



PROCEEDINGS of the International Seminar

The Council of Rector of Indonesian State University (CRISU)
and The Council of University President of Thailand (CUPT)

“EXPLORING RESEARCH POTENTIALS”

Editors:

A. Muslim (Indonesia); Siti Herlinda (Indonesia); Nurly Gofar (Malaysia);
Melanie Bournsnel (Australia); K.T. Tantrakarnapa (Thailand);
Judhiastuty Februhartanty (Indonesia); Misnaniarti (Indonesia);
Najmah (Indonesia); Suci Destriatania (Indonesia)

**Published by Sriwijaya University
Cooperation with**

**The Council of Rector of Indonesian State University (CRISU)
and The Council of University President of Thailand (CUPT)**



**SRIWIJAYA UNIVERSITY
PALEMBANG, INDONESIA, 20-22 OCTOBER 2011**

**Proceedings of the International Seminar on Exploring
Research Potentials, Palembang, 20-22 October 2011**

**The Council of Rector of Indonesian State University (CRISU) and the
Council of University President of Thailand (CUPT)**

Editors:

**A. Muslim (Indonesia)
Siti Herlinda (Indonesia)
Nurly Gofar (Malasyia)
Melanie Bournsell (Australia)
K. T. Tantrakarnapa (Thailand)
Judhiastuty Februhartanty (Indonesia)
Misnaniarti (Indonesia)
Najmah (Indonesia)
Suci Destriatania (Indonesia)**

**Published by Sriwijaya University on Cooperation
The Council of Rector of Indonesian State University (CRISU)
The Council of University President of Thailand (CUPT)**

ISBN 978-979-98938-5-7

Copyright @ 2011 by Sriwijaya University

All rights reserved. Publish in Indralaya, Indonesia

Reproduction or translation of any part of this Proceedings beyond that permitted by Sriwijaya University Copyright, without the permission of the copyright owner is unlawful. Requests for permission or further information should be addressed to Sriwijaya University

Sriwijaya University:

**Jl. Palembang-Prabumulih Km. 32, Ogan Ilir, Indralaya, Indonesia
Telephone +62711580069, 580169, 580645, facsimile: +62711580664**

**Proceedings of the International Seminar on Exploring Research Potentials,
Palembang, 20-22 October 2011.**

**The Council of Rector of Indonesian State University (CRISU) and the
Council of University President of Thailand (CUPT)**

ISBN 978-979-98938-5-7

FOREWORD

Dear special guests:

Minister for National Education, Ambassadors of Thailand for Indonesia, Ambassadors of Indonesia for Thailand, all delegates from The Council of Rector of Indonesian State University (CRISU) and The Council of University President of Thailand (CUPT), Government of South Sumatra and Palembang City, and all The 6th CRISU-CUPT Conference, International Seminar and Exhibition participants

On behalf of the Sriwijaya University as Host University, I would like to extend my warmest welcome to all of the participant of The 6th CRISU-CUPT Conference, International Seminar and Exhibition, held on 20th-22nd October 2011 at Sriwijaya University Palembang with the join theme "Exploring Research Potentials".

There will be many challenges and opportunities in higher education in the Asean Community in the next decade. This is, therefore, considerable significant will arise from the The 6th CRISU-CUPT Conference, International Seminar and Exhibition. The previous five CRISU-CUPT conferences have been significantly deepening the relationships and come up with very fruitfull discussion in various subjects of collaboration and cooperation, for example, global warming, global mobility, academic interaction and cross-fertilization. The 5th conference was held in Chiang Mai, Thailand on July 7th-9th 2010 and appointed Sriwijaya University as a host for the 6th conference.

The 6th CRISU-CUPT conference will include many agenda, with not only include the meeting of the President Forum, the Dean Forum, and the Student Forum, but also will include international Seminar and Exhibition. This conference, therefore, might come up with more fruitfull conclusion and deepest commitment among participants.

With regard to considerable conference agenda, we greatly appreciate any support and sponsorship derived from any governmental as well as private institutions for the success of the conference. Great appreciation is also handed to organizing committee of the conference for any voluntarily effort that bring to the succes of the conference.

The 6th CRISU-CUPT Conference, International Seminar and Exhibition is being attended by about 600 participants. I hope you enjoy the beauty of Palembang City as one of the oldest city in Indonesia which is 1318 years old, established during the glory of the vast Sriwijaya Kingdom. The city also have variety of interesting culture and places.

Palembang, October 2011
Chairperson,



Prof. Dr. Badia Perizade, M.B.A
Rector of Sriwijaya University

TABLE OF CONTENTS

Foreword	iii
Table of Contents	iv
Papers of Keynote Speakers:	
1. Mental Illness In Australia (Dr. Melanie Bournnell , University of Newcastle Australia)	xvi
2. Chemical Toxicology towards humans health and EHIA (Environmental Health Impact Assessment) in Thailand (Prof. Kraichat Tantrakarnapa , Faculty of Public Health, Mahidol University, Thailand)	xxvi
3. Nutrition transition in Indonesia (DR. Ir. Judhiastuty Februhartanty , M.Sc, SEAMEO RECFON Indonesia, Indonesia University)	xxxvii
4. Cancer : Genetic And Environmental Causes And Risk Factors (Prof Dato' Dr. M.S. Lye , University Putra Malaysia)	vi
5. Accelerating Diversification In Food Consumption Based on Indigenous Resources as An Alternative Action To Support Food Security In Indonesia (Prof. Dr. Rindit Pambayun , M.P, Sriwijaya University, Indonesia)	vi
Papers of Presenters:	
A. Food Security	
1. Diversity, Domination, and Distribution Of Rice Stem Borer Species and it Interaction with Egg Parasitoids in Various Land Typology in Jambi (Wilyus¹, Siti Herlinda², Chandra Irsan², Yulia Pujiastuti² : <i>Agriculture Faculty of Jambi University, Faculty of Agriculture, Sriwijaya University</i>)	1
2. Land Suitability for <i>Elaeis Guineensis</i> Jacq Plantation in South Sumatra, Indonesia (M. Edi Armanto^{*1,2}, M.A. Adzemi², Elisa Wildayana¹, M.S. Imanudin¹, S.J. Priatna¹ and Gianto³ : <i>¹Faculty of Agriculture, Sriwijaya University, South Sumatra, Indonesia, ²Faculty of Agrotechnology and Food Science (FASM), UMT Terengganu, Malaysia, ³Forestry Delineation Agency, Department of Forestry, Indonesia</i>)	10
3. From Economic Valuation to Policy Making in Forest Conversion for <i>Elaeis Guineensis</i> Jacq Plantation (Elisa Wildayana^{*1}, M. Edi Armanto¹ and M.A. Adzemi² : <i>¹Faculty of Agriculture, Sriwijaya University, Indonesia, ²Faculty of Agrotechnology and Food Science (FASM), UMT Terengganu, Malaysia</i>)	19
4. Floating Agriculture Model from Bamboo for Rice Cultivation on Swamp Land At South Sumatra (Siti Masreah Bernas, Siti Nurul A.F. and Agung Maulana : <i>Soil Science Program Study and Low Land Management Field, Agricultural Faculty, Sriwijaya University</i>)	27
5. The Responsiveness of Jambi Rice Acreage to Price and Production Costs (Edison : <i>Faculty of Agriculture, Jambi University, Indonesia</i>)	34
<i>Proceedings of the International Seminar, Palembang 20-22 October 2011</i>	vi

36. Social Benefit of Coal Mining Activity (Syaifudin Zakir¹ and Restu Juniah²) 242
¹Dept. Public Administration Faculty Social and Political Sciences, Sriwijaya University, ²Environmental Science Program University of Indonesia
37. Behavior of Connection Rotations Composite Steel Beam with Partial Strength Using Trapezoid Web Profiled 250
 (Anis Saggaff¹, Mahmood Md. Tahir², And Arizu Sulaiman³ : Civil Engineering Department, Faculty of Engineering, Sriwijaya University, ²Steel Technology Centre, Faculty of Civil Engineering, University Teknologi Malaysia, ³ Faculty Of Civil Engineering, Universiti Teknologi Malaysia.
38. Chemical Compound from Endophytic Fungi of Medicinal Plant Used in Treatment Of Gout (Elfita^{1*}, Muharni¹, Munawar : Faculty of Mathematics and Natural Sciences , Sriwijaya University) 259
39. 3-OXO Friedelin Compound from the Stem Bark of Manggu Leuweung (Garcinia cornea) 265
 (Muharni^{*}, Elfita, Handi : Department of Chemistry, Faculty of Mathematics and Natural Science, Sriwijaya University, Indralaya,, South Sumatera, Indonesia)
40. Antioxidant Flavonoids from Tunjuk Langit (*Helminthostacys Zaylanica*) 271
 (Fitrya^{1*}, Muharni¹ dan Eliza : Department of Chemistry, University of Sriwijaya)
41. The Industry Characteristic and Managers View: their Influence On Employment Relations In The Indonesian Hospitality Industry (Explorations From Three Case Studies) 276
 (Hendragunawan S¹. Thayf, John Lewer : Hasanuddin University, Indonesia)
42. Competitiveness of Management State-Owned Enterprises (Soes) Telecommunications 289
 (Kesi Widjajanti : Faculty of Economic Semarang University, Semarang, Indonesia)
43. Prospects and Challenges of The Introduction of Open Educational Resources in Indonesia (Daryono, Udan Kusmawan, Olivia Idrus) 299
44. Research Collaboration on Quality Assurance for Open and Distance Learning in Asia (Endang Nugraheni, Aminudin Zuhairi : Universitas Terbuka, Indonesia) 306
45. Fast Ship Serving Makassar, South Sulawesi to Majene, West Sulawesi 313
 (Muhammad Alham Djabbar and Andi Haris Muhammad : Ocean Engineering Study program, Department of Naval Architecture, Faculty of Engineering, Hasanuddin University, Makassar, Indonesia)
- D. Public Health and Medical Science**
46. Pesticides Exposure and Liver Dysfunction on Childbearing-Age Women in Kersana Sub District, Brebes Regency 316
 (Arum Siwiendrayanti , Public Health Department, Sport Science Faculty, Semarang State University)

CONCLUSION

One organic salt has been isolated from endophytic fungi *Penicillium* sp of kandis gajah used in treatment of gout. This compound contain is one methyl, two methylene sp^3 , one methylene sp^2 , three methyne sp^3 and one methoxy proton. This compound also contain is four carbon sp^2 and heteroatom.

REFERENCE

- Bacon, C. W., White, J. F. 2000. Physiological adaptations in the evolution of endophytism in the Clavicipitaceae in Microbial Endophytes (Eds.: C. W. Bacon, J. F. White), Marcel Dekker Inc., New York & Basel, pp. 237-261.
- Chandrashekhara, Niranjanraj, S., Deepak, S.A., Amruthesh, K.N., Shetty, N.P., and Shetty, H.S. 2007. Endophytic Bacteria from Different Plant Origin Enhance Growth and Induce Downy Mildew Resistance in Pearl Millet. *Asian Journal of Plant Pathology*, 1 (1): 1-11.
- Hundley, N.J. 2005. Struktur Elucidation of Bioactive Compounds Isolated from Endophytes of *Alstonia Scholaris* and *Acmena Graveolens*. Thesis. Department of Chemistry and Biochemistry, Brigham Young University.
- Lumyong, S., Norkaew, N., Ponpathachart, D., Lumyong, P., and Tomita, F. 2001. Isolation, Optimization, and Characterization of Xylanase from Endophytic Fungi. Biotechnology for Sustainable Utilization of Biological Resources. *The Tropic*, 15.
- Misaghi, I.J. and Donndelinger, C.R. 1990. Endophytic Bacteria in Symptom-Free Cotton Plants. *The American Phytopathological Society*, 80 (9): 808-811.
- Saikkonen, K., Faeth, S. H., Helander, M., and Sullivan, T. J. 1998. Fungal endophytes: A continuum of interactions with host plants. *Annu. Rev. Ecol. Syst.*, 29, 319-343.
- Schulz, B., Boyle, C., Draeger, S., Römmert, A.-K., and Krohn, K. 2002. Endophytic fungi: a source of novel biologically active secondary metabolites *Mycol. Res.*, 106(9), 996-1004.
- Strobel, G. A. 2002. Microbial gifts from rain forests. *Can. J. Plant Pathol.*, 24(1), 14-20.
- Whitmore, M.A., 1973, *Tree Flora of Malaya*, Forest Department, Manistry of Primary Industries, Malaysia, Longman.

EO 07

3-OXO FRIEDELIN COMPOUND FROM THE STEM BARK OF MANGGU LEUWEUNG (*Garcinia cornea*)

Muharni*, Elfita, Handi

Department of Chemistry, Faculty of Mathematics and Natural Science,
Sriwijaya University, Indralaya,, South Sumatera, Indonesia

*Correspondent author: muharnimyd@yahoo.co.id

ABSTRACT

The tropical family Guttiferae is well known to be rich source of isoprenylated xanthenes and biflavonoids as mayor compound and triterpenoid as minor compound with variety of biologically active such antioxidant, anti malaria, anticancer, and antibacterial activity. *Garcinia cornea* commonly known as manggu leuweung, As part of a phytochemical studi in Guttiferae we

have previously reported the presence chemical constituent of a triterpenoid 3-oxo friedelin (1) and now describe the isolation and structure elucidation of further constituent of the stem bark of *G. cornea* collected in Bogor. Isolation and purification have been carried out by vacuum liquid chromatography and open column chromatography by using silica gel adsorbent and gradient eluting system of n-hexane, ethyl acetate, and methanol. The structure of this compound was deduced on basis of spectroscopic data ^1H NMR, ^{13}C NMR, and DEPT and comparison with the reported data. This compound has been reported from others species.

Keyword: *Garcinia cornea*, triterpenoid, 3-oxo friedeline(+)-morelloflavon.

INTRODUCTION

Garcinia is the most numerous genus of the clusiaceae family with about 400 species widely distributed in tropical Asia, Africa, New caledonia and Polynesia (Waterman, 1986). *Garcinia* are known to produce a variety of biologically active metabolites such isoprenylated xanthenes, benzophenones, and biflavonoids (Gustafson *et al*, 1992; Hay *et al*, 2004). *G. cornea* commonly known as manggu leuweung is a medium sized tree found in South east Asia (Whitmore, 1972). No medicinal uses are recorded for this species although it has been used as fruit tree. Previous phytochemical studies of *G. cornea* have been reported the presence of 3-oxo-23-hydroxycycloart-24-en-oic acid, 3-oxocycloart-24-en-23-ol, and (-)- epicatechin (Darwati dkk, 2008). In continuation of our study of species *G. cornea* we have previously reported the presence chemical constituent of a triterpenoid 3-oxo friedeline and now describe the isolation and structure elucidation of further constituent of the stem bark of *G. cornea* collected in Bogor. Isolation and purification have been carried out by vacuum liquid chromatography and open column chromatography by using silica gel adsorbent and gradient eluting system of n-hexane, ethyl acetate, and methanol. The structure of this compound was deduced on basis of spectroscopic data ^1H NMR, ^{13}C NMR, and DEPT and comparison with the reported data. This compound has been reported from others species.

MATERIAL AND METHODS

Material

Vacuum liquid chromatography (VLC) and column chromatography were carried using Merck silica gel 60 GF₂₅₄ (230-400 mesh)), column chromatography using Si gel 60 (70 -230 mesh.). Analytical thin layer chromatography (TLC) was carried out using Merck (Art.5554) silica gel 60 F₂₅₄, pre-coated aluminium sheets 20x 20 and solvents for chromatography were technical grade and distilled before use.

Instrumentation

Melting point was determined on a micromelting point apparatus NMR spectra were recorded at 500 MHz (^1H) and 125 MHz (^{13}C) on JEOL JNM ECA-500 spectrometer. Organic materials were detected by first viewing the plate under UV light at 254 nm and 365 nm. The extracts were organic mixture samples were applied in the pre-adsorbed form on silica gel 60 (70 - 230 mesh.)

Plant material

Sample of the stem bark of *G. cornea* was collected on April 2010 from Hutan Raya Bogor, west Java, Indonesia.. The plant was identified by the staff at the Herbarium Bogoreiensis Bogor and a voucher spesiment had been deposited at the herbarium.

METHOD

Extraction and isolation

The powdered of the stem bark *G. cornea* (1 kg) was extracted by maceration technique three times with hexane, EtOAc and methanol respectively for 5 days at room temperature. Evaporation of each extract (n-hexane, EtOAc and methanol) to dryness in vacuo, afford n-hexane extract (12 g), EtOAc (25 g) and methanol (400 g). Methanol extract was further fractionated by vacuum liquid chromatography (VLC) eluted with a gradient system (n-hexane, n-hexane 100%, n-hexane : etil asetat (9:1 - 7:3, 5:5 dan 3:7) The based of thin layer chromatography (TLC) analyze afforded 5 fractions F1- F5. Fraction 1 was further purified column chromatography (eluted with gradient system, n-hexane : EtOAc = 9:1 - 1:9) to afford 6 subfraction. Subfraction 2 after purification with recrystallization gave a pure compound (80 mg). This compound, obtained as a white crystal, ^1H NMR (chloroform- d_1 , 500 MHz) δ_{H} ppm, ^{13}C NMR (chloroform- d_1 , 125 MHz) δ_{C} ppm and DEPT can see Table 1.

RESULTS AND DISCUSSION

The n-hexane extract from the dried stem bark of *G. cornea* has been isolated a triterpenoid as 3-oxo friedelin (1) as white crystal, m.p 237 - 239°C. The H-NMR spectra of compound 1 showed characteristic signals for triterpenoid the presence of many signal at δ_{H} 0.7 - 02.4 ppm as signal to methyl, methylene and methine proton in performant SP^3 (Shashi *et al.*, 1994). At the spectrum no showed signal at aromatic proton (δ_{H} 6-8 ppm) and indicated the compound is triterpenoid. Signal-signal characteristic with high intensity with integration proton 3.0 - 6.0 is signal from methyl proton showed at chemical shifts δ_{H} 0.72 (3H, s); 0.87 (3H, s); 0.88; 0.95; 0.99; 1.00; 1.05; and 1.187 ppm. Four signal observed in this spectrum at chemical shifts δ_{H} 1.6 - 2.4 ppm (Figure 1) is signal for proton methylene which located beside C carbonyl. Signal at 2.39 dan 2.30 each (1H, dd) is signal for proton methylene at C-2 and ortho coupled with two proton as showed as doublet-doublet signal. In spectrum also observed signal at chemical shifts 1.96 dan 1.68 (1H, td) to methylene proton at C-1 and showed ortho coupled with one proton at C-10 and another coupling ortho proton with two proton at C-2 and showed as doublet triplet (multiplet) signal. Signal at 2.25 to prediction as signal to proton at C-4 be which located beside C carbonyl and showed as signal more deshielding.

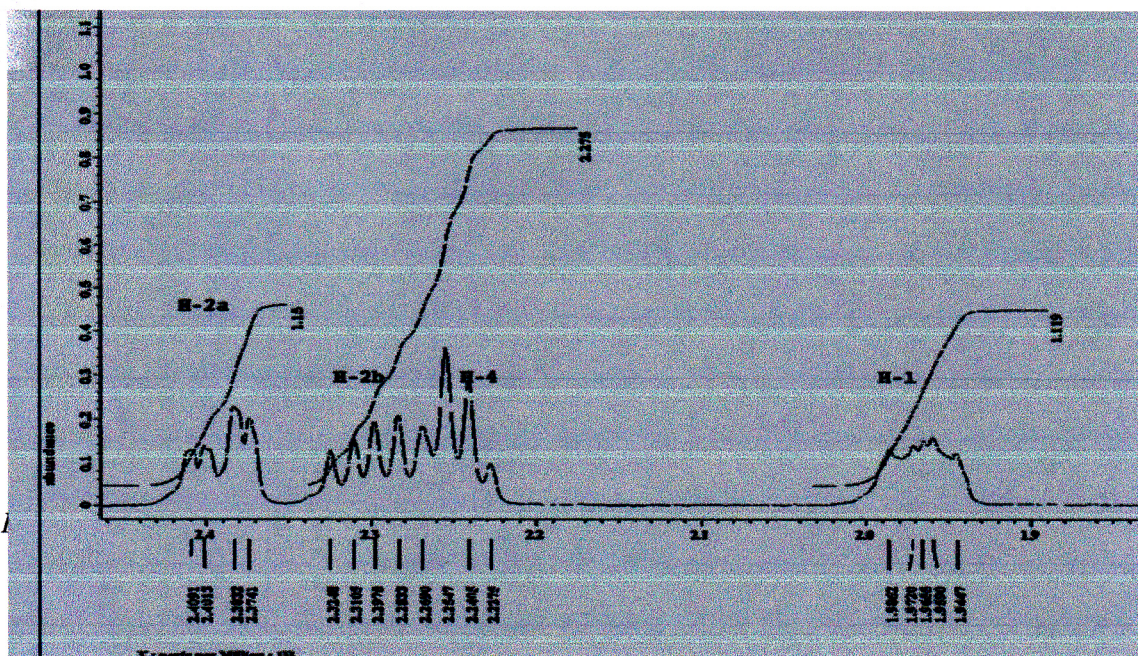


Figure 1. ^1H - NMR Spectrum at δ_{H} 1,9 – 2,4 ppm

Support for the structure 1 were obtained from ^{13}C NMR, and DEPT data (Table 1). ^{13}C NMR spectrum revealed the presences of 30 carbon resonances and no signal above δ_{C} 100 ppm for SP^2 carbons. One carbonyl group observed at δ_{C} 213.5 ppm, Signal others showed at δ_{H} 7 - 50 ppm characteristic for carbon SP^3 . The carbonyl at triterpenoid usually at position C-3. The spectrum data supported that compound triterpenoid. DEPT spectrum (Figure 2) showed 30 signal carbon to identified as 8 C primary (CH_3) at chemical shifts δ_{C} 7.0 (C-23); 14.8 (C-24); 18.1 (C-25); 18.8 (C-27); 20.4 (C-26); 32.2 (C-28); 35.0 (C-29); and 32.0 ppm (C-30), 11 C secondary (CH_2) at δ_{C} 22.4 (C-1); 41.5 (C-2); 42.3 (C-5); 41.7 (C-6); 35.8 (C-11); 30.7 (C-12); 32.6 (C-15); 36.7 (C-16); 35.5 (C-19); 32.9 (C-21); and 39.4 ppm (C-22), 4 signal C tertiary (CH) at δ_{C} 18.4 (C-7); 37.6 (C-9); 42.9 ppm (C-18); and 58.4 (C-4), and 7 signal for C quaternary (C) at δ_{C} 231.4 (C-3); 53.2 (C-8); 59.6 (C-10); 3.8 (C-13); 38.4 (C-14); 30.1 (C-17); dan 2.3 (C-20).

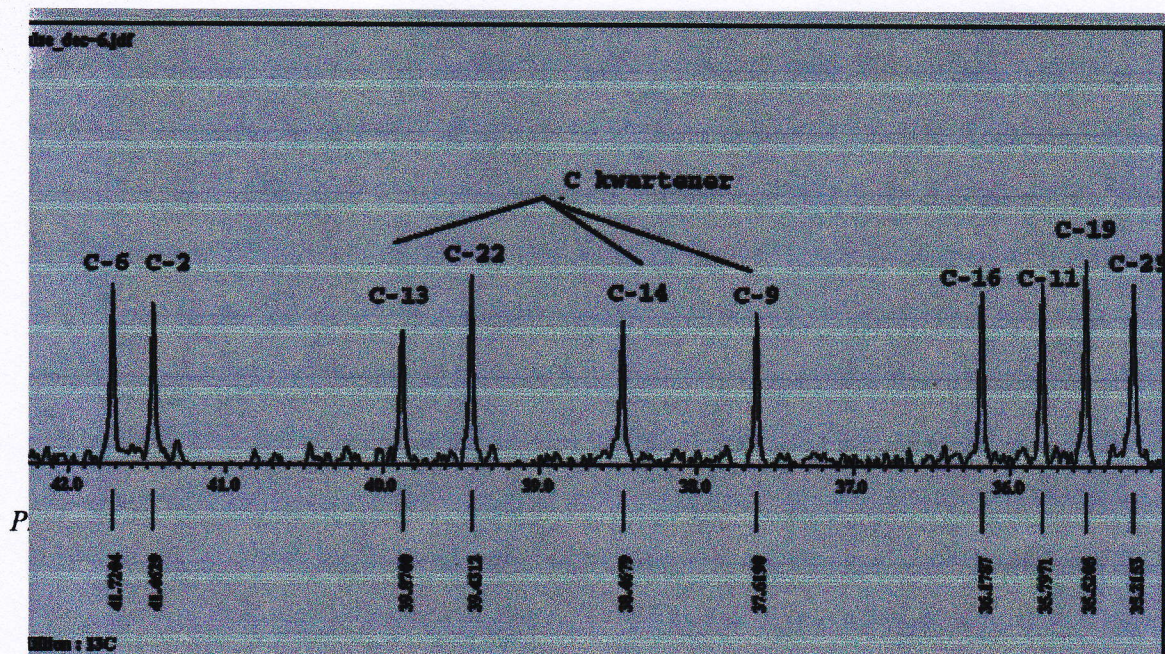


Figure 2. DEPT Spectrum at δ_c 35 -42 ppmTable 1. Data Spectra ^1H NMR, ^{13}C NMR and DEPT from compound 1 at 500 MHz (^1H) and 125 MHz (^{13}C), in methanol- d_4 and comparizon 3-oxo friedelin* has been reported (Klass *et al.*, 1992)

Posisi C	δ_c (ppm) 3-oxo friedelin*	δ_c (ppm) 1	δ_H 3-oxo friedelin *	δ_H Compound 1	DEPT
1	22,3	22,4	1,96; 1,68	1,96; 1,67 (td)	CH2
2	41,5	41,5	2,39; 2,28	2,39; 2,30 (dd)	CH2
3	213,2	213,4			C
4	58,2	58,4	2,25	2,25	CH
5	42,1	42,3			C
6	41,3	41,7	1,75; 1,28	1,74; 1,28	CH2
7	18,2	18,4	1,49; 1,37	1,48; 1,37	CH2
8	53,1	53,2	1,39	1,38	CH
9	37,4	37,6			C
10	59,4	59,6	1,53	1,57	CH

11	35,6	35,8	1,46; 1,26	1,45; 1,25	CH2
12	30,5	30,7	1,34; 1,34	1,34; 1,34	CH2
13	39,7	39,8			C
14	38,3	38,4			C
15	32,4	32,6	1,46; 1,27	1,48; 1,25	CH2
16	36,0	36,2	1,57; 1,36	1,56;	CH2
17	30,0	30,1			C
18	42,8	42,9	1,56	1,55	CH
19	35,3	35,5	1,38; 1,20	1,22	CH2
20	28,1	28,3			C
21	32,7	32,9	1,51; 1,30	1,57; 1,25	CH2
22	39,2	39,4	1,50; 0,94	1,48; 0,93	CH2
23	6,8	7,0	0,87	0,88	CH3
24	14,6	14,8	0,71	0,72	CH3
25	17,9	18,1	0,86	0,86	CH3
26	20,2	20,4	1,00	1,00	CH3
27	18,6	18,8	1,05	1,05	CH3
28	32,1	32,2	1,17	1,17	CH3
29	35,0	35,2	1,00	0,99	CH3
30	31,8	32,0	0,95	0,95	CH3

Spectrum data for compound I to comparison with the reported data (Table 1). In table showed data spectrum compound 1 have many similarities with data spectrum of 3-oxo friedelin. The base of spectroscopy data analysis compound was identified as 3-oxo friedelin with structure showed at Figure 3. This compound had been reported from EtOAc extract of *Peritassa compta* (Celastraceae) (Klass *et al.*, 1992).

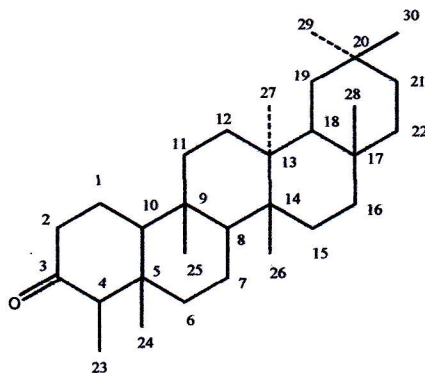


Figure 3. Structure 3-oxofriedelin (1)

CONCLUSION

One triterpenoid pentacyclic has been isolated from n-hexane extract of stem bark *G. cornea* and the base spectroscopy data analysis and comparized by reported data suggested this compound 3-oxo friedelin with formula molecule $C_{30}H_{50}O$. This compound add kinds of phytochemistry studies from the stem bark of *G. cornea*.

REFERENCE

1. Whitmore, M.A., 1973, *Tree Flora of Malaya*, Forest Department, Manistry of Primary Industries, Malaysia, Longman.

2. Klass, J., Winston, F., and Tinto, 1992, Friedelane Triterpenoids from *Peritassa compta*: Complete H and C Assignment by 2D Spectroscopy, *Journal of Natural Products*, 55 (11), 1626-1630
3. Hay, A.E., Helesbeux, J.J., Duval, O., Labaied, M., Grellier, P., and Richomme, P. 2004. Antimalaria Xanthones from *Calophyllum caledonicum* and *Garcinia vieillardii*. *Life Sciences* 75: 3077-3085.
4. Darwati, Soetardjo, S., Bahti, H.H., dan Dachriyanus. 2007c. Nortriterpenoid as Major Compound from Antioxidant Activity Fraction of Stem Bark *Garcinia cornea*. *Proceeding Seminar of International Conference on Traditional Medicine and Medicinal Plants*, Universitas Surabaya, Surabaya, 7-9 September 2007.
5. Gustafson, K. R., Blunt, J. W., Munro, M. H. G., Fuller, R. W., McKee, T. C., Cardellina, J. H., McMahon, J. M., Cragg G. M., and Boyd, M. R. 1992. The guttiferones, HIV-inhibitory Benzophenones from *Symphonia globulifera*, *Garcinia livingstonei*, *Garcinia ovalifolia* and *Clusia rosea*. *Tetrahedron* 48 (46): 10093-10102.
6. Waterman, P. G., 1986, APhytochemist in the African rain forest, *Phytochemistry*, 31, 3-17.
7. Shashi, B., Mahato, and Asish, P. K., 1994, C NMR Spectra of Pentacyclic Triterpenoid-A Complication and Some Salient Features, *Phytochemistry* 37 (6), 1517-1575.

EO 08

**ANTIOXIDANT FLAVONOIDS FROM TUNJUK LANGIT
(HELMINTHOSTACYS ZAYLANICA)**

Fitrya^{1*}, Muharni¹ and Eliza¹

¹ Department of Chemistry, University of Sriwijaya

Jl. Raya Palembang-Prabumulih Km 32, Indralaya, OI, Sumsel

* Corresponding author, tel/fax : 085669222508, email: fitrya_ap@yahoo.com

ABSTRACT

A new flavonoid (compound 2), had been isolated from ethylacetate extract of rhizome of *Helmynthostachys zeylanica*. The structure of this compound was determined on the basis of