

## Document details

[< Back to results](#) | 1 of 1
[↗ Export](#)
[↓ Download](#)
[🖨 Print](#)
[✉ E-mail](#)
[Save to PDF](#)
[☆ Add to List](#)
[More... >](#)
[Full Text](#)
[View at Publisher](#)

AIP Conference Proceedings

Volume 1784, 17 November 2016, Article number 030015

2016 Postgraduate Colloquium of the Universiti Kebangsaan Malaysia, Faculty of Science and Technology, UKM FST 2016; Faculty of Science and Technology, Universiti Kebangsaan MalaysiaSelangor; Malaysia; 13 April 2016 through 14 April 2016; Code 126554

## Metabolite profiling of Clinacanthus nutans leaves extracts obtained from different drying methods by <sup>1</sup>H NMR-based metabolomics (Conference Paper)

Hashim, N.H.N.<sup>ab</sup>, Latip, J.<sup>a</sup>, Khatib, A.<sup>c</sup>

<sup>a</sup>School of Chemical Sciences and Food Technology, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, Bangi, Malaysia

<sup>b</sup>Department of Plant Science, Kulliyah of Science, International Islamic University Malaysia, Kuantan, Malaysia

<sup>c</sup>Kulliyah of Pharmacy, International Islamic University Malaysia, Kuantan, Malaysia

### Abstract

[View references \(15\)](#)

The metabolites of Clinacanthus nutans leaves extracts and their dependence on drying process were systematically characterized using <sup>1</sup>H nuclear magnetic resonance spectroscopy (NMR) multivariate data analysis. Principal component analysis (PCA) and partial least square-discriminant analysis (PLS-DA) were able to distinguish the leaves extracts obtained from different drying methods. The identified metabolites were carbohydrates, amino acid, flavonoids and sulfur glucoside compounds. The major metabolites responsible for the separation in PLS-DA loading plots were lupeol, cycloclinosides, betulin, cerebrosides and choline. The results showed that the combination of <sup>1</sup>H NMR spectroscopy and multivariate data analyses could act as an efficient technique to understand the C. nutans composition and its variation. © 2016 Author(s).

### Author keywords

<sup>1</sup>H NMR   Clinacanthus nutans   different drying methods   metabolites content

ISSN: 0094243X

ISBN: 978-073541446-4

**Source Type:** Conference Proceeding

**Original language:** English

DOI: 10.1063/1.4966753

**Document Type:** Conference Paper

**Volume Editors:** Basri K.H., Noorani M.S.M., Yaacob W.Z.W., Yusoff M.F.M., Karim N.H.A., Jumali M.H.H., Ibrahim N., Mustapha M.A., Zainuddin Z., Masseran N., Nor M.M., Ibrahim Z., Rasol N.H.A., Zain C.R.C.M., Joe L.S., Ibrahim K., Ahmad N., Daud N.M., Dzul-Kifli S.C.

**Sponsors:****Publisher:** American Institute of Physics Inc.

### References (15)

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

### 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:



### Related documents

Perspective and insight on  
Clinacanthus nutans Lindau in  
traditional medicine

Shim, S.Y. , Aziana, I. , Khoo, B.Y.  
(2013) *International Journal of  
Integrative Biology*

Analysis of flavone C -glycosides  
in the leaves of clinacanthus  
nutans (Burm. f.) Lindau by  
HPTLC and HPLC-UV/DAD

Chelyn, J.L. , Omar, M.H. , Mohd  
Yusof, N.S.A.  
(2014) *Scientific World Journal*

The calligenic effects of 2,4-  
Dichlorophenoxy acetic acid (2,4-  
d) on leaf explants of sabah snake  
grass (Clinacanthus nutans)

Phua, Q.Y. , Chin, C.K. , Asri,  
Z.R.M.  
(2016) *Pakistan Journal of Botany*

View all related documents based  
on references

Find more related documents in  
Scopus based on:

- 1 Sakdarat, S., Shuyprom, A., Pientong, C., Ekalaksananan, T., Thongchai, S.  
**Bioactive constituents from the leaves of Clinacanthus nutans Lindau**

(2009) *Bioorganic and Medicinal Chemistry*, 17 (5), pp. 1857-1860. Cited 48 times.  
doi: 10.1016/j.bmc.2009.01.059

[View at Publisher](#)

- 2 Wanikiat, P., Panthong, A., Sujayanon, P., Yoosook, C., Rossi, A.G., Reutrakul, V.  
**The anti-inflammatory effects and the inhibition of neutrophil responsiveness by Barleria lupulina and Clinacanthus nutans extracts**

(2008) *Journal of Ethnopharmacology*, 116 (2), pp. 234-244. Cited 47 times.  
doi: 10.1016/j.jep.2007.11.035

[View at Publisher](#)

- 3 Yoosook, C., Panpisutchai, Y., Chaichana, S., Santisuk, T., Reutrakul, V.  
**Evaluation of anti-HSV-2 activities of Barleria lupulina and Clinacanthus nutans**

(1999) *Journal of Ethnopharmacology*, 67 (2), pp. 179-187. Cited 52 times.  
doi: 10.1016/S0378-8741(99)00008-2

[View at Publisher](#)

- 4 Kongkaew, C., Chaiyakunapruk, N.  
**Efficacy of Clinacanthus nutans extracts in patients with herpes infection: Systematic review and meta-analysis of randomised clinical trials**

(2011) *Complementary Therapies in Medicine*, 19 (1), pp. 47-53. Cited 15 times.  
doi: 10.1016/j.ctim.2010.12.003

[View at Publisher](#)

- 5 Teshima, K.I., Kaneko, T., Ohtani, K., Kasai, R., Lhieochaiphant, S., Picheansoonthon, C., Yamasaki, K.  
(1998) *Phytochemistry*, 48, p. 831.

- 6 Teshima, K.-I., Kaneko, T., Ohtani, K., Kasai, R., Lhieochaiphant, S., Picheansoonthon, C., Yamasaki, K.  
**C-glycosyl flavones from Clinacanthus nutans**

(1997) *Natural Medicines*, 51 (6), p. 557. Cited 19 times.

- 7 Kim, H.K., Choi, Y.H., Verpoorte, R.  
**NMR-based metabolomic analysis of plants**

(2010) *Nature Protocols*, 5 (3), pp. 536-549. Cited 318 times.  
doi: 10.1038/nprot.2009.237

[View at Publisher](#)

- 8 Lee, J.-E., Lee, B.-J., Chung, J.-O., Shin, H.-J., Lee, S.-J., Lee, C.-H., Hong, Y.-S.  
**<sup>1</sup>H NMR-based metabolomic characterization during green tea (Camellia sinensis) fermentation**

(2011) *Food Research International*, 44 (2), pp. 597-604. Cited 39 times.  
doi: 10.1016/j.foodres.2010.12.004

[View at Publisher](#)