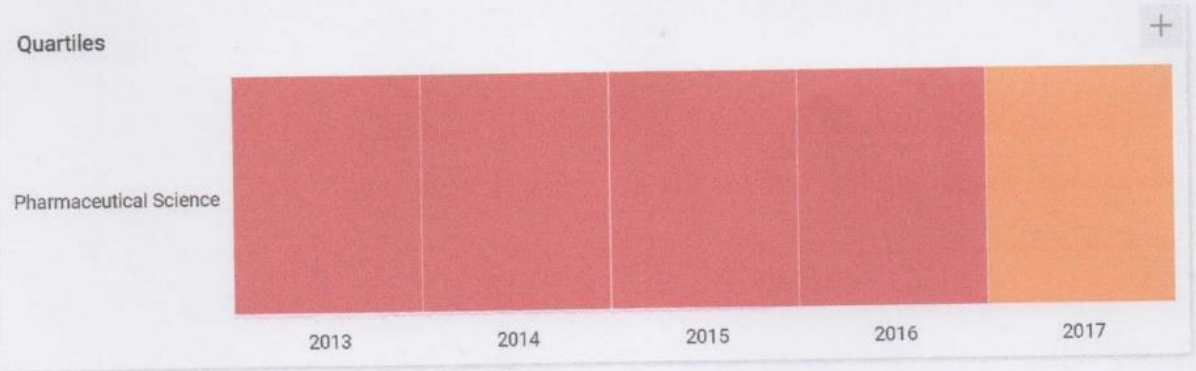
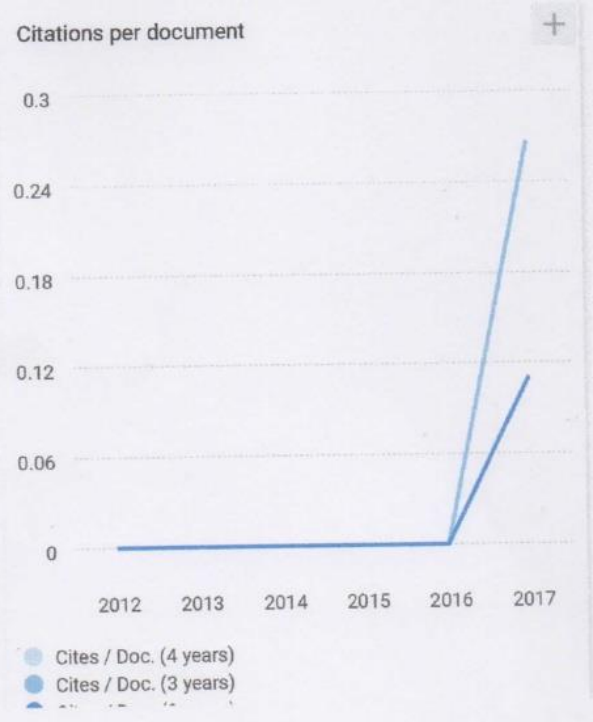
International Research Journal of Pharmacy

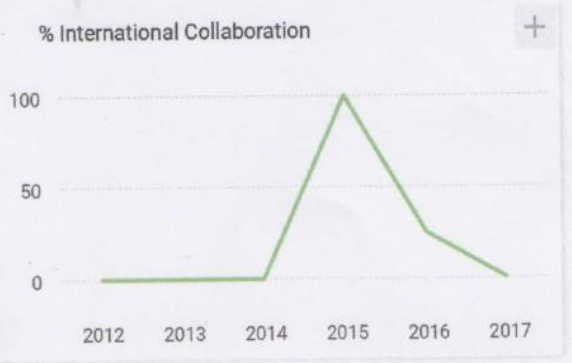
Country	India - SIR Ranking of India
Subject Area and Category	Pharmacology, Toxicology and Pharmaceutics Pharmaceutical Science
Publisher	Moksha Publishing House
Publication type	Journals
ISSN	22308407
Coverage	2012, 2014-ongoing

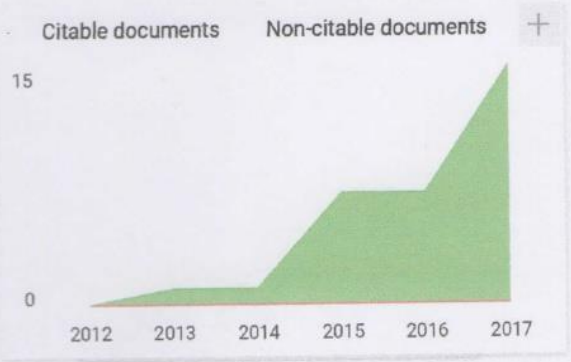
1
H Index

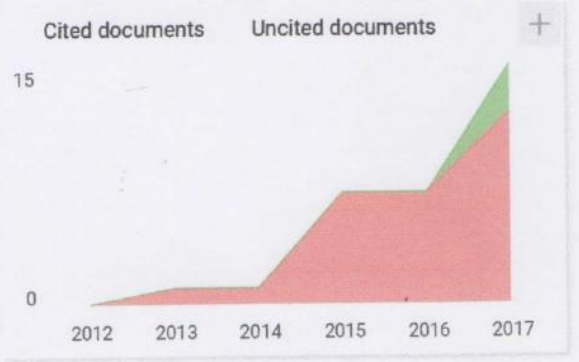
Join the conversation about this journal











← Show this widget in your own website

Just copy the code below and paste within your html code:

<a href="https://www.scim

the possibility to dialogue through comments linked to a which general doubts about the processes of publication in the he publication of papers are resolved. For topics on particular annels with your editor.

Developed by: Powered by:

Follow us on @ScimagoJR

ISSN (Online): 2230-8407
ICV 2016:78.9
CODEN: IRJPBS
DOI Prefix: 10.7897/2230-8407
Indexing and Listing

International Research Journal of Pharmacy

Scopus Journal Metrics

International Research Journal of Pharmacy

Q3 Pharmaceutical Science

best quartile

SJR 2017
0.13

powered by scimagojr.com

Welcome to International Research Journal of Pharmacy

International Research Journal of Pharmacy (IRJP) is a open access monthly online Journal, which publishes original research work that felicitates scientific knowledge in Pharmaceutical Sciences.

Researchers may submit (1) Original Research Articles (2) Review articles (3) Short Notes
(4) Case reports (5) Letter to the editor in various disciples of Pharmaceutical Sciences.

Follow us

Current Issue

Read current issue of various review and research articles submitted to us by authors in various fields of Pharmaceutical Sciences.

read more

Archives

Read past issues of various review and research articles submitted to us by authors in various fields of Pharmaceutical Sciences.

read more

Search Articles

Title
Author
Keywords
Issues Select Issue
Search

Index in

Scopus

Note: IRJP is accepting advertisements for display on home page of our website. For more details contact us at irjponline@gmail.com

Site visits so far 226406

ISSN (Online): 22
ICV 2016:78.9
CODEN: IRJPBS
DOI Prefix: 10.78
Indexing and List
Impact Factor =
(Calculated as pe
citations 2010-1

International Research Journal of Pharmacy

Editorial Board

Chief Editor

Dr. Mukesh Singh Sikarwar
M. Pharm., Ph.D (Pharm. Sci.)
AIMST University, Malaysia

Associate Editor

Dr. Asif Karigar
Maratha Mandal College of Pharmacy
Belgaum, Karnataka, India

Indian Editorial Board Members

Dr. (Mrs) M. Himaja M.Sc., Ph.D.
Professor, Pharmaceutical Chemistry Division, School of Advanced Sciences
VIT University, Vellore-632014, Tamil Nadu, India

Dr. Milind Parle, M. Pharm., Ph.D.
Professor of Pharmacology , Dept. Pharm. Sciences,
Guru Jambheshwar University of Science and Technology, Hisar, Haryana, India

Prof. Anant P. Hardas M.Pharm, DBM, AIC {Ph.D}
Nagpur, Maharashtra, India

Dr. Yogitha Bali M.R BAMS, M.S (Ayu), MSC (Yoga), DNHE, MA (Sans)
Consultant Ayurvedic Surgeon, Yoga and Diet Consultant
Dheerghaayu Ayurvedic Health Care Center, Bangalore, India

Dr. Chetan Sharma Ph.D
Department of Microbiology, Kurukshetra University
Kurukshetra, Haryana, India

Dr. Vijay Kumar M. M.V.Sc.,DABT
Assistant Professor, Department of Veterinary Pharmacology and Toxicology
Veterinary College, KVAFSU, Bidar, India

Dr. Y. Prashanthi Ph. D.
Department of Chemistry, Mahatma Gandhi University,
Nalgonda, A.P., India

Dr. B.V.Ramana MD
Department of Microbiology, Sri Venkateswara Institute of Medical Sciences
Tirupati, Andhra Pradesh, India

Dr. Anubha Khale M. Pharm., Ph.D., MBA
Principal & HOD Pharmaceutics H K College of Pharmacy, Mumbai, India

Dr. Manish Jaimini M. Pharm., Ph.D.
Professor, Jaipur College of Pharmacy

Download Copyright Form

Authors are required to submit a copyright
submissions. Click on below button to dow
Transfer Form & Authorship Responsibility

download

Instructions to Authors

General instructions to authors willing to s
articles, review articles, notes etc. in vario

read more

Jaipur, Rajasthan India

Dr. Sukhen Som M. Pharm., Ph.D.
Department of Pharmaceutical Chemistry
M.M.U College of Pharmacy, K.K. Doddi, Ramanagara- 562159 Karnataka, India

Prof. R. Sundaraganapathy M. Pharm.
Dept. Pharma. Chemistry, Swamy Vivekanandha College of Pharmacy Elayampalayam,
Tiruchengode, Namakkal (Dt), Tamil Nadu, India

Dr. Nitesh Kumar M.V.Sc., Ph.D.
Associate Professor, Department of Veterinary Pharmacology and Toxicology,
College of Veterinary Science & A.H., Kuthulia, Rewa, MP, India

Dr. Anurag Mishra M. Pharm., Ph.D.
Associate Professor, Deparment of Pharmacognosy, School of Pharmacy
BBD University, Lucknow, U.P., India

Dr. Santosh M Biradar
Assistant Professor
Dept of Community Medicine, BLDE University Shree BM Patil Medical College Bijapur, Karnataka, India

Dr. Suresh N. Jangle Ph.D.
Department of Biochemistry, Rural Medical College, Pravara Institute of Medical Sciences
Loni, Maharashtra, India

Dr.Mrs. Padmini Hrudeshnandan Sharma M.Pharma, Ph.D
Padm. Dr. D. Y. Patil College of Pharmacy, D.Y. Patil Educational Complex,
Sec.No29, Akurdi, Pune 44 Maharashtra, India

Dr. Pankaj Katara BAMS, MD
Ch. Brahm Prakash Ayurved Charak sansthan
Khera Dabar Govt. of NCT Delhi, India

Dr. K.Madhava Chetty M.Sc., M.Ed., M.Phil., Ph.D., PG DPD, FIAAT
Department of Botany , Sri Venkateswara University
Tirupati, Andhra Pradesh, India

Dr. Shrikaant Kulkarni M.Sc., M.Phil, Ph.D., M.B.A.(HR)
Dept. of Chemical Engg., Vishwakarma Institute of Technology
Pune – 411037 Maharashtra, India

Dr. Sankalp Yadav MBBS, PGDEM
General Duty Medical Officer-II, Chest Clinic Moti Nagar, North Delhi Municipal Corporation,
New Delhi, India

Dr. Riju Agarwal MS (Shalakya)
Associate Professor, Ch. Brahm Prakash Ayurved Charak Sansthan
Ooty Road, Mysuru, Karnataka, India

Dr. Ajay Bilandi
Department of Pharmaceutics, Seth G. L. Bihani S. D. College of Technical Education (Pharmacy),Institute of
Pharmaceutical Sciences & Drug Research,
Sri Ganganagar, Rajasthan, India

Dr. Rajesh N
Department of Biochemistry, JSS College of Arts, Commerce & Science
New Delhi, India

Dr. N Rajan
Manager, Analytical Research and Development, Dr. Reddy's Laboratories Limited
Hyderabad, India

Dr. Manodeep Chakraborty
Department of Pharmacology, Shree Devi College of Pharmacy, Airport road, Mangalore
Karnataka, India

Dr. Gyanesh Singh
School of Bioengineering and Biosciences, Faculty of Technology and Sciences, Lovely Professional University

International Editorial Board Members

St. John Fisher College, Wegmans School of Pharmacy,
Rochester, New York

Dr. Idress Hamad Attitalla,
Professor, PhD in Molecular Evolution (Uppsala University, Sweden), Department of Microbiology (Head),
Faculty of Science, Omar Al-Mukhatr University, Box 919, Al-Bayda, Libya,
Director of Research and Study at Agriculture Researc Centre, Al-Bayda, Libya

Dr. Khaled Nabih Zaki Rashed
National Research Centre (NRC), Pharmacognosy Department,
Pharmaceutical and Drug Industries Research Division, Dokki, Giza, Egypt

Dr. Rashad Alnamer
Faculty of Medicine and Pharmacy, University of Thamar, Yemen

Dr. Sameer Dhingra B.Pharm., M.Pharm., Ph.D., R.Ph.
Assistant Professor, School of Pharmacy, Faculty of Medical Sciences, Mount Hope Campus
The University of the West Indies, St. Augustine, Trinidad, WI

Dr. Aysu Yurdasiper
Ege University, Faculty of Pharmacy
Dept. of Pharmaceutical Technology
Izmir Turkey

Dr. Milind Sadashiv Alai, M. Pharm.PhD
Postdoctoral Researcher, National Yang Ming University,
Taipei, Taiwan

Dr. Bijay Aryal
Assoc. Professor, Department of Clinical Pharmacology, Chitwan Medical College Teaching Hospital
Bharatpur-10, Chitwan, Nepal

Prof. Dr. Heyam saad Ali
Head Department of Pharmaceutics, Dubai Pharmacy College, Dubai, UAE

Dr. Saad Touqeer Pharm D, M. Phil (Pharmaceutical Chemistry), R. Ph
Department of Pharmaceutical Chemistry, University of Lahore
Lahore, Pakistan and AIMS Institute, 100 B Johar Town, Lahore, Pakistan

Dr. Kiran Kumar Vangara Ph.D.
Formulations Scientist, R & D, INSYS Therapeutics. Inc.
444 S Ellis St, Chandler, AZ, USA

Dr. Gokhan Zengin Ph.D
Department of Biology, Faculty of Science, Selcuk University
42075, Campus, Konya, Turkey

Dr. Sitansu Sekhar Nanda
Myongji University
Yongin, South Korea

Dr. Murali Krishna Matta
Fellow at US Food and Drug Administration, Silver Spring, MD
USA 20901

Dr. SundariChodavarapu
Department of Biochemistry and Molecular Biology, Michigan State University
East Lansing, MI 48824 USA

Dr. Sripal Reddy Palavai
Manager –Analytical R&D (Inhalation & Dermatology), Aurobindo Pharma
USA

Dr. Sai PrachetanBalguri
ORISE Fellow at U.S. FDA, 10903 New Hampshire Avenue, Silver spring
MD 20993 USA

Mr. Syed Masudur Rahman Dewan
Department of Pharmacy, Noakhali Science and Technology University

ISSN (Online): 2230-8407
ICV 2016:78.9
CODEN: IRJPBS
DOI Prefix: 10.7897/2230-8407
Indexing and Listing
Impact Factor = 0.751
(Calculated as per Google scholar citations 2010-13)

International Research Journal of Pharmacy

Archives

International Research Journal Of Pharmacy
Volume 9, Issue 3, Mar 2018

Review Articles

Research Articles

INTERNATIONAL RESEARCH JOURNAL OF PHARMACY
www.irjponline.com
ISSN 2230 – 8407

Research Article

ISOLATION AND CHARACTERIZATION TRITERPENOID COMPOUND FROM LEAVES MANGROVE PLANT (*Sonneratia Alba*) AND ANTIBACTERIAL ACTIVITY TEST

Weny JA. Musa *[1], Suleman Duengo [1] and Boima Situmeang [2]
[1]Department of Chemistry, Faculty of Mathematic and Natural Sains, Gorontalo State University, Indonesia
[2]Department of Chemistry, Sekolah Tinggi Analis Kimia Cilegon, Banten, Indonesia
*Corresponding Author Email: boimatumeang@stakc.ac.id

Article Received on: 22/02/18 Approved for publication: 22/03/18

DOI: 10.7897/2230-8407.09347

ABSTRACT

Mangrove plant *(Sonneratia alba)* is easily found in Indonesia and has the potential of being a herb medicine. General phytochemical screening revealed the presence of flavonoid, steroid, triterpenoid, and tannin compounds. Mangrove plant variously used in ethnomedicine to treat wounds, diarrhea, and fever disease. Lup-20(29)-en-3β-ol (lupeol) compound is pentacyclic triterpenoid group. Lupeol was isolated from the methanol extract of the leaves of mangrove (*S. alba*). Extraction was done by maceration method using methanol 96% as solvent. Its isolation was carried out by a combination of column chromatography and combination of n-hexana, ethyl acetate, and methanol solvent. The structure was determined by analysis of IR, ^{1}H-NMR, ^{13}C-NMR, 2D NMR and MS spectroscopies data, as well as comparison with various reference. The result of antibacterial activity test showed that isolated compound effectively inhibited the growth of these bacterial pathogens with inhibition zone 18 mm for *Staphyloccocus aureus,* 14 mm for *Pseudomonas aeruginosa*, and 13 mm for *Escherichia coli.* This is the first report of isolation lupeol compound from the leaves of *Sonneratia alba* of this species and antibacterial activity test against *Staphyloccocus aureus*, *Pseudomonas aeruginosa*, and *Escherichia coli* pathogen bacterial.

Keywords: *Sonneratia alba,* antibacterial, triterpenoid, and mangrove.

INTRODUCTION

Mangroves are a group of plants high or shrubs that grow in coastal areas tropical and subtropical. This plant has a distinctive morphological features and can survive in environments with high salinity[1,2]. Mangroves grow in coastal areas and have a unique adaptation to cope with environmental stresses such as high salinity, high temperature and strong sunlight radiation, as well as the abundance of microorganisms and insects[3]. Some mangroves have been used as herbs and extracts have biological activity in humans, animals and harmful bacteria but a study of the womb secondary metabolites responsible the biological activity is still limited[4-6].

Sonneratia alba is one of mangrove plants in the family of *lythraceae*. *Sonneratia alba* widely known in Indonesia with the name coastal Pidara white and widely distributed in the coastal regions of Southeast Asia and the Indian Ocean[7]. This plant has been used traditionally in coastal communities of Indonesia to the treatment of wounds, diarrhea, and fever[8]. In previous study phytochemical investigation *Sonnetaria* has been reported contained triterpenoid, steroid, and flavonoid compounds.

Infectious disease and parasites are one of the major disease in the world. According to World Health Organization (WHO) data in 2011, infectious diseases and parasites are the third leading cause of death in the world[9]. In Indonesia, infection deseases is one of the major caused of death especially in north Indonesia and still a health problem in all levels of society from low to high socioeconomic levels. Infectious disease of the skin tissue that commonly affects the public caused by various microbes. Bacteria cause the most common skin disease and infection is *Staphylococcus aureus, Pseudomonas aeruginosa,* and *Escherichia coli*[10,11]. Based on reports of various studies have not revealed the active compounds antibacterial, diarrhea and in skin disease derived from the leaves of plants *Sonneratia alba.* Therefore in this study, isolation of antibacterial compounds from plant leaf parts and antibacterial activity test against bacterial pathogen causing skin diseases are needed.

MATERIAL AND METHODS

Material

The research specimen is *S. alba* collected from Dulupi village, Boalemo district, Gorontalo province, Indonesia in july 2016. The chemicals used in this research were ethyl acetate, *n*-hexane, methanol, distilled water, silica gel G60 (70-320 mesh), thin layer chromatography (TLC), silica plate, octadecylsilane (ODS) RP-18, 10% H_2SO_4 in ethanol, alcohol 70%, ciprofloxacin 100 ppm, amoxylin 100 ppm, bacto agar, and Mueller-Hinton agar.

Instrumentation

Spectrum measurements were performed using a variety of spectroscopy tools. Infrared (IR) spectra were measured with Shimadzu FTIR, ^{1}H and ^{13}C-NMR spectra were measured using JEOL JNM A-500 which works at 500 MHz (for ^{1}H-NMR spectrum) and at 125 MHz (for ^{13}C-NMR spectrum) with TMS as an internal standard, ES-MS spectrometry (UPLC MS/MS TQD type Waters) and laminar air flow.

Extraction and Purification

Dried leaves of *S. alba* (240 g) was extracted successively with methanol 96% (3 × 24 hours), followed by filtration. The filtrates

were combined and evaporated by rotary evaporator at a temperature of 45°C using a buchi rotary evaporator to give a residu. Concentrate of methanol extract obtained as much 13 g of a gummy concentrate of the crude extract.

The methanol extract (10 g) was subjected to liquid chromatography over silica gel using a gradient elution mixture of n-hexane-EtOAc (10:0-0:10) as an eluting solvent, yielding 7 fractions (A–G). Fraction C (0.15 g) was subjected to column chromatography over silica gel using a mixture of n-hexane :EtOAc (9:1) as an eluting solvent, affording 30 fractions (E01–E30) and give pure isolated. The purification results of these compounds were determined by TLC on silica gel and ODS with several solvent systems and showed a single spot.

Chromatographic Separation

The column was packed with fine TLC grade siliga gel G60 was used as the packing material. A column having 50 cm leght and 5 cm in diameter was packed with the silica gel G60 under reduced pressure. The column was washed with methanol and then with n-hexane to facilitate compact packing. The methanol extract was subjected to column chromatography. The column was then eluted using n-hexane (150 mL) followed by mixture of *n*-hexane-ethyla cetate (10:0-0:10). A total of 10 fractions (A-J) were collected each in 250 mL beakers.

The fraction C (0.15 g) was subjected to column chromatography over silica gel (Kieselgel G60, mesh 70-230) using a mixture of n-hexane :Ethyl acetate (9:1) as an eluting solvent, affording 30 fractions (C01–C30). Fraction C19 was found to yield crystal on the wall of the beakers. The crystals were washed with n-hexane carefully. As a result mother solution was obtained leaving back the needle shape crystals which were isolate as compound. The purification results of compound were determined by TLC on silica gel and ODS with several solvent systems and showed a single spot (>95% pure).

Test for Triterpenoid with Liebermann-Burchard Reaction

A few crystals of compound 1 and 2 were dissolve in chloroform and a few drops of concentrated sulfuric acid were added to it followed by the addition of 2-3 drops of anhydride acetid. In this case isolated compound turned to violet blue and finally formed green color which indicates the presence of triterpenoid[10].

Characterization compound

Different spectroscopic methods were used to elucidate the structure of isolated compound. Among the spectroscopic techniques IR, ^{1}H and ^{13}C-NMR, HMQC, HMBC and H-H COSY were carried out. The infrared spectrum was recorded on Shimadzu affinity-1, ^{1}H and ^{13}C-NMR spectra were recorded using $CDCl_3$ as solvent on JEOUL NMR 500 MHz spectrometer.

Isolated compound : white needles. IR (KBr) U_{max} /cm^{-1}: 3590, 2935, 1687, 1462, 1385, 1236, and 897. ^{1}HNMR (500 MHz, $CDCl_3$) δ: 2.22 (2H, m, H1), 1.65 (2H, m, H2), 3.15 (1H, dd, J 15.0, 8.4 Hz, H3), 0.70 (1H, d, H5), 1.42 (2H, m, H6), 1.44 (2H, m, H7), 1.07 (1H, H9), 140 (2H, m, H11), 1.41 (2H, m, H12), 0.75 (1H, s, H13), 1.20 (2H, m, H15), 1.39 (2H, m, H16), 0.96 (1H, d, H18), 2.23 (1H, d, H19), 2.25 (2H, m, H21), 2.22 (2H, m, H22), 0.94 (3H, s, H23), 0.96 (3H, s, H24), 0.85 (3H, s, H25), 0.75 (3H, s, H26), 1.00 (3H, s, H27), 1.59 (3H, s, H28), 4.58 & 4.60 (2H, s, H29), 1.69 (3H, s, H30). ^{13}CNMR (125 MHz, $CDCl_3$) δ: 39.7 (CH_2, C1), 28.1 (CH_2, C2), 79.7 (CH, C3), 40.1 (C_q, C4), (CH, C5), 19.6 (CH_2, C6), 35.7 (CH_2, C7), 43.3 (C_q, C8), 56.9 (CH, C9), 38.4 (Cq, C-10), 26.9 (CH_2, C11), 28.8 (CH_2, C12), 40.2 (CH, C13), 48.6 (C_q, C14), 30.9 (CH_2, C15), 38.3 (CH_2, C16), 49.2 (C_q, C17), 52.1 (CH, C18), 50.5 (CH, C19), 152.2 (C_q, C20), 35.5 (CH_2, C21), 42.2 (CH_2, C22), 31.8 (CH_3, C23), 16.2 (CH_3, C24), 16.9 (CH_3, C25), 16.7 (CH_3, C26), 15.2 (CH_3, C27), 19.5 (CH_3, C28), 110.2 (CH_2, C29), 22.2 (CH_3, C30).

Antibacterial Activity Test

The antibacterial activity test was conducted using the Kirby-Bauer method, where in the bacterial growth inhibition zone was used as a parameter to determine the antibacterial activity. Bacteria that have grown on solid media were given a test compound solution on a paper disk with concentration: 100 µg/ml. Ciprofloxacin was used as a positive control at a concentration of 100 µg/ml for *P. aeruginosa* and amoxylin 100 µg/ml for *E. coli* and *S. aureus* in the solvent water, and methanol/water are used as negative controls (3:1). After the incubation for 24 hours at a temperature of 35-37 °C in aerobic and anaerobic, clear zone around the paper disk which has been given a test solution (test compound, positive control and negative control), was observed and measured using calipers). This clear zone indicates the bacterial growth inhibition zone produced by the test compound[11,12].

RESULT AND DISCUSSION

The leaves of *S. alba* was dried and successively extracted with methanol 96%. Therefore, the subsequent phytochemical analysis was focused on the methanol extract, which was chromatographed over a coloumn packed with silica gel G60 with gradient elution. The fractions were repeatedly subjected to normal-phase and reverse-phase column chromatography, yielding one triterpenoid pentacyclic (Figure 1). The compound (20 mg), appeared as white needles.

Spectral data

The IR spectrum (KBr) of isolated showed characteristic absorption frequencies at 3590 and 1236cm^{-1} typical of the O-H stretching and C-O bond vibrations respectively; The C-C vibrations was at 1687 cm^{-1}. The absorption observed at 897cm^{-1} was due to an unsaturated out of plane C-H vibration; stretching and bending vibrations due to methyl groups were represented by the bands at 2935cm^{-1} and 1462cm^{-1} and the signal at 1385cm^{-1} was due to methylenic vibration (cycloalkane) [13,14].

The ^{1}H-NMR spectrum of compound showed the presence of seven singlet methyl protons at δ 0.75, 0.85, 0.94, 0.96, 1.00, 1.59 and 1.69 ppm. Isolated compound also showed protons at δ 2.23 ppm ascribable to 19β -H is indicated of lupeol. The H-3 proton showed a multiplet at δ 3.15 ppm while a pair of broad singlets at δ 4.58 and δ 4.60 (1H, each) was indicative of olefinic protons at (H-29). The methylene proton Sp^3 showed at δ_H 1.20, 1.39, 1.40, 1.41, 1.42, 1.44, 1.65, 2.22, and 2.25 ppm. These assignments are in good agreement belonging the structure of lupeol[14-16].

The ^{13}C-NMR spectrum showed seven methyl groups at δ: 31.8 (C-23), 19.5 (C-28), 16.8 (C-25), 16.7 (C-26), 16.2 (C-24), 15.2 (C-27) and 22.2 (C-30); the signals due to an exomethylene group at δ: 110.2 (C-29) and 152.0 (C- 20). The DEPT 135º indicated and belonging to ten methylene, five methine and five quaternary carbons were assigned with the aid of DEPT 135º spectrum[15,16]. The deshielded signal at δ 79.0 was due to C-3 with a hydroxyl group attached to it. The confirmation of the structure of isolated was accomplished through the 2D-NMR experiments (COSY and HMBC).

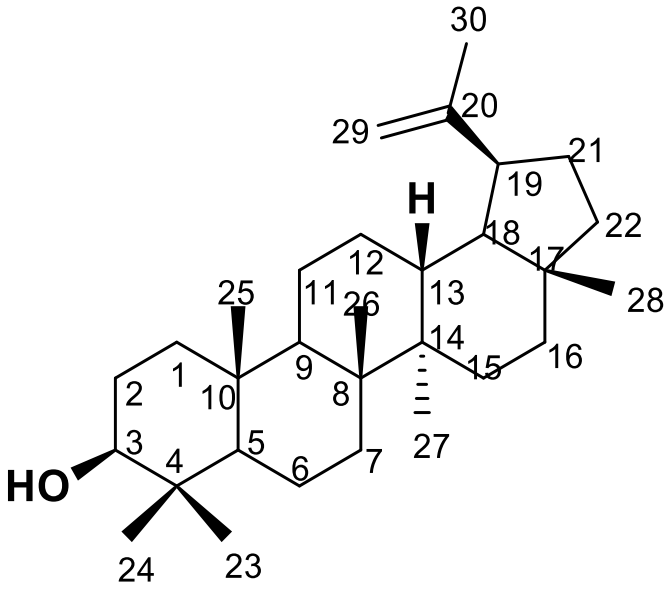


Figure 1. Structure of isolated compound: Lup-20(29)-en-3*β*-ol)

Table 1. NMR data (500 MHz for ^{1}H and 125 MHz for ^{13}C, in CDCl3) for isolated compound and Compared with references

Position C	^{13}C-NMR δ_C (ppm)	DEPT 135°	^{1}H -NMR δ_H (Int., mult)	^{13}C-NMR δ_C (ppm) ref.	^{1}H -NMR δ_H (Int., mult) ref.
1	39.7	CH_2	2.22 (2H, *m*)	38.0	2.37 (2H, *m*)
2	28.1	CH_2	1.65 (2H, *m*)	25.3	1.65 (2H, *m*)
3	79.7	CH	3.15 (1H, *dd*)	78.4	3.20 (1H, *dd)*
4	40.1	Cq	-	38.6	-
5	57.7	CH	0.70 (1H, *d*)	55.1	0.69 (1H, *d*)
6	19.6	CH_2	1.42 (2H, *m*)	18.1	1.42 (2H, *m*)
7	35.7	CH_2	1.44 (2H, *m*)	34.1	1.43 (2H, *m*)
8	43.7	Cq	-	41.2	-
9	56.9	CH	1.07 (1H, *d*)	49.7	1.06 (1H, *d*)
10	38.4	Cq	-	37.3	-
11	26.9	CH_2	1.40 (2H, *m*)	21.1	1.40 (2H, *m*)
12	28.7	CH_2	1.41 (2H, *m*)	27.5	1.41 (2H, *m*)
13	40.2	CH	0.75 (1H, *s*)	39.2	0.76 (1H, *s*)
14	48.6	Cq	-	42.6	-
15	30.9	CH_2	1.20 (2H, *m*)	27.6	1.22 (2H, *m*)
16	38.3	CH_2	1.39 (2H, *m*)	35.6	1.38 (2H, *m*)
17	49.2	Cq	-	43.2	-
18	52.1	CH	0.96 (1H, *d*)	48.2	0.97 (1H, *d*)
19	50.5	CH	2.23 (1H, *d*)	47.8	2.38 (1H, *d*)
20	152.2	Cq	-	151.6	-
21	35.5	CH_2	2.25 (2H, *m*)	30.2	2.40 (2H, *m*)
22	42.2	CH_2	2.22 (2H, *m*)	40.2	2.39 (2H, *m*)
23	31.8	CH_3	0.94 (3H, *s*)	28.2	0.91 (3H, *s*)
24	16.2	CH_3	0.96 (3H, *s*)	16.0	0.94 (3H, *s*)
25	16.8	CH_3	0.85 (3H, *s*)	16.8	0.74 (3H, *s*)
26	16.7	CH_3	0.75 (3H, *s*)	16.4	0.78 (3H, *s*)
27	15.2	CH_3	1.00 (3H, *s*)	15.1	1.06 (3H, *s*)
28	19.5	CH_3	1.59 (3H, *s*)	18.0	1.59 (3H, *s*)
29	110.2	CH_2	4.58 & 4.60 (2H, *s*)	108.6	4.56 & 4.70 (2H, *s*)
30	22.2	CH_3	1.69 (3H, *s*)	19.5	1.72 (3H, *s*)

Table 2. Antibacterial activity test result

Bakteri	lupeol compound (mm)	Positive control (mm)	Negative control (mm)
S. aureus	18	22	0
P. aeruginosa	14	25	0
E. coli	13	22	0

The ^{1}H-^{1}H COSY spectrum is used to identify protons that are correlated with three bond spacing. COSY spectrum of isolated compound indicates peaks such as between δ 2.23, H-19 and one Sp^3 methylene proton signal (δ 2.25, H-21) and another Sp^3 methine proton signal (δ 0.96, H-18); and oxygenated methine proton signal belonging to (δ 1.69, H- 30 and Sp^3 methylene signal (δ 1.65, H-2)[16-19].

The HMBC spectrum used to determine the correlation between proton and carbon from two to three bonds (2J and 3J). From the spectrum it can be observed that H-13 (δH = 0.75 ppm) correlates with C-12 (δC = 28.7 ppm), H-26 (δH = 0.75 ppm) has a correlation with C-10 (δC = 38.4 ppm), H-23 (δH = 0.95 ppm) has a correlation with C-24 (δC = 16.2 ppm), and H-28 (δH = 1.0 ppm) has correlation with C-15 (δC = 30.9 ppm). The pair of broad singlets of olefinic proton at δ_H 4.58 and 4.60 showed cross peaks with a methylene carbon signal [δ 50.5 (C-19) and δ 22.2 (C-30)] by J3 correlation. The forgoing spectral analysis and comparison with reported data (table 1), led us to propose the structure of isolated compund as lupeol, a pentacylic triterpenoid, (figure 1) below.

Antibacterial Test Result

The results of antibacterial activity testing of isolated compound based on the inhibition zone of isolated compounds on bacterial growth of *Staphylococcus aureus, Pseudomonas aeruginosa* and *Escherichia coli* is shown in Table 2.

Different responses from three classes of bacteria to isolated compounds is caused by differences in sensitivity in Gram positive bacteria (*S. aureus* and *E. coli*) and Gram negative bacteria (*P. aeruginosa)* against isolated compound. Gram-positive bacteria tend to be more sensitive to antibacterial components. This is caused by the Gram positive cell wall structure is simple making it easier for the antibacterial compounds to enter the cells and to find goals for work.

Lupeol compound were successfully isolated is a compound of the triterpenoid group. Triterpenoids are compounds that the carbon framework is derived from six isoprene units and synthesized derived from C hydrocarbons 30 acyclic, which is skualena. Based on literature review, triterpenoid group compounds and steroids has antibacterial activity with the mechanism of action inhibiting synthesis protein[20-21].

CONCLUSION

In this research we successfully isolated pentacyclic triterpenoid compound Lup-20(29)-en-3*β*-ol) from methanol extract of leaves *Sonneratia alba.* The result of antibacterial activity test showed that isolated compound effectively inhibited the growth of these bacterial pathogens with inhibition zone 18 mm for *Staphyloccocus aureus,* 14 mm for *Pseudomonas aeruginosa*, and 13 mm for *Escherichia coli.* This is the first report of isolation lupeol compound from the leaves of *Sonneratia alba* and test antibacterial activity against pathogens bacteria of this species.

ACKNOWLEDGEMENTS

The author thank the ministry of research and higher education of the Indonesia Republic for funding this collaboration (RISTEKDIKTI) and Mrs. Fajriah, M.Si as well as Dr. Achmad, M.Si for their help in conducting the NMR spectrum measurement.

REFERENCES

1. Prabhu VV & Guruvayoorappan C. Phytochemical screening of methanolic extract of mangrove *Avicennia marina* (Forssk.) Vierh. Der Pharmacia Sinica, 2012; 3(1): 64-67.
2. Setyawan AD, Winarno K, Purnama PC. Mangrove Ecosistem in Java: Restorasi. Biodiversitas. 2003; 5(2): 105-118.
3. Wu J, Xiao Q, Xu J, Li MY, Pana JY, Yang M. Natural products from true mangrove flora: source, chemistry and bioactivities. Natural Product Report, 2008; 25: 955-981.
4. Harizon, Pujiastuti B, Kurnia D, Sumiarsa D, Shiono, Y. Triterpenoid lupan from stem bark of *Sonneratia alba.* Bionatura. 2014 march 1; 16 (1):25-29.
5. Ramanathan T, Shamugapriya R, Renugadevi G. Phytochemical characterization and antimicrobial effiency of mangrove plants Avicennia marina and Avicennia officianalis. Int. J. Pharm&Bio. 2012; 3(2): 348-351.
6. Khafagi I, Gab-Alla A, Salama W, Fouda M. Biological activities and phytochemical constituent f the gray mangrove *Avicennia marina* (Forssk.) Vierh. Egyptian J. of Biology, 2003; l(5): 62-69.
7. Kumar VA., Ammani K, Siddhardha B. In vitro antimicrobial activity of leaf extract of certain mangrove plants collected from Godavari estuarine of Konaseema delta, India. Int. J. Med. Arom. Plants. 2011; 1(2): 132-136.
8. Abeysinghe PD, Wanigatunge RP, Pathirana RN. Evaluation of antibacterial activity of different *mangrove* plant extracts. Ruhuna Journal of Science, 2006; 1: 104-112.
9. Singh, G. S. and Pandeya, S. N. 2011. Natural product in discovery of potential and safer antibacterial agent. *Natural product in medicinal chemistry*. 63-101: 978-81-308-0448-4.
10. Harbone, J B. Phytochemical Methods: A Guide to Modern Techniques of Plant Analysis. 3rd Edn., Chapman and Hall, London, 1998; 302:129-138.
11. Wang XY, Tang GH, Yuan CM, Zhang Y, Zou T, Yu C, Qing Z. Aphagrandinoids A-D, cycloartane triterpenoids with antibacterial activities from *Aphanamixis grandifolia.* Fitoterapia.2013; **85**: 64-68.
12. Gaekwak I, Vinchurkhar AS. Isolation and identification of nicotine bacterial species from tobacco leaves. Int. Research.J.of Pharm. 2018; 9(1):103-106.
13. Shu Y, Liu Y, Feng, Lou B, Zhou X, Wu H. Antibacterial Activity Of Quercetin On Oral Infectious Pathogens. Shicuan University. African Journal Of Microbiologi Research. 2011; **5**(30).
14. Martins D, Carrion LL, Ramos DF, Salome KS, Silva PEA, Barison A, Nunes CV. Triterpenes and antimicrobial of *Durorra macopyhlla* Huber (*Rubiaceae*). BioMed. Research Internationa., 2013; 7: 60583.
15. Ayotollahi AM, Ghanadian M, Afsaridove S, Abdella OM, Murzai M, Aiskan G. Pentacyclic triterpenes in Euphorbia

microsciadia with their T-Cell profiration activity. Irian journal of pharmaceutical. 2011; 10 (287-294).
16. Abdullah SM, Musa AM, Abdullah MI, Sule M, Sany YM. Isolation of lupeol from the steam bark of *Lonchocarpus sericeus*. Sch. Acad, J. Brosci. 2013; 1(1): 18-19.
17. Prakash CV & Prakash I. Isolation and structural characterization of lupane triterpenes from *Polypodium vulgare*. Res. J. Pharm. 2012; 1(1): 23-27.
18. Saha S, Subrahmanyam EVS, Kodangala C, Shastry S. Isolation and characterization of triterpenoids and fatty acid ester of triterpenoid from leaves of *Bauhinia variegata*. *Der Pharma Chemica*. 2011; 3(4): 28-37.
19. Wal A, Wal P, Rai AK, Raj K. Isolation and modification of pesudohybrid plant (lupeol). J. Pharm. Sci. & Res.2010; 2(1):13-25.
20. Babalola IT, Shode FO. A potencial pentaciclic triterpene natural product. Phyto journal. 2010; 2(2): 2278-4136.
21. Vogt T. Phenylpropanoid Biosynthesis. Molecule. Plant.J. 2010; 3(1): 2-20.

Cite this article as:

Weny JA. Musa *et al*. Isolation and characterization triterpenoid compound from leaves mangrove plant (*Sonneratia Alba*) and antibacterial activity test. Int. Res. J. Pharm. 2018;9(3):85-89 http://dx.doi.org/10.7897/2230-8407.09347

Source of support: Ministry of Research and Higher education of the Indonesia Republic, Conflict of interest: None Declared

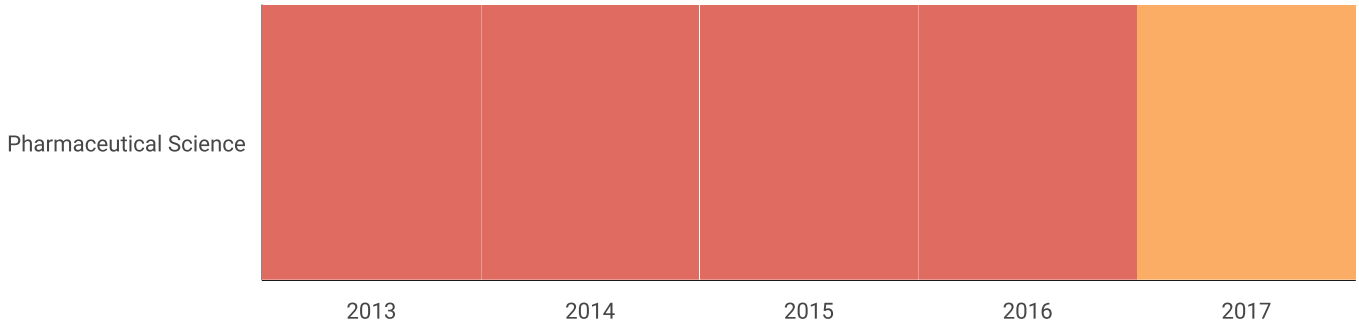
International Research Journal of Pharmacy

Country	India
Subject Area and Category	Pharmacology, Toxicology and Pharmaceutics Pharmaceutical Science
Publisher	Moksha Publishing House
Publication type	Journals
ISSN	22308407
Coverage	2012, 2014-ongoing

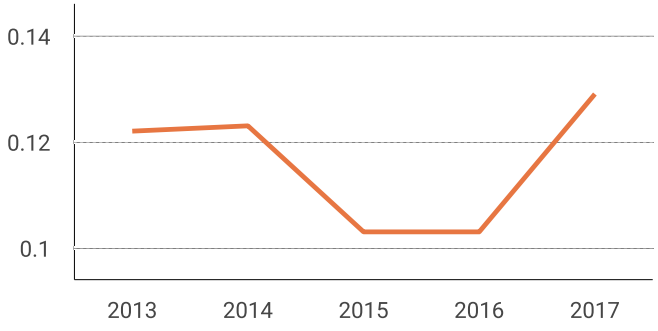
1

H Index

Quartiles

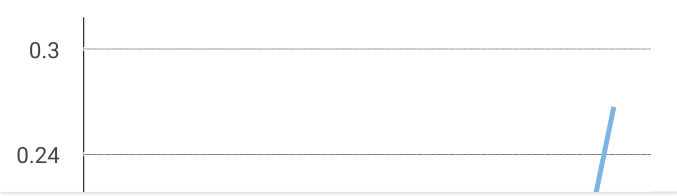


SJR

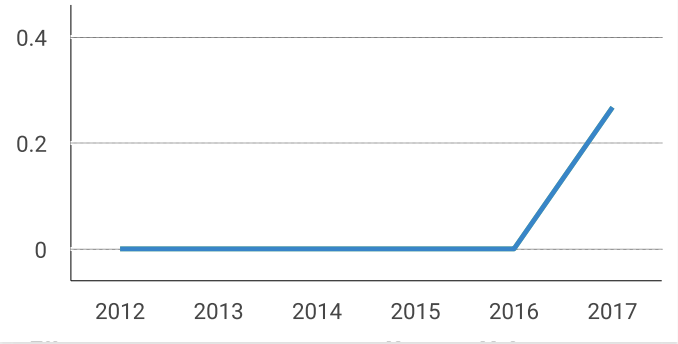


Citations per document

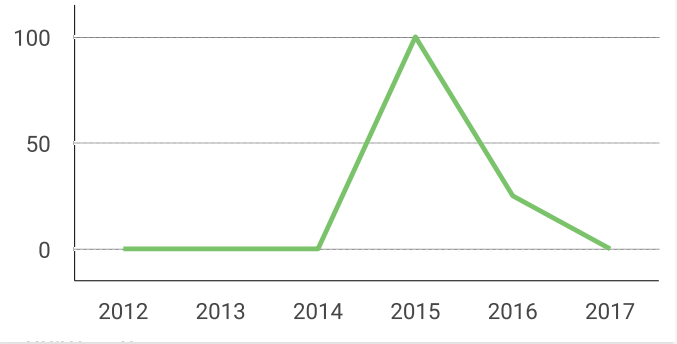
Total Cites Self-Cites



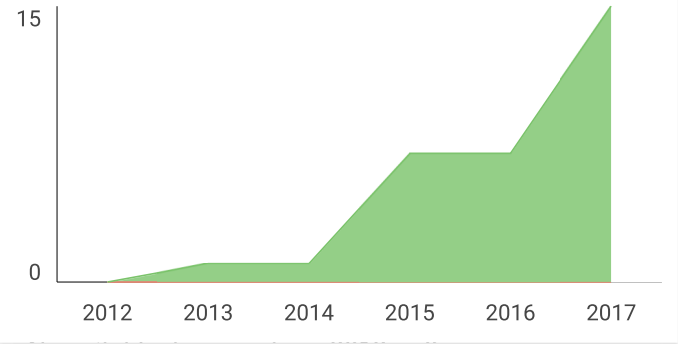
External Cites per Doc Cites per Doc



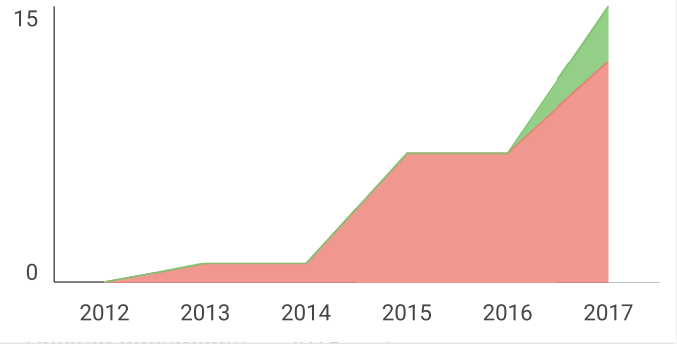
% International Collaboration



Citable documents Non-citable documents



Cited documents Uncited documents



← Show this widget in your own website

Just copy the code below and paste within your html code:

<a href="http://www.scimag

Developed by:

Powered by:

Follow us on @ScimagoJR

EST MODUS IN REBUS

Horatio (Satire 1,1,106)