

PAPER • OPEN ACCESS

Potential of methanol extract from the stem bark of mangrove *Rhizophora mucronata* against bacteria *Escherichia coli* and *Aeromonas hydrophilla*

To cite this article: Mahmiah *et al* 2018 *IOP Conf. Ser.: Earth Environ. Sci.* **162** 012030

View the [article online](#) for updates and enhancements.



IOP | ebooks™

Bringing you innovative digital publishing with leading voices to create your essential collection of books in STEM research.

Start exploring the collection - download the first chapter of every title for free.

Potential of methanol extract from the stem bark of mangrove *Rhizophora mucronata* against bacteria *Escherichia coli* and *Aeromonas hydrophilla*

Mahmiah¹, Gimam¹, Nanik Siti Aminah², Mulyadi Tanjung²

¹ University of Hang Tuah Surabaya, Indonesia

² Faculty of Science and Technology, University of Airlangga, Indonesia

E-mail: mahmiah@hangtuah.ac.id

Abstract. *Escherichia coli* and *Aeromonas hydrophilla* are well known pathogenic bacteria causing diseases in both human and animals. Since the popular antibacterial drugs in the market lead to resistance, other alternatives antibacterial need to be searched from the active ingredient found in marine and terrestrial vegetation. The potential use of secondary metabolites from marine vegetation is currently being developed. One of marine vegetation that has been expected to have antibacterial activity is mangrove. This study aims to provide information related to the phytochemical and antibacterial activity of methanol extract of the bark of mangrove *Rhizophora mucronata*. The phytochemical screening and disc testing methods were used in this study. The results showed that the methanol extract of *R. mucronata* contained phenolics, alkaloids, and terpenoids. Furthermore, the positive outcome of active antibacterial potential of the methanol extract against *E. coli* and *A. hydrophilla* has been indicated by inhibition of discs in a clear zone at 7,56 and 7,00 mm.

1. Introduction

Mangrove is an estuary plant living in a high salinity habitat, influenced by temperature, wind, wave, and ocean current. This extreme environmental condition leads the plant to produce various secondary metabolite compounds that function as a protective effect to surrounding environment. The secondary metabolite compounds contained in these mangroves can potentially be developed as antibacterial, antiviral, and antioxidant agents. [1] explains that mangrove plants in Indonesia are the largest in the world, both in terms of territory ($\pm 42,550 \text{ km}^2$) and number of species (± 45 species). On the basis of this mangrove, Indonesia certainly has a high species diversity and possibly potential as a medicinal material.

Escherichia coli and *Aeromonas hydrophilla* are pathogenic bacteria causing various diseases in human, fish and other animals. The use of antibiotic drugs such as chloramphenicol has been proven to cause resistance to these bacteria. Therefore, it is necessary to develop alternative antibiotics as antibacterial agents derived from terrestrial and aquatic plants.

One of the alternative aquatic plants that have antibacterial potentials is mangrove plant. Research on antibacterial activity of mangrove plants has been shown on the leaves extract of *Avicennia marina* and *R. stylosa* living in Sudanese waters. These plants demonstrated the potential reactions to inhibit the activity of *E. coli* and *Candida albicans*. The antibacterial activity of the plants was suspected



because of the secondary metabolite compounds; tannins, alkaloids, flavonoids, steroids, and glycosides contained in extract of *A. marina* and *R. stylosa* [2].

One of the mangroves living in East-coast Shore of Surabaya (Pamurbaya), East Java, Indonesia is *R. mucronata*. This mangrove species is a true mangrove commonly found and ethno-botanically utilized some parts of the plant as a pain reliever and natural wood dye by the surrounding community [3]. This study focused on finding alternative utilization of methanol extract of plant stem bark of *R. mucronata* in inhibiting the activity of *E. coli* and *A. hydrophilla* bacteria.



Figure 1. *Rhizophora mucronata*

2. Method

2.1. Materials Research

Dry samples of mangrove rod bark of *R. mucronata* were collected from Pamurbaya area, Surabaya, East Java. The taxonomic test of *R. mucronata* sampling was conducted at Purwodadi Botanical Garden. The chemicals used in the extraction process include pro-analyzed (p.a) and technical organic solvents which has been distilled such as methanol, ethyl acetate, ethanol and n-hexane. The materials for antimicrobial assays include agar media, *E. coli* and *A. hydrophilla* bacteria.

2.2. Extraction

Methanol solvent was used in extraction of *R. mucronata*'s stem bark. This solvent was chosen because it is a universal solvent which can dissolve all the active ingredients of secondary metabolite compounds.

2.3. Antibacterial Bioactivity Test

The method used in the antimicrobial test is the disc diffusion method (agar diffusion method) with pour order.

2.4. GC-MS Analysis of Methanol Extract *R. mucronata*

Methanol extract of *R. mucronata*'s stem bark was analyzed using GC-MS HP 6890. 1 μ L sample was injected into GC-MS operated using capillary model number agilent column 19091S-433 HP-5MS 5% Phenyl Methyl Siloxane, 30 m long, diameter 250 μ m, and 0.25 μ m thickness. The oven temperature was programmed between 100-220 $^{\circ}$ C with a temperature rise rate of 15 $^{\circ}$ C / min, a 10.5 psi pressure helium carrying gas, a total rate of 140 mL / min and a split ratio of 1:50.

3. Results

R. mucronata is one of the many mangroves living in the East-coast of Surabaya. The utilization of mangrove stem part of *R. mucronata* in this research was based on chemotaxonomic study of secondary metabolite compounds from the mangrove. The extraction process of secondary metabolite

compound from *R. mucronata*'s bark was performed by maceration method using methanol solvent at room temperature.

A total of 1.005 kg *Rhizophoramucronata*'s bark powder was proceeded in maceration method by immersing the powder with methanol solvent for 3 (three) days. The extraction obtained as much as 235.0543 g brown paste-shaped. The antibacterial activity of methanol extract of *R. mucronata* in this research was conducted to measure the ability of the extract in controlling microorganism / bacterium of *A. hydrophilla* and *E. coli*. Chloramphenicol 1% was used as comparator. The 1% dosage of chloramphenicol is the usual dosage in antibacterial (antibiotic) drugs production.

3.1. Antibacterial activity of extract on *A. hydrophilla*

A. hydrophilla is one of the bacteria causing disease in fish. The existence of these bacteria cause the fish quickly suffered to the protein damage so that it quickly experience decay. The magnitude of the methanol extract inhibition zone against *A. hydrophilla* test bacteria was presented in Table 1.

Table 1. Inhibition zone diameter of methanol extract of *R. mucronata* against *A. hydrophilla*

No	Extract content (ppm)	Inhibitory rate (mm)			Average (mm)
		1	2	3	
1	100	6.65	6.55	7.8	7.00
2	200	4.45	4.15	4.75	4.45
3	400	7.65	5.2	3.75	5.53
4	600	4.05	6.8	6.6	5.81
5	800	5.95	6.85	5.75	6.18
6	1000	7.2	5.95	6.05	6.4
7	Chloramphenicol	6.25	5.05	7.3	6.28

Based on Table 1, each sample test clearly has an inhibitory activity against *A. hydrophilla*. The largest inhibitory rate was at 100 ppm of methanol extract with average inhibitory of 7.00 mm. Compared with chloramphenicol, 100 ppm of methanol extract has greater inhibitory rate. The comparison of inhibitory rate of methanol extract at various concentrations was presented in Fig. 2.

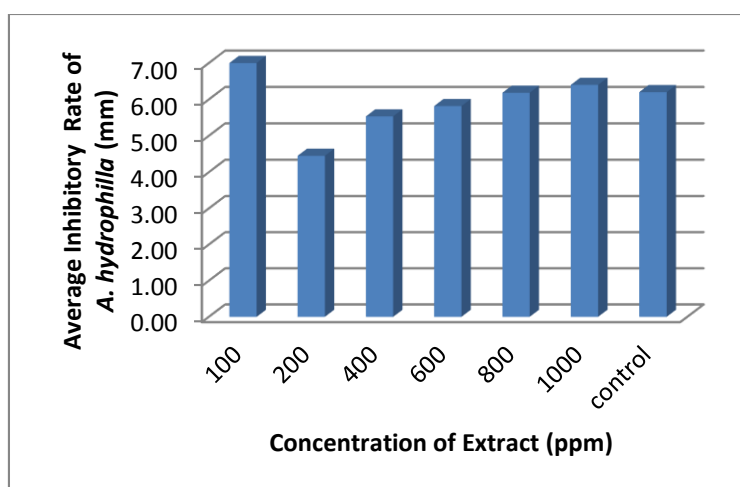


Figure 2. Comparison of concentration test against *A. hydrophilla* inhibition zone

According to [4], the formation of inhibition zone is a measurement of the strength of an antimicrobial agent against the examined bacteria. The resistance around the disc depends on the absorption capacity of the used active ingredient. If the antibacterial agent positively inhibit, the bacterial growth will stop. This condition was indicated by the clear circle around the disc that is not overgrown with bacteria after incubated for 18-24 hours.

3.2. Antibacterial activity of extract on *E. coli*

E. coli is one of the many types of bacteria found in fresh water. Consuming the bacterial-contaminated food or beverages can cause gastrointestinal diseases. The magnitude of methanol extract inhibition zone against *E. coli* was shown in Table 2.

Table 2. Inhibition zone diameter of extract methanol of *R. mucronata* bark against *E. coli*

No	Concentration	Inhibitory rate (mm)			Average (mm)
		1	2	3	
1	100	8.65	6.15	6.95	7,23
2	200	5.05	7.8	8.45	7,1
3	400	8.15	6.85	6.5	7.16
4	600	6.3	7.7	5.45	6.48
5	800	8.25	6.5	5.75	6.8
6	1000	8.65	6.85	7.2	7.56
7	Chloramphenicol	8.15	7.95	6.4	7.56

Based on table 2, it was recorded that the extract has an inhibition zone diameter of > 6 mm which means that the test material show positive activity in inhibiting the growth of *E. coli*. The highest concentration was seen at 1000 ppm with 7.56 ppm inhibition as well as chloramphenicol positive control was. Inhibitory rate comparison of methanol extract at various concentrations is shown in Fig. 3.

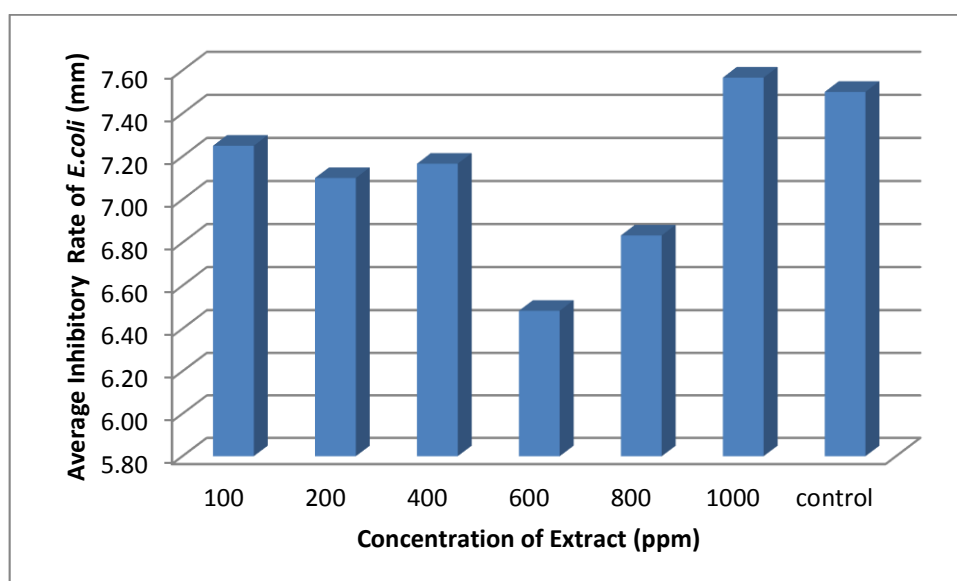


Figure 3. Comparison of concentration test against *E. coli* inhibition zone

The size of the inhibition areas produced by *R. mucronata* extract might be affected by the sensitivity of the organism, culture medium, incubation conditions and agar diffusion rate. This was in accordance with a statement that suggests factors affecting the speed of diffusion, they are; the concentration of microorganisms, the composition of the media, the incubation temperature and the incubation time [5]

The inhibitory zone differentiations produced by each extract can be affected by differences of the active ingredients content in each extract. The active compound will diffuse into the agar and will result in a concentration gradient. The highest concentration occurs in the area near the paper disc and decreases with increasing distance from the paper disc [5].

3.3. The content of secondary metabolite compounds of methanol extract of *R. mucronata*

Based on GC-MS chromatogram data (Fig. 4) it is known that there are 25 secondary metabolite compounds contained in methanol extract of *R. mucronata* stem bark.

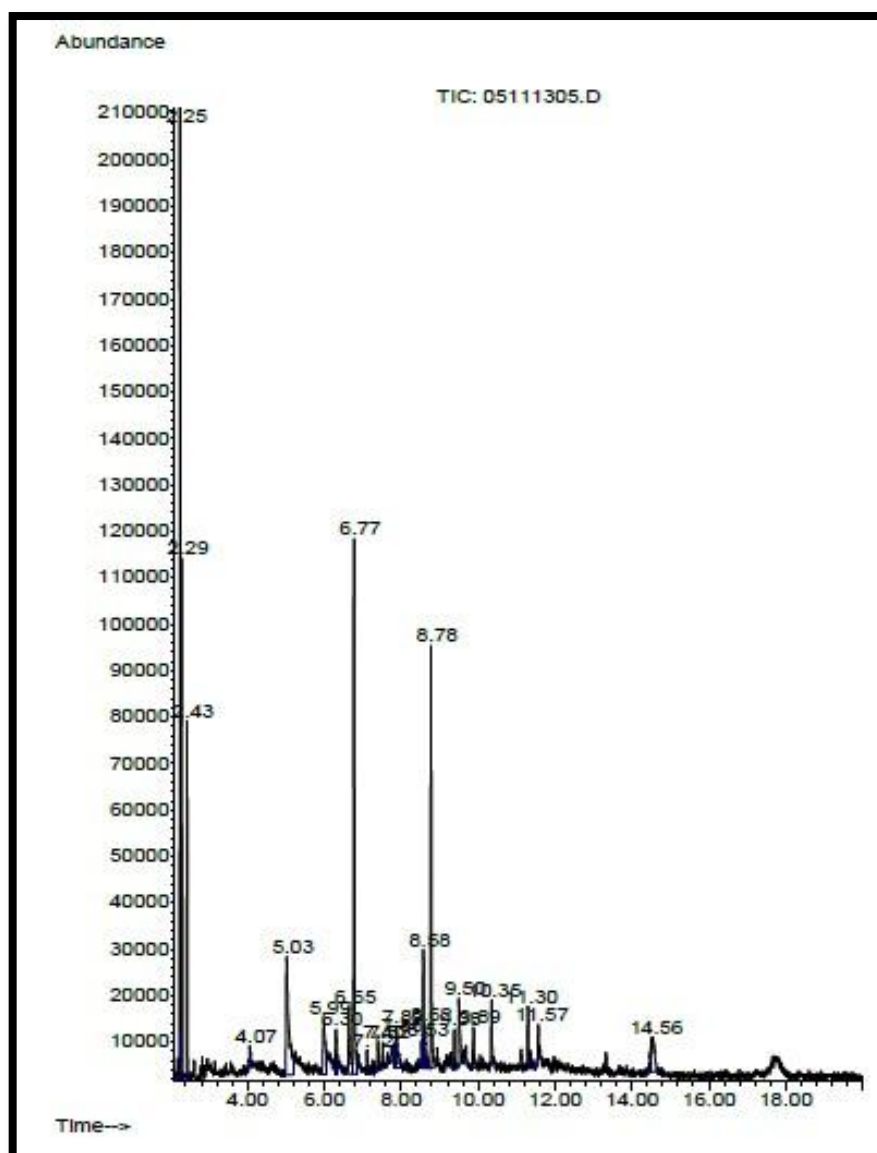


Figure 4. GC chromatogram of *R. mucronata* stem bark extract

The 25 secondary metabolite compounds contained in *R. mucronata* stem bark extract in accordance with the GC-MS tool literature are presented in Table 3.

Table 3. GC-MS literature of secondary metabolite compounds contained in *R. mucronata* bark extract

<i>No</i>	<i>Compound name</i>	<i>RT</i>	<i>% Area</i>
1	Benzene, ethyl- (CAS) \$\$ EB \$\$...	2,25	16,00
2	Benzene, 1,3-dimethyl- (CAS) \$\$...	2,29	8,63
3	XYLENE	2,43	6,86
4	3-Cyclohexene-1-carboxaldehyde,...	4,06	0,78
5	Phenol, 2-ethoxy- (CAS) \$\$ Guet...	5,03	9,05
6	1,2-Benzenediol, 4-methyl-	5,99	3,53
7	Phenol, 3-methyl-5-(1-methyleth...	6,30	2,01
8	Benzaldehyde, 4-hydroxy-	6,65	2,96
9	TRANS-2-(1-PENTENYL)FURAN	6,78	14,29
10	Vanilin	7,11	0,65
11	1,4-Benzenediamine, N,N-dimethyl-	7,40	0,87
12	Benzoic acid, 3-hydroxy-, methy...	7,53	0,82
13	Benzenamine, 3-azido-N,N-dimeth...	7,86	0,99
14	Benzoic acid, 3-hydroxy-	7,89	1,70
15	4-Methyl-2,5-dimethoxybenzaldehyde	8,53	0,73
16	Phloroglucinol \$\$ 1,3,5-Benzene..	8,58	4,06
17	Phenol, 4-(3-hydroxy-1-propenyl...	8,62	1,34
18	2-propyl-5-vinylthiophene	8,78	11,03
19	Phenol, 2-methoxy-4-(methoxymet...	9,38	1,06
20	2-Trimethylsilyl-1,3-dithiane	9,50	3,23
21	Phenol, 4-(3-hydroxy-1-propenyl...	9,89	1,45
22	2-Hydroxy-5-methylbenzaldehyde	10,35	1,87
23	Hexadecanoic acid, methyl ester...	11,30	1,75
24	2-Methoxy-5-amino-4,6-diphenylp...	11,57	0,63
25	Di-n-octyl phthalate	14,56	3,70

The above GC-MS analysis results provide information that in the stem bark of *R. mucronata* mangrove plant obtained from the East Coast coastline Surabaya is rich of secondary metabolite compounds of phenolic, alkaloid, and terpenoid groups. These compounds are a widely used chemical in the health field as antioxidant, antibacterial, and antibiotic agents.

The decrease of bacterial population used in the testing process at all concentrations given by the test compounds showed that *R. mucronata* extract was able to suppress the growth of *A. hydrophila* and *E. coli* indicated by the increasing of inhibition zone diameter. The methanol extract inhibition

zone against *A. hydrophila* and *E. coli* was higher than that of chloramphenicol. This means that the extract is active to kill bacteria and can be used as an alternative to natural chloramphenicol.

Internal factors decreasing the density or population of bacteria is caused by *R. mucronata* extract that produce secondary metabolite compounds contained alkaloid group, or its derivatives that become inhibitors for the growth of *A. hydrophila* and *E. coli*. [6] explained that the steroid group has antibacterial activity. Alkaloids and their derivatives are also widely used as antibiotics that are able to inhibit bacterial growth [7].

4. Conclusions

The results of the research on the extract of methanol bark of *R. mucronata* obtained from the East Coast of Surabaya showed that the methanol extract was active as an antibacterial indicated by the inhibitory rate against *A. hydrophila* and *E. coli* of 7.00 and 7.56 mm. The activity of antibacterial extract is higher than that of the positive control of chloramphenicol, therefore it can be used as an alternative natural antibacterial agent. The 25 secondary metabolite compounds of phenolic, alkaloid, and terpenoid groups contained in *R. mucronata* stem bark extract. The active compounds that act as antibacterial agents are thought to belong to the alkaloids.

Acknowledgement

Special thanks to RISTEKDIKTI for the PEKERTI Grant Funding 2016.

References

- [1] Spalding M D, Ravilious C and Green E P 2001 World Atlas of Coral Reefs University of California Press Berkeley USA
- [2] Mouafi F E, Abdel-aziz S M, Bashir A A and Fyiad A A 2014 Phytochemical Analysis and Antimicrobial Activity of Mangrove Leaves (*Avicennia marina* and *Rhizophora stylosa*) Against Some Pathogens, *World Applied Science Journal* **29** (4): 547-554
- [3] Mahmiah, Gimam, Aminah N S, Tanjung and Mulyadi 2016 Antioxidant Activity of Methanol Extracts From The Stem Bark Of Mangrove Plants *Rhizophoramucronata* Surabaya: Proceeding ICMHS
- [4] Jawetz E, Melnick J L and Adelberg E A 2005 *Mikrobiologi Kedokteran* diterjemahkan oleh Mudihardi, E., Kuntaman, Wasito, E.B., Mertaniasih, N., M., Harsono, S., Alimsardjono, L., Edisi XXII, Penerbit Salemba Medika, Jakarta
- [5] Salosso Y and Jasmanindar Y 2014 Potential of Patikan Kerbau (*Euphorbia hirta*) as Antibacterial on *Aeromonas hydrophilla* and *Vibrio alginolyticus* in Fish Culture *Aquatic Science and Technology* **2**(1)
- [6] Kusmiyatidan Ni Wayan S A 2006 Uji Aktivitas Senyawa Antibakteri dari Mikroalga *Porphyridium cruentum* Indonesia: BIODIVERSITAS
- [7] Ndwigah F I, Boga H, Wamyoike W and Kachiuri R 2010 Enzymatic Activity, and Secondary Metabolites of Fungal Isolates From Lake Sonachi in Kenya Kenya: University of Agriculture and Technology



Journal of Physics: Conference Series

Country [United Kingdom](#) - [SJR Ranking of United Kingdom](#)

Subject Area and Category [Physics and Astronomy](#)
[Physics and Astronomy \(miscellaneous\)](#)

Publisher [Institute of Physics](#)

Publication type Journals

ISSN 17426588, 17426596

Coverage 2005-ongoing

Scope From 1 January 2010, IOP Publishing's open access proceedings titles no longer require authors to sign and submit copyright forms. For the following titles •Journal of Physics: Conference Series •IOP Conference Series: Materials Science and Engineering •IOP Conference Series: Earth and Environmental Science assignment of copyright forms are being replaced by a publishing licence under which authors retain their copyright. Please note that our regular journals are unaffected by this change.

[Homepage](#)

[How to publish in this journal](#)

[Contact](#)

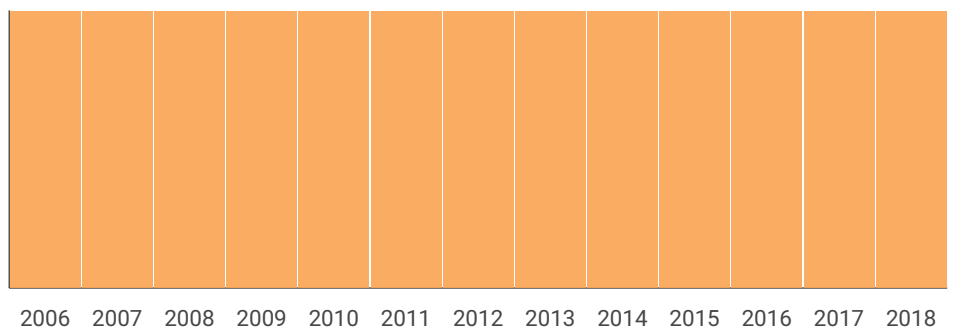
[Join the conversation about this journal](#)

65

H Index

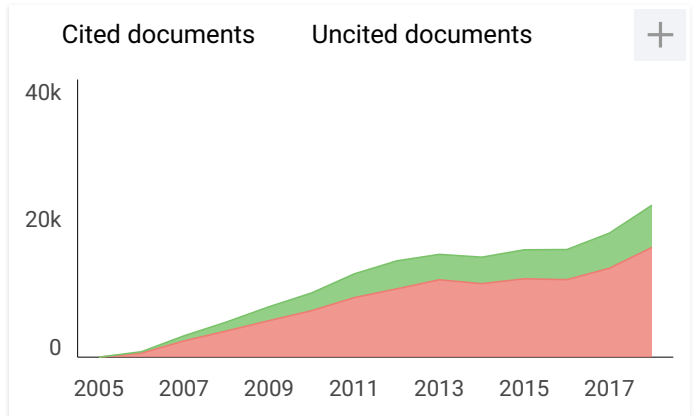
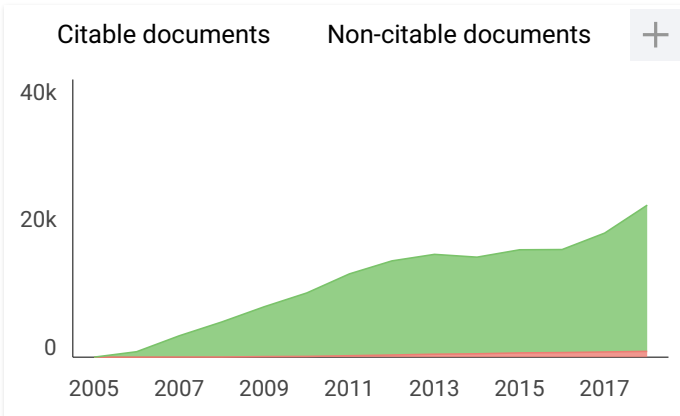
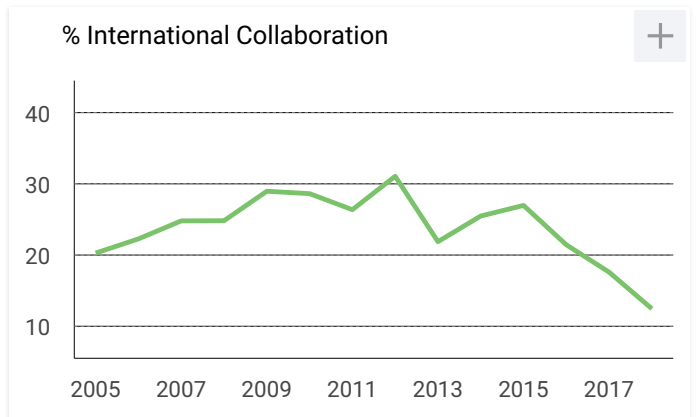
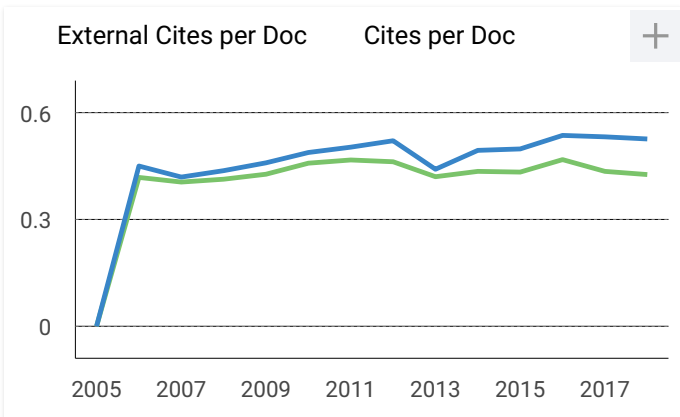
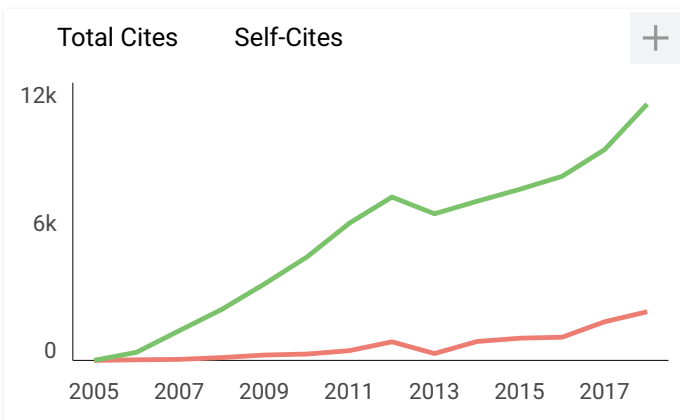
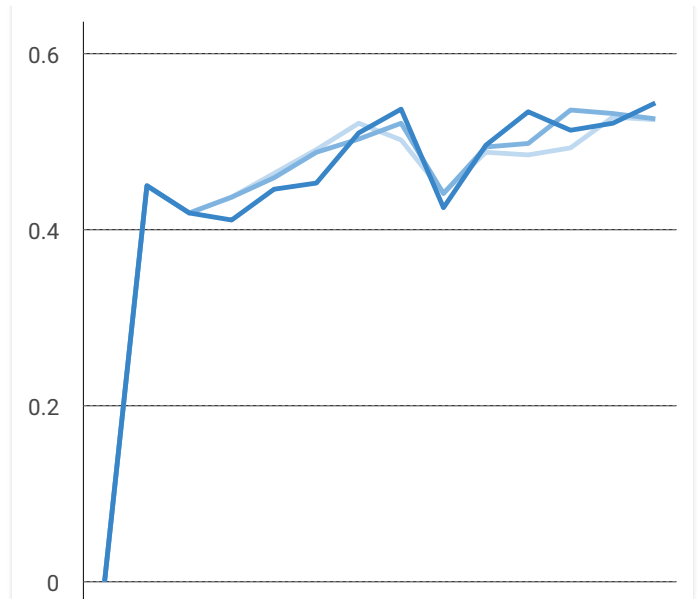
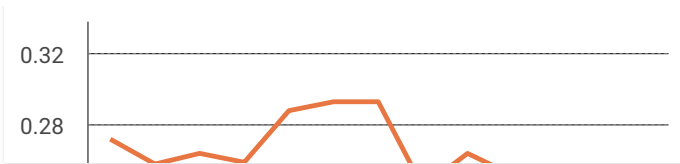
Quartiles

Physics and Astronomy (miscellaneous)



SJR

Citations per document



**Journal of Physics:
Conference Series**

Q3

Physics and
Astronomy
(miscellaneous)
best quartile

SJR 2018
0.22

powered by scimagojr.com

← Show this widget in
your own website

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

```
<a href="https://www.scimagojr
```

I'm not a robot
reCAPTCHA
Privacy - Terms

Submit

The users of Scimago Journal & Country Rank have the possibility to dialogue through comments linked to a specific journal. The purpose is to have a forum in which general doubts about the processes of publication in the journal, experiences and other issues derived from the publication of papers are resolved. For topics on particular articles, maintain the dialogue through the usual channels with your editor.

Developed by:



Powered by:



Follow us on @ScimagoJR

Scimago Lab, Copyright 2007-2019. Data Source: Scopus®

EST MODUS IN REBUS

Horatio (Satire 1.1.106)

This site uses cookies. By continuing to use this site you agree to our use of cookies. To find out more, see our [Privacy and Cookies policy](#).



Table of contents

Volume 162

2018

[◀ Previous issue](#) [Next issue ▶](#)

**1st International Conference on Maritime Sciences and Advanced Technology "Ocean Science and Technology Toward a Global Maritime Axis"
3–5 August 2017, Denpasar, Bali, Indonesia**

[View all abstracts](#)

Accepted papers received: 5 June 2018

Published online: 6 July 2018

Preface

OPEN ACCESS 011001

1st International Conference on Maritime Sciences and Advanced Technology
"Ocean Science and Technology Toward a Global Maritime Axis"

[+ View abstract](#)  PDF

OPEN ACCESS 011002








Peer review statement







[+ View abstract](#)  PDF

Papers

Ocean and Coastal Dynamics


OPEN ACCESS

- Ocean numerical model experiment on estimating the variation of volume and heat transport in Karimata strait 012001
I P Anwar, M R Putri and A Setiawan
[+](#) View abstract  PDF
-
- OPEN ACCESS** 012002
Evaluation of a global ocean general circulation model; The Lat-Lon-Cap (LLC90) configuration of the MITgcm
Bernawis Lamona, Judith Hauck and Christoph Völker
[+](#) View abstract  PDF
-
- OPEN ACCESS** 012003
The roles of mixed layer depth in affecting chemical and biological characteristics of Makassar straits, Indonesia
I C Dewi, M R Putri and A Setiawan
[+](#) View abstract  PDF
-
- OPEN ACCESS** 012004
The study of MJO impact on wave height and wind speed in Indonesian Seas
I Hilmi, N S Ningsih, I Sofian, F Hanifah and A M Rizal
[+](#) View abstract  PDF
-
- OPEN ACCESS** 012005
Integrated 3D numerical modeling during La Niña and El Niño events using Regional Ocean Modeling System (ROMS) in Makassar Strait: preliminary study
S Mubarrok, M Riza, A A Nur and I Mandang
[+](#) View abstract  PDF
-
- OPEN ACCESS** 012006
The changes of water mass characteristics using 3-dimensional Regional Ocean Modeling System (ROMS) in Balikpapan bay, Indonesia
A A Nur, I Mandang, S Mubarrok and M Riza
[+](#) View abstract  PDF
-
- OPEN ACCESS** 012007
Numerical modeling of wave-current interaction in Merak Port, Indonesia
S Nurfitri, N S Ningsih, A N Sentanu and R Rachmayani
[+](#) View abstract  PDF

-
- OPEN ACCESS** 012008
- Environmental assessment of Pari Island towards oil spill using Geographic Information System (GIS): a preliminary study
- S Nurfitri, M Raihan, M R Putri, A Setiawan, M Gade and T Pohlmann
- [+](#) View abstract  PDF
-
- OPEN ACCESS** 012009
- Image side-scan sonar segmentation for seafloor detection in Lembeh strait, Bitung, North Sulawesi
- Rina Nurkhayati, Henry M Manik, Totok Hestirianoto, Susilohadi and Delyuzar Ilahude
- [+](#) View abstract  PDF
-
- OPEN ACCESS** 012010
- Temperature-Salinity stratification in the Eastern Indian Ocean using argo float
- N P Purba, W S Pranowo, I Faizal and H Adiwira
- [+](#) View abstract  PDF
-
- OPEN ACCESS** 012011
- Monochromatic interfacial wave propagating over one and two bar(s)
- L H Wiryanto
- [+](#) View abstract  PDF
-
- OPEN ACCESS** 012012
- Numerical simulation of internal wave propagation over a variable topography
- R K Yasmin and S R Pudjaprasetya
- [+](#) View abstract  PDF
-
- Air-Sea Interaction and Climate Variability**
-
- OPEN ACCESS** 012013
- Study of coastal flooding in Kupang, East Nusa Tenggara due to Tropical Cyclone Frances (case study April 27th - 30th 2017)
- I G A P P Astiduari, T H A Rasyiid and I R Nugraheni
- [+](#) View abstract  PDF
-
- OPEN ACCESS** 012014

Characteristics of diabatic heating associated with mesoscale convective systems over Indian Ocean from radiosonde and GPS radio occultation

Khairunisa Febrina, Tri Wahyu Hadi and Noersomadi

[+ View abstract](#)  PDF

OPEN ACCESS

012015

Semiannual variation of zonal current along the equatorial Indian Ocean

Faruq Khadami, Totok Suprijo and Iskhaq Iskandar

[+ View abstract](#)  PDF

OPEN ACCESS

012016

Interannual variability of sea surface height difference between western Pacific Ocean and eastern Indian Ocean and its effect to geostrophic current in Lombok Strait

H A Rejeki, Kunarso and Munasik

[+ View abstract](#)  PDF

OPEN ACCESS

012017

Water temperature variation of Segara Anakan, Sempu Island, South Malang, Indonesia in relation to the climate variation

A Sartimbul, H Nakata, E Rohadi, S H J Sari, M Najib, S Alisafira, S N Ikhsani and D Listiyaningsih

[+ View abstract](#)  PDF

OPEN ACCESS

012018

Analysis of daily wind circulation toward sea level rise in Semarang

N Fitrianti, Y D Haryanto, E V S Simamora, H F A Bintari, A Hartoko, S Anggoro and M Zainuri

[+ View abstract](#)  PDF

Marine Disaster and Hazards & Marine Degredation

OPEN ACCESS

012019

Spatial multi criteria approach for tsunami risk assessment

Abu Bakar Sambah, F Miura, Guntur and Fuad


[+ View abstract](#)  PDF

OPEN ACCESS

012020

Critical-phase sea dike construction of NCICD program in Jakarta as national capital city

H Suprayogi, A Rudyanto, H Bachtiar and L M Limantara


[+ View abstract](#)  PDF

OPEN ACCESS

012021

Nitrate and phosphate from rivers as mitigation of eutrophication in Benoa bay, Bali-Indonesia

Y Suteja and A I S Purwiyanto

[+ View abstract](#)  PDF

Living Marine Resources (Sub-theme: Coastal Conservation, Biodiversity, Marine Pollutant, Marine Food Security and Aquaculture)

OPEN ACCESS

012022

Identification of *Decapterus sp.* potential fishing grounds in Java and Western Kalimantan Seas

Avrionesti and M R Putri

[+ View abstract](#)  PDF

OPEN ACCESS

012023

Microplastics in Sumba waters, East Nusa Tenggara

M R Cordova and U E Hernawan

[+ View abstract](#)  PDF

OPEN ACCESS

012024

Measurement and analysis of acoustic backscattering strength for characteristics of seafloor sediment in Indian Ocean WPP 572-573

Fauziah, A Priatna, W F Prakoso, T Hidayat, H Surbakti and E Nurjuliasti

[+ View abstract](#)  PDF

OPEN ACCESS

012025

Primary productivity of coastal ecosystems in the Seribu Islands (case study on Kelapa Dua Island, Pramuka Island and Pari Island)

Y A Nurrahman and S Nurdjaman


[+ View abstract](#)  PDF

OPEN ACCESS

012026

Study of biophysical status and resources support marine tourism area of mangrove in Indramayu Karangsong

Donny Juliandri Prihadi, Indah Riyantini and Mochamad Rudyansyah Ismail


[+](#) View abstract  PDF

OPEN ACCESS

012027

Quantitative assessment of vulnerability in aquaculture: climate change impacts on whiteleg shrimp (*Litopenaeus vannamei*) farming in East Java Province

A D Puspa, T Osawa and I W Arthana

[+](#) View abstract  PDF

OPEN ACCESS

012028

Developing one map of national marine resources of Indonesia

Nurwadjedi, Sri Hartini and Lien Rosalina

[+](#) View abstract  PDF

OPEN ACCESS

012029

Aesthetic quality assessment in Santolo Beach, West Java Province, Indonesia

Ankiq Taofiqurohman, Ivonne M Radjawane and Yayat Dhahiyat

[+](#) View abstract  PDF

OPEN ACCESS

012030

Potential of methanol extract from the stem bark of mangrove *Rhizophora mucronata* against bacteria *Escherichia coli* and *Aeromonas hydrophilla*

Mahmiah, Gimam, Nanik Siti Aminah and Mulyadi Tanjung

[+](#) View abstract  PDF

OPEN ACCESS

012031

Effects of artificial and natural materials ropes as substrates for settling and metamorphosis of pediveliger pearl oyster, *Pinctada maxima* (Jameson, 1901)

Medy Ompi, Fontje Kaligis, Stephanus Mandagi and Kathe Jensen

[+](#) View abstract  PDF

OPEN ACCESS

012032

Spatial assessment of relative resilience potential to support management of coral reef ecosystem in Doreri Bay area, Manokwari Regency, Indonesia

T F Pattiasina, A Sartimbul, B Semedi, E Y Herawati, D D Pelasula, M Krey and Mulyadi

[+](#) View abstract  PDF


Non-living Marine Resources (Sub-theme: Marine Geology and Marine Renewable Energy)

OPEN ACCESS

012033

Depositional environmental evolution of Kalibiuk formation based on paleontological molluscan Study, Cisaat River section, Bumiayu, Central Java, Indonesia

Aswan, Elina Sufiati, Alfend Rudyawan, Desty Kistiani and Thaw Zin Oo

+ [View abstract](#)  [PDF](#)

OPEN ACCESS

012034

Ichnofossils study of paleocene sediment source rock cores from Bintuni basin, West Papua, Eastern Indonesia

Aswan, Alfend Rudyawan and Thaw Zin Oo

+ [View abstract](#)  [PDF](#)

OPEN ACCESS

012035

Chlorophyll-A variability in the southern coast of Java Island, Indian Ocean: corresponding to the tropical cyclone of Ernie

U Efendi, A Fadlan and A M Hidayat

+ [View abstract](#)  [PDF](#)

OPEN ACCESS

012036

The readiness of small island community to the development of potential renewable energy: case study of Bulang Kebam Island, Riau Island province, Indonesia

P A Soejarwo, W P Fitriyanny, A R Hakim and A Heriati

+ [View abstract](#)  [PDF](#)

OPEN ACCESS

012037

Study of ocean thermal energy resources in Para'baya, West Sulawesi

Y B Wicaksono and M R Putri

+ [View abstract](#)  [PDF](#)

Satellite and Ocean Remote Sensing







OPEN ACCESS

012038

Estimation of marine gravity anomaly model from satellite altimetry data (Case Study : Kalimantan and Sulawesi Waters-Indonesia)

P Hartanto, S Huda, W Putra, E D Variandy, B Triarahmadhana, D Pangastuti, A M Pahlevi and C Hwang

+ [View abstract](#)  [PDF](#)

-
- OPEN ACCESS** 012039
GEOBIA an (Geographic) Object-Based Image Analysis for coastal mapping in Indonesia: *A Review*
F Hidayat, A W Rudiastuti and N Purwono
[+](#) View abstract  PDF
-
- OPEN ACCESS** 012040
Utilization of AIS (Automatic Identification System) sensor for mobility monitoring of fishing vessel based on PFZ (Potential Fishing Zones) distribution
S M Purnama, D Y Hutapea and R Permala
[+](#) View abstract  PDF
-
- OPEN ACCESS** 012041
Salt pond analysis using ALOS PALSAR case study Sampang, Madura-Indonesia
S M Purnama, A Cahyawati and D Y Hutapea
[+](#) View abstract  PDF
-
- OPEN ACCESS** 012042
Identification of flood area in the coastal region using remote sensing in Karawang Regency, West Java
Bambang Riadi, Baba Barus, Widiatmaka, Moh Yanuar and Bambang Pramudya
[+](#) View abstract  PDF
-
- OPEN ACCESS** 012043
Long term variation of sea level anomaly (September 1992-January 2017) in the Indonesian sea from multi-mission satellite altimetry data
Dina A. Sarsito, Kosasih Prijatna, Dudy D. Wijaya, T Nur Fajar, Ivonne M. Radjawane, Wiwin Windupranata and Brian Bramanto
[+](#) View abstract  PDF
-
- OPEN ACCESS** 012044
Oceanographic factors related to Eastern Little Tuna (*Euthynnus affinis*) catches in the west Java Sea
Mega Syamsuddin, Sunarto and Lintang Yuliadi
[+](#) View abstract  PDF
-
- OPEN ACCESS** 012045

Variabilities of the sea level anomalies in the upstream areas of the Kuroshio Current

Y J Wijaya, S Sugitani, D N Sugianto, D P Wijayanti and Y Hisaki

[+ View abstract](#) [PDF](#)

OPEN ACCESS

012046

Analysis of dissemination methods for remote sensing information in maritime field to support the local government

G D Yudha and S M Purnama

[+ View abstract](#) [PDF](#)

Marine Technology (Sub-theme: Offshore Technology, Underwater Acoustic and Ocean Observation)

OPEN ACCESS

012047

Predictor-corrector scheme for simulating wave propagation on shallow water region

Rifky Fauzi and L. Hari Wiryanto

[+ View abstract](#) [PDF](#)

OPEN ACCESS

012048

Monitoring remote tidal based on web

Engki A Kisnarti and Suryadhi

[+ View abstract](#) [PDF](#)

OPEN ACCESS

012049

Stress concentration factor distribution of inclined brace in multiplanar offshore tubular double kt joints

Rudi Walujo Prastianto, Yoyok Setyo Hadiwidodo, Ibnu Fasyin Fuadi, Mhd Bonar Yudha Prawira Naibaho and Prasetyo Nugroho Rahardianto

[+ View abstract](#) [PDF](#)

JOURNAL LINKS

[Journal home](#)

[Information for organizers](#)

[Information for authors](#)

[Search for published proceedings](#)

[Contact us](#)