references \(14\)](#)

Purpose: The purpose of this paper is to validate the antimicrobial activity (both antibacterial and antifungal) of in vivo and in vitro ethanolic anthocyanin extracts of *Clitoria ternatea* L. (vivid blue flower butterfly-pea) and *Dioscorea alata* L. (purple yam) against selected bacteria (*Bacillus subtilis*, *Staphylococcus aureus* and *Escherichia coli*) and fungi (*Fusarium* sp., *Aspergillus niger* and *Trichoderma* sp.). **Design/methodology/approach:** The freeze-dried samples (0.2 g) from in vivo vivid blue flowers of *C. ternatea* L. were extracted using 10 mL ethanol (produced ethanolic red extraction) and 10 mL distilled water (produced aqueous blue extraction) separately. Two-month-old in vitro callus samples (0.2 g) were only extracted using 10 mL ethanol. The anthocyanin extractions were separated with the addition (several times) of ethyl acetate and distilled water (1:2:3) to remove stilbenoids, chlorophyll, less polar flavonoids and other non-polar compounds. Furthermore, the antimicrobial properties were determined using agar diffusion technique. Three bacteria (*B. subtilis*, *S. aureus* and *E. coli*) and fungi (*F. sp.*, *A. niger* and *T. sp.*) were streaked on bacteria agar and dextrose agar, respectively, using "hockey stick". Then, the sterile paper discs (6 mm diameter) were pipetted with 20 µL of 1,010 CFU/mL chloramphenicol (as control for antibacterial) and carbendazim (as control for antifungal) in vivo and in vitro extracts. The plates were incubated at room temperature for 48 h, and the inhibition zones were measured. **Findings:** Based on the results, both in vivo and in vitro ethanolic extracts from vivid blue flowers of *C. ternatea* L. showed the best antibacterial activity against the same bacteria (*B. subtilis*), 11 and 10 mm inhibition zones, respectively. However, different antifungal activity was detected in in vitro ethanolic callus extract (12 mm), which was against *T. sp.*, contrary to in vivo ethanolic extract (10 mm), which was against *F. sp.*; antibacterial activity of *D. alata* L. was seen against the same bacteria (*E. coli*) with the highest inhibition zone for in vivo extract (8.8 mm), followed by in vitro extract (7.8 mm). **Research limitations/implications:** Anthocyanins are responsible for the water soluble and vacuolar, pink, red, purple and blue pigments present in coloured plant pigments. These pigments (pink, red, purple and blue) are of important agronomic value in many crops and ornamental plants. However, anthocyanins are not stable and are easy to degrade and fade whenever exposed to light. **Social implications:** Plant extracts containing bioactive agents with antimicrobial properties have been found to be useful in treating bacterial and fungal infections, as well as showed multiple antibiotic resistance. **Originality/value:** Both in vivo and in vitro extracts from vivid blue flower petals (*C. ternatea* L.) and purple yam (*D. alata* L.) have important applications as natural antimicrobial (antibacterial and antifungal) agents in the coating industry, instead of natural pharmaceutical products. © 2018, Emerald Publishing Limited.

SciVal Topic Prominence ⓘ

Topic: *Clitoria* | *Convolvulaceae* | *Evolvulus alsinoides*

Prominence percentile: 65.145 ⓘ

Reaxys Database Information

[View Compounds](#)**NEW!** SciVal Topic Prominence is now available in Scopus.Which Topic is this article related to? [View the Topic.](#)

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

Inhibitory effect of *Clitoria ternatea* flower petal extract on fructose-induced protein glycation and oxidation-dependent damages to albumin in vitroChayaratanasin, P. , Barbieri, M.A. , Suanpairintr, N. (2015) *BMC Complementary and Alternative Medicine*

MIC susceptibility testing should replace disk diffusion testing

Brown, W.J. (1982) *Clinical Microbiology Newsletter*

A clinical evaluation of cefoxitin sodium on an orthopaedic service

Schurman, D.J. , Dillingham, M. (1978) *Journal of Antimicrobial Chemotherapy*[View all related documents based on references](#)

Find more related documents in Scopus based on:



Author keywords

Antibacterial Antifungal Clitoria ternateaL Dioscorea alataL Ethanolic extract Inhibition zone

Indexed keywords

Engineering controlled terms:

Algae Anthocyanins Antibiotics Antifungal agents Aspergillus Bacteriology
Escherichia coli Essential oils Ethanol Plant extracts Polysaccharides

Engineering uncontrolled terms

Anti-fungal Antibacterial Clitoria ternateaL Dioscorea alataL Ethanolic extracts
Inhibition zones

Engineering main heading:

Extraction

Funding details

Funding sponsor	Funding number	Acronym
Universiti Malaya		UM
	RIGS 16-077-0241	
	Grant-PG071-2013B	
	PG189-2014B	

Funding text

The authors are grateful to the University of Malaya, Malaysia, for financial aid and facilities provided by the Institute of Research Management and Monitoring, IPPP (Postgraduate Grant-PG071-2013B and PG189-2014B) and RIGS 16-077-0241.

ISSN: 03699420

CODEN: PGRTB

Source Type: Journal

Original language: English

DOI: 10.1108/PRT-11-2016-0109

Document Type: Article

Publisher: Emerald Group Publishing Ltd.

References (14)

[View in search results format >](#)

All Export Print E-mail Save to PDF Create bibliography

- 1 Adeniyi, S.A., Orjiekwe, C.L., Ehiagbonare, J.E., Arimah, B.D.
Preliminary phytochemical analysis and insecticidal activity of ethanolic extracts of four tropical plants (*Vernonia amygdalina*, *Sida acuta*, *Ocimum gratissimum* and *Telfaria occidentalis*) against beans weevil (*Acanthscelides obtectus*)

(2010) *International Journal of Physical Sciences*, 5 (6), pp. 753-792. Cited 21 times.
<http://www.academicjournals.org/ijps/PDF/pdf2010/Jun/Adeniyi%20et%20al.pdf>