

Documents

Salim, K.S.^a, Harun, A.^a, Aziz, N.A.^b, Daud, S.^a, Ahmat, N.^c, So'Ad, S.Z.M.^d, Taib, M.^e, Adzahar, N.S.^f

In vitro appraisal of antibacterial activity of *Entada spiralis*'s leaves extracts against phytopathogenic bacteria *Erwinia chrysanthemi* and *Erwinia carotovora*

(2024) *AIP Conference Proceedings*, 3023 (1), art. no. 020012, .

DOI: 10.1063/5.0188348

^a Faculty of Applied Sciences, Universiti Teknologi MARA (UiTM) Cawangan Pahang, Kampus Jengka, Bandar Tun Abdul Razak Jengka, Pahang, 26400, Malaysia

^b Faculty of Plantation and Agrotechnology, Universiti Teknologi MARA (UiTM) Cawangan Pahang, Kampus Jengka, Bandar Tun Abdul Razak Jengka, Pahang, 26400, Malaysia

^c Centre of Foundation Studies, Universiti Teknologi MARA (UiTM), Cawangan Selangor, Kampus Dengkil, Selangor, Dengkil, 43800, Malaysia

^d Kulliyah of Pharmacy, International Islamic University Malaysia (IIUM), Jalan Sultan Ahmad Syah, Kuantan, Pahang, 25200, Malaysia

^e Faculty of Science and Marine Environment, Universiti Malaysia Terengganu (UMT), Terengganu, Kuala Nerus, 21030, Malaysia

^f Faculty of Industrial Sciences and Technology, Universiti Malaysia Pahang Al-Sultan Abdullah (UMPSA), Lebuhr Persiaran Tun Khalil Yaakob, Pahang, Kuantan, 26300, Malaysia

Abstract

Entada spiralis Ridl. or also known as 'akar beluru' or 'akar sintok', is one of the least studied species in the Fabaceae family. The species was famous for its soap-like properties in which the natives use them as soap and shampoo for hygiene and treating itchiness. The phytochemicals and biochemicals properties of this plant have always been an interesting area to be discovered, as the study of the species is still scanty. In this study, the aim is to evaluate the antibacterial effects of the *E. spiralis* leaves extracts against two Gram-negative phyto-bacteria species, *Erwinia chrysanthemi* (ATCC 437624) and *Erwinia carotovora* (ATCC 15713) for the discovery of the natural active bactericides. Hexane, dichloromethane, ethyl acetate and methanol were used as menstruum in producing the extracts through cold maceration method. The extracts were subjected to screening tests for identification of phytochemicals which revealed the presence of phenolics, terpenoids, saponins, coumarins, flavonoids, and tannins. Antibacterial activities of the extracts were assessed via Kirby-Bauer disk diffusion method by measuring the inhibition zones post-incubation for 24 hours at room temperature. While, minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were evaluated through broth microdilution method after incubation at room temperature for 24 hours. Output data from this study showed that, methanol extract against *E. chrysanthemi* and ethyl acetate extract against *E. carotovora* have the maximum zone of inhibition in antibacterial susceptibility with 22.7 ± 0.6 mm and 26.3 ± 0.6 mm respectively at 400 mg/mL concentration. In accordance with MIC, *E. chrysanthemi* was revealed to be most susceptible in methanol extract with MIC value of 1.56 ± 0.00 mg/mL (MBC value at 3.13 ± 0.00 mg/mL). *E. carotovora* has been determined to be best susceptible also in ethyl acetate extracts with MIC values of 0.65 ± 0.23 mg/mL (MBC value at 2.60 ± 0.90 mg/mL). © 2024 Author(s).

Funding details

Ministry of Higher Education, Malaysia MOHEFRGS/1/2021/WAB04/UiTM/02/07

The authors would like to express gratitude to the Ministry of Higher Education for financial support under project grant (FRGS/1/2021/WAB04/UiTM/02/07).

References

- Toth, I.K., Bell, K.S., Holeva, M.C., Birch, P.R.
Soft rot erwiniae: From genes to genomes
(2003) *Molecular Plant Pathology*, 4 (1), pp. 17-30.
- Charkowski, A.O.
The changing face of bacterial soft-rot diseases
(2018) *Annual Review of Phytopathology*, 56, pp. 269-288.
- Elhalag, K., Elbadry, N., Farag, S., Hagag, M., Hussien, A.
Etiology of potato soft rot and blackleg diseases complex in Egypt
(2020) *Journal of Plant Diseases and Protection*, 127 (6), pp. 855-871.

- Waleron, M., Waleron, K., Lojkowska, E.
Characterization of *Pectobacterium carotovorum* subsp. odoriferum causing soft rot of stored vegetables
(2014) *European Journal of Plant Pathology*, 139 (3), pp. 457-469.
- Calixto, J.B.
The role of natural products in modern drug discovery
(2019) *Anais da Academia Brasileira de Ciências*, p. 91.
- Newman, D.J., Cragg, G.M.
Natural products as sources of new drugs from 1981 to 2014
(2016) *Journal of Natural Products*, 79 (3), pp. 629-661.
- Harun, A., So'Ad, S.Z.M., Hassan, N.M.
Bioassay guided isolation of an antidermatophytic active constituents from the stem bark of *Entada spiralis* Ridl
(2015) *Malaysian, J. Anal. Sci*, 19, pp. 752-759.
- Roheem, F.O., Mat Soad, S.Z., Ahmed, Q.U., Ali Shah, S.A., Latip, J., Zakaria, Z.A.
Evaluation of the enzyme inhibitory and antioxidant activities of *Entada spiralis* stem bark and isolation of the active constituents
(2019) *Molecules*, 24 (6), p. 1006.
- Harun, A., So'Ad, S.Z.M., Hassan, N.M., Ramli, N.
In vitro antidermatophytic activity of methanolic fractions from *Entada spiralis* Ridl. stem bark and its bioautographic profile
(2014) *Pertanika. J Sci Technol*, 22, pp. 113-121.
- Harun, A., Aziz, N.A., Azenan, N.S.M., Kamarazzaman, N.F.M., So'Ad, S.Z.M.
Antimicrobial Efficacy
(2020) *Antioxidant Profile and Nine Alternative Active Constituents from Petroleum Ether and Ethyl Acetate Extract of *Entada Spiralis*. Malaysian Journal of Analytical Sciences*, 24 (5), pp. 707-718.
- Rachmadita, F., Martati, E., Mohamad, S.N.A.S., So'Ad, S.Z.M.
Antimicrobial Study of Chloroform Fraction from the Leaves of *Entada spiralis* Ridl
(2021) *Journal of Pharmacy*, 1 (1), pp. 45-53.
- Roheem, F.O.
(2018) *Phytochemicals from *Entada Spiralis* Ridl. and *Tetracera Macrophylla* Vall. and Their Bioactivities*,
- Harun, A., So'Ad, S.Z.M., Hassan, N.M., Ramli, N.K.C.M.
Bioactive Terpenoids from the Stem Bark of *Entada spiralis* Ridl. (Sintok).
(2014) *Proceedings of the International Conference on Science, Technology and Social Sciences (ICSTSS)*, 2012
- Irulandi, K., Geetha, S., Suresh, M., Siva, V., Nirmalkumar, N., Mehalingam, P.
Antimicrobial and Phytochemical analysis of different solvent extracts of barks of *Syzygium laetum* (Buch.-Ham.) Gandhi
(2016) *J Nat Prod Plant Resour*, 6 (4), pp. 15-19.
- Al-Birawee, A.R., Nasser, A.K.
Gel extraction from caper fruits (*Capparies spinosa* L.) and assess its effectiveness as antioxidants
(2019) *Basrah Journal of Agricultural Sciences*, 32 (2), pp. 74-84.
- Mogana, R., Adhikari, A., Tzar, M., Ramliza, R., Wiart, C.
Antibacterial activities of the extracts

(2020) *Fractions and Isolated Compounds from Canarium Patentinervium* Miq. Against Bacterial Clinical Isolates. *BMC Complementary Medicine and Therapies*, 20 (1), pp. 1-11.

- Marotta, S.M., Giarratana, F., Parco, A., Neri, D., Ziino, G., Giuffrida, A., Panebianco, A.
Evaluation of the antibacterial activity of bergamot essential oils on different *Listeria monocytogenes* strains
(2016) *Italian Journal of Food Safety*, 5 (4).
- Zewdie, K.A., Bhoumik, D., Wondafrash, D.Z., Tuem, K.B.
Evaluation of in-vivo antidiarrhoeal and in-vitro antibacterial activities of the root extract of *Brucea antidysenterica* JF Mill (Simaroubaceae)
(2020) *BMC Complementary Medicine and Therapies*, 20 (1), pp. 1-11.

Correspondence Address

Harun A.; Faculty of Applied Sciences, Kampus Jengka, Bandar Tun Abdul Razak Jengka, Malaysia; email: aizaharun@uitm.edu.my

Editors: Salim N., Abu Bakar N.H., Samah N.A., Khoon H.P., Widia M.

Publisher: American Institute of Physics Inc.

Conference name: 4th Symposium on Industrial Science and Technology, SISTEC 2022

Conference date: 23 November 2022 through 24 November 2022

Conference code: 196200

ISSN: 0094243X

ISBN: 9780735448001

Language of Original Document: English

Abbreviated Source Title: AIP Conf. Proc.

2-s2.0-85182556355

Document Type: Conference Paper

Publication Stage: Final

Source: Scopus

ELSEVIER

Copyright © 2024 Elsevier B.V. All rights reserved. Scopus® is a registered trademark of Elsevier B.V.

 **RELX Group™**