

BUKTI KORESPONDENSI

Lampiran	:	Peer review proses korespondensi submit Publikasi Jurnal Ilmiah Internasional
Nama Jurnal	:	Letters in Applied NanoBioScience Vol. 8 Issue 4 2019 Hal: 739-742
Judul Jurnal	:	Antidiarrheal Activity of Ethanolic Extract of Leaves Sangkareho (<i>Callicarpa longifolia</i> Lam) from Central Kalimantan

No	Item	Tanggal	Halaman
1	Submit artikel melalui email jurnal BRIAC (Biointerface Research in Applied Chemistry) review@biointerfaceresearch.com	01 November 2019	1
2	Artikel accepted, namun ditransfer pada jurnal LIANBS (Letters in Applied NanoBioScience)	14 November 2019	2
3	Review process (LIANBS)	01 Desember 2019	2
4	Article for final proof (LIANBS)	27 Desember 2019	49
5	Article Published (LIANBS)	30 Desember 2019	49
6	Ethical approval	05 Juli 2018	51

1. Submit artikel melalui email jurnal BRIAC (Biointerface Research in Applied Chemistry)

Dear Chief Editor Biointerface Research in Applied Chemistry

I am Syahrída, my colleague Moh. Rizki Fadhil Pratama suggest me to sent my article to Biointerface Research in Applied Chemistry, I attached the following manuscript below.

Thank you for your kind attention and we look forward to your good news soon.

Best regards

Syahrída Dian Ardhany
Department of pharmacy, Faculty of Health Sciences
Muhammadiyah University of Palangkaraya
73111 Palangka Raya, Indonesia

1. Title of Article:

Antidiarrheal Activity of Ethanolic Extract of Leaves of Sangkareho (*Callicarpa longifolia* Lam) from Central Kalimantan

2. Name of Corresponding Author: **Syahrída Dian Ardhany**

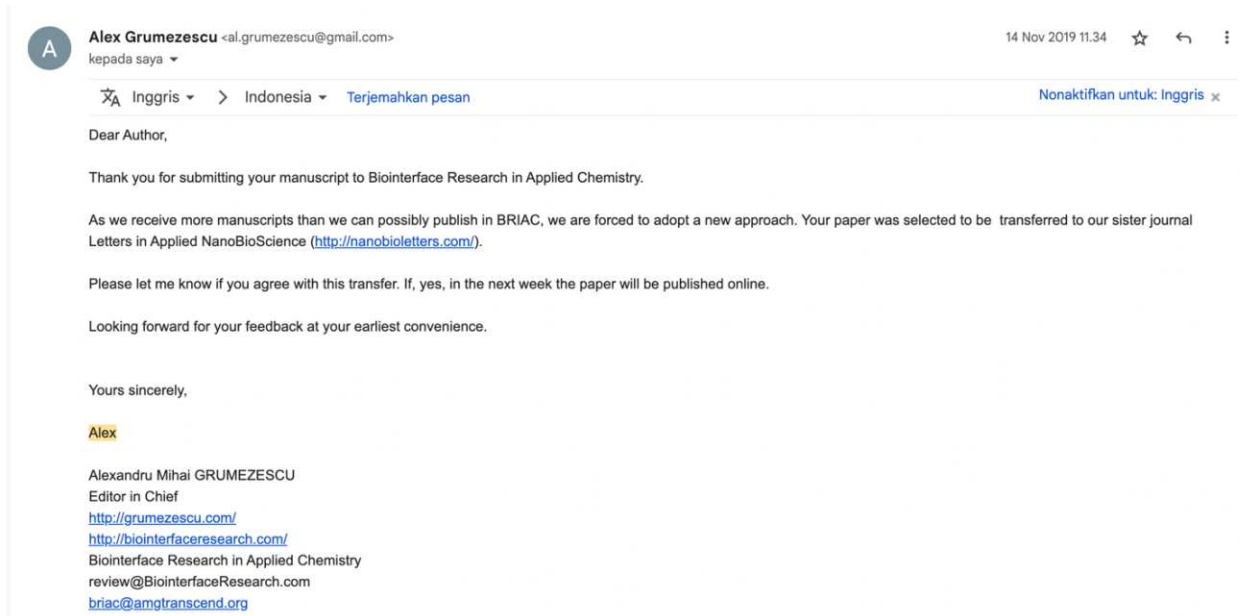
3. Corresponding Author e-mail address: chass501@gmail.com

4. Abstract:

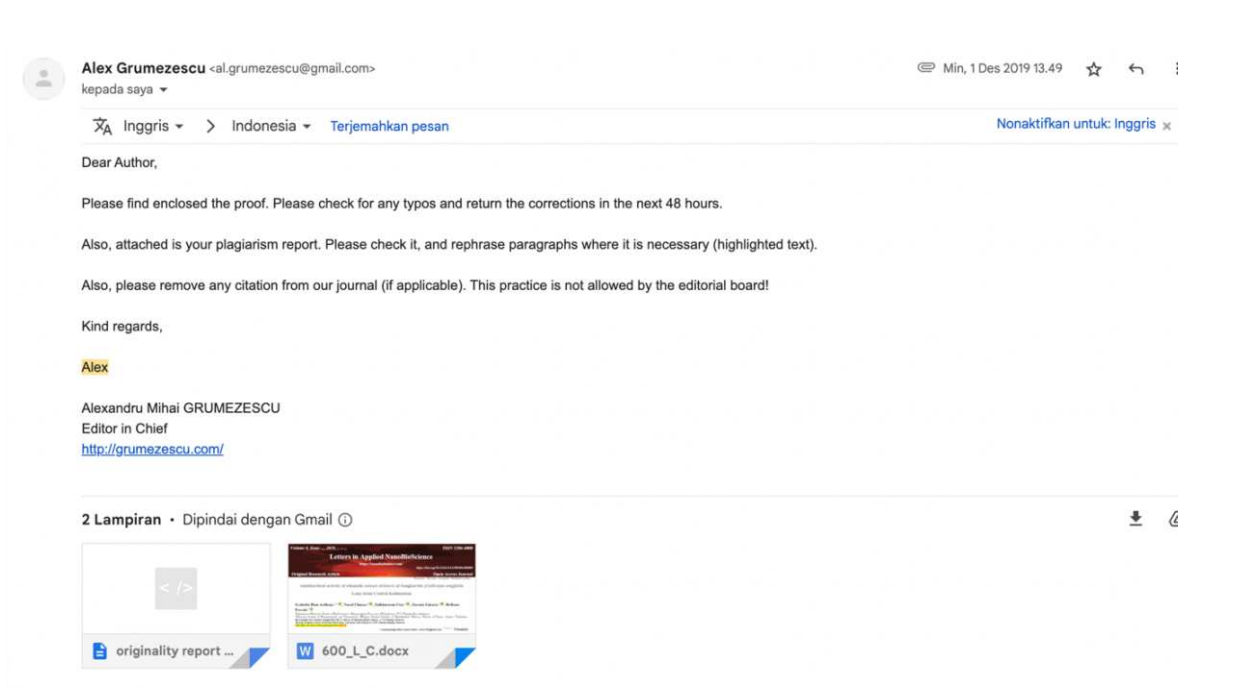
Diarrhea is one of the leading causes of preventable death in developing countries including in Indonesia and Malaysia. It has been reported that the leaves of sangkareho (*Callicarpa longifolia* Lam) is used traditionally as an antidiarrheal treatment in Central Kalimantan. The present study was aimed to evaluate the pharmacological activity against diarrhea using the ethanolic extract of sangkareho leaves. The extract was used for castor oil-induced diarrhea in mice. The extracts were given orally to the mice at 200, 300, 400 mg/kg bodyweight and loperamide was used as a standard drug for diarrhea. The results showed % inhibition of diarrhea with values of no detected, 42.62%, 81.97%, 70.49% at 200, 300, 400 mg/kg bodyweight dose levels of the extract and loperamide, respectively as compared to the negative control. It can be considered at dose level of 400 mg/kg bodyweight the extract has a greater anti-diarrheal effect than loperamide. In conclusion, ethanolic extract of sangkareho leaves (*Callicarpa longifolia* Lam) has anti-diarrheal activity and this supports the use of this plant as antidiarrhea in traditional treatment.

5. Keywords: *Antidiarrheal; Callicarpa longifolia; Central Kalimantan; Loperamide; Sangkareho*

2. Artikel accepted, namun ditransfer pada jurnal LIANBS (Letters in Applied NanoBioScience)



3. Review process (LIANBS)



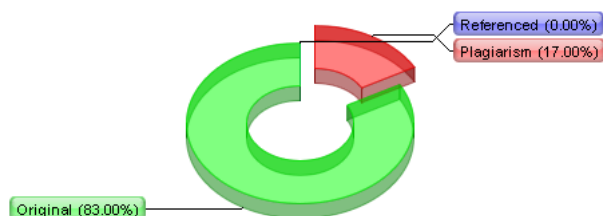
Plagiarism Detector v. 1053 - Originality Report:

Analyzed document: 30.11.2019 10:54:49

"600_L_C.docx"

Licensed to: [temporary-NA] [temporary-NA]

Relation chart:



Distribution graph:

Comparison Preset: Word-to-Word. Detected language: English

Top sources of plagiarism:

% 6

wrds: 178

<https://journals.sagepub.com/doi/full/10.1177/2515690X19853264>

% 4

wrds: 115

http://nanobioletters.com/wp-content/uploads/2019/08/LIANBS_2019_V1.docx

% 4

wrds: 122

<https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-018-6266-z>

[\[Show other Sources:\]](#)

% 4

wrds: 125

<https://science.news/2018-07-31-evaluating-the-anti-diarrheal-activity-of-the-lantana-cama...>

% 4

wrds: 125

<http://medicine.news/2018-07-31-evaluating-the-anti-diarrheal-activity-of-the-lantana-cama...>

% 3

wrds: 104

<https://bmcpublichealth.biomedcentral.com/track/pdf/10.1186/s12889-018-6266-z>

% 3

wrds: 85

<https://www.mdpi.com/1420-3049/24/7/1367/htm>

% 3

wrds: 73

<https://www.ncbi.nlm.nih.gov/pubmed/29866147>

% 2

wrds: 51

https://www.academia.edu/34133743/Antidiarrheal_property_of_Napoleona_imperialis_may_be_du...

% 2

wrds: 45

<https://clinicaltrials.gov/ct2/show/NCT03356327>

% 2

wrds: 40

<https://doi.org/10.22037/ijpr.2010.16>

% 1

wrds: 38

<https://www.bibliomed.org/?mno=207274>

% 1

wrds: 48

<https://www.who.int/bulletin/volumes/87/3/08-052175/en/>

% 1

wrds: 48

<https://www.who.int/bulletin/volumes/87/3/08-052175/en>

% 1

wrds: 34

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6412823>

% 1

wrds: 34

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6412823/>

% 1
wrds: 34
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6721159>

% 1
wrds: 34
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6721159/>

% 1
wrds: 32
<https://nanobioletters.com/wp-content/uploads/2019/10/2284680884692697.pdf>

% 1
wrds: 32
<https://nanobioletters.com/wp-content/uploads/2019/10/2284680884711714.pdf>

% 1
wrds: 32
https://www.researchgate.net/publication/335892457_Biosynthesis_of_metal_nanoparticles_by_...

% 0,9
wrds: 30
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4418062/>

% 0,7
wrds: 19
<http://www.pri.sld.cu/wp-content/uploads/2019/04/Enfermedad-Diarreica-Aguda.pdf>

% 0,7
wrds: 21
<http://www.fortunejournals.com/articles/a-case-of-insulin-autoimmune-syndrome.pdf>

% 0,7
wrds: 21
<http://www.fortunejournals.com/articles/persistent-hypoglycemia-in-venlafaxine-overdose.pd...>

% 0,7
wrds: 18
<https://journal.uniga.ac.id/index.php/JFB/article/view/653>

% 0,6
wrds: 19
https://www.unina.it/documents/11958/18351500/STAIANO_Annamaria_2019.pdf

% 0,6
wrds: 21
http://ajp.mums.ac.ir/article_3937_5af51255ef6057cd4d8e901ae677b3b9.pdf

% 0,6

wrds: 17
<https://www.nature.com/articles/s41598-019-46480-6>
% 0,6

wrds: 17
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6620335/>
% 0,6

wrds: 17
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6620335>
% 0,6

wrds: 15
<https://ejournal.unisba.ac.id/index.php/Farmasyifa/article/view/Elis%20Susilawati%2C%20Nit...>
% 0,6

wrds: 17
<https://reizdarm.one/medikamente/tannacomp/>
% 0,6

wrds: 17
<https://reizdarm.one/medikamente/tannacomp>
% 0,5

wrds: 12
<https://id.123dok.com/document/y933v1jy-uji-aktivitas-antimikroba-ekstrak-etanol-daun-cayr...>
% 0,5

wrds: 19
<https://www.sumathipublications.com/index.php/ijcbr/article/download/225/259>
% 0,3

wrds: 10
<https://www.ncbi.nlm.nih.gov/pubmed/29033994>
% 0,3

wrds: 10
<https://albertahealthservices.ca/assets/about/publications/ahs-pub-ahs-female-physician-le...>
% 0,3

wrds: 10
<http://www.medicunaplanta.com/spip.php?article75>
% 0,3

wrds: 8
<http://jurnalscientia.org/index.php/scientia/article/view/118>
% 0,3

wrds: 10

<http://ijrpc.com/files/15-426.pdf>

% 0,3

wrds: 9

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3289602/>

% 0,3

wrds: 9

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3874089/>

% 0,3

wrds: 9

<http://www.bioflux.com.ro/abah/docs/2018.9-17.pdf>

% 0,3

wrds: 9

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3874089/>

% 0,3

wrds: 6

<https://www.mestecc.gov.my/web/en>

% 0,3

wrds: 6

<https://www.mestecc.gov.my/web/en/>

% 0,3

wrds: 6

http://jurnal.akfarsam.ac.id/index.php/jim_akfarsam/article/download/24/23/

% 0,3

wrds: 7

<https://paperity.org/p/199328397/the-amazing-potential-of-fungi-50-ways-we-can-exploit-fun...>

% 0,2

wrds: 8

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3881529/>

% 0,2

wrds: 8

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3881529/>

% 0,2

wrds: 8

<https://www.hindawi.com/journals/ijmicro/2013/746165/>

% 0,2

wrds: 8

<https://www.hindawi.com/journals/ijmicro/2013/746165>

% 0,2
wrds: 6
<https://bpspubs.onlinelibrary.wiley.com/doi/10.1111/j.1476-5381.1987.tb08992.x>

% 0,2
wrds: 6
<https://www.ncbi.nlm.nih.gov/pubmed/3594072>

% 0,2
wrds: 7
<http://annalsofplantosciences.com/index.php/aps/article/view/382>

% 0,2
wrds: 6
<https://www.mendeley.com/catalogue/fenugreek-seed-extract-inhibit-fat-accumulation-amelior...>

% 0,2
wrds: 6
<http://journal.umpalangkaraya.ac.id/index.php/bjop/article/download/427/389/>

% 0,2
wrds: 6
<https://www.hinnews.com/news/world-food-day-nigeria-has-the-2nd-highest-number-of-malnouri...>

% 0,2
wrds: 6
<https://castoroil-guide.com/castor-oil-for-beards>

% 0,2
wrds: 6
<https://www.lowyat.net/2019/192558/disney-plus-movie-tv-series>

% 0,2
wrds: 6
<http://www.nmcp.or.ke/index.php/resource-centre/download-centre>

% 0,2
wrds: 6
<https://www.lowyat.net/2019/192558/disney-plus-movie-tv-series/>

% 0,1
wrds: 6
<https://id.123dok.com/document/y600674y-basics-science-for-improving-survival-and-quality-...>

% 0,1
wrds: 6
<https://www.ema.europa.eu/en/documents/herbal-references/final-list-references-supporting-...>

Processed resources details:

[\[Show other Sources:\]](#)

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1,01 DC <http://creativecommons.org/licenses/by/4.0/>.

% 0

wrds: 0

RDF :: Timeouted :: dt: 30,66 DC <https://content.sciendo.com/downloadpdf/journals/folmed/61/2/article-p249.pdf>

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (403) Forbidden. dt: 2,02 DC <https://stke.sciencemag.org/content/7/307/ra2/F2>

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC [https://www.researchgate.net/profile/Sumarni_Ghazali/publication/228735426_Obesity_among s...](https://www.researchgate.net/profile/Sumarni_Ghazali/publication/228735426_Obesity_among_s...)

% 0

wrds: 0

RDF :: Timeouted :: dt: 30,66 DC <https://academicjournals.org/journal/AJB/article-full-text-pdf/1D8870457565>

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (403) Forbidden. dt: 1,17 DC <https://www.peoplefinders.com/name/mao-sun>

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (403) Forbidden. dt: 0,5 DC <https://www.instantcheckmate.com/people/mao-sun/>

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC [https://www.researchgate.net/profile/Afaf_Weli/publication/256493112_In_vitro_Antioxidant ...](https://www.researchgate.net/profile/Afaf_Weli/publication/256493112_In_vitro_Antioxidant_...)

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC https://www.researchgate.net/profile/Muthuirulappan_Srinivasan2/publication/282744653_GC-M...

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC https://www.researchgate.net/publication/322302956_Selenium_Treatment_Ameliorates_Experime...

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,51 DC
https://www.researchgate.net/profile/Samuel_Olaleye/publication/281846919_Effect_of_zinc_t...

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC
https://www.researchgate.net/publication/329560049_Prevalence_of_and_factors_associated_wi...

% 0

wrds: 0

RDF :: GRF :: Unable to connect to the remote server dt: 2,5 DC <http://www.science.gov/topicpages/e/eugenia>

% 0

wrds: 0

RDF :: GRF :: Unable to connect to the remote server dt: 2,5 DC <https://www.science.gov/topicpages/e/eugenia>

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC
https://www.researchgate.net/publication/281897303_Ethno_Veterinary_Practices_Prevalent_Am...

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC
https://www.researchgate.net/publication/335099243_Biological_Characterization_and_Inhibit...

% 0

wrds: 0

RDF :: GRF :: Unable to connect to the remote server dt: 2,51 DC <http://www.science.gov/topicpages/t/tall>

% 0

wrds: 0

RDF :: GRF :: Unable to connect to the remote server dt: 2,51 DC <https://www.science.gov/topicpages/d/dilute>

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC
https://www.researchgate.net/publication/323176979_Determination_of_flavonoids_in_Acer_oka...

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC
https://www.researchgate.net/publication/321827228_Formulasi_Pasta_Gigi_Gel_Ekstrak_Etanol...

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (403) Forbidden. dt: 1,01 DC <https://quizlet.com/205106068/ch-20-m-icro-flash-cards>

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC <https://www.researchgate.net/publication/322800859> The effect of chronic conditions and mu...
% 0
wrds: 0

RDF :: GRF :: Too many automatic redirections were attempted. dt: 4,51 DC <https://www.beautyhealtheasy.com/article/415468-is-pectin-vegetarian>
% 0
wrds: 0

RDF :: GRF :: Unable to connect to the remote server dt: 2,5 DC <https://www.science.gov/topicpages/e/>
% 0
wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC <https://www.researchgate.net/publication/316804951> Springer Finance
% 0
wrds: 0

RDF :: GRF :: The underlying connection was closed: The connection was closed unexpectedly. dt: 26,6 DC <http://juke.kedokteran.unila.ac.id/index.php/majority/article/view/510>
% 0
wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC <https://www.researchgate.net/publication/333355156> Pengaruh Gel Ekstrak Daun Kerehau Calli...
% 0
wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC <https://www.researchgate.net/publication/293276916> Struggle Against Vector-borne Diseases ...
% 0
wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC https://www.researchgate.net/profile/Hermizi_Hapidin/publication/270967783 Quercus infecto...
% 0
wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC https://www.researchgate.net/profile/Amin_Malik_Shah_Abdul_Majid/publication/48408389 The ...
% 0
wrds: 0

RDF :: GRF :: The remote server returned an error: (403) Forbidden. dt: 1,55 DC <https://quizlet.com/68880055/microbio-chapter-2-flash-cards>
% 0
wrds: 0

RDF :: GRF :: The remote server returned an error: (403) Forbidden. dt: 1,05 DC <https://quizlet.com/76540587/bsc-121-exam-3-flash-cards>
% 0
wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,51 DC
https://www.researchgate.net/profile/Laura_Corte/publication/6736856_General_evidence_supp...

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,52 DC
https://www.researchgate.net/publication/325189869_Whole_genome_sequencing_data_of_1110_My...

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 5,03 DC https://chs.uonbi.ac.ke/uon_publications/author/1733

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1 DC <http://dx.doi.org/10.1186/s13052-018-0497-6>.

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 0,5 DC <https://www.sciencedirect.com/.../medicine-and-dentistry/airway-smooth-muscle-contraction>

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC
https://www.researchgate.net/profile/Zhi_Jun_Dai/publication/7063403_Downregulation_of_sur...

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC
https://www.researchgate.net/profile/Seyed_Mahmoud_Mehdinia/publication/263659554_Rice_Hus...

% 0

wrds: 0

RDF :: GRF :: The underlying connection was closed: An unexpected error occurred on a send. dt: 24,85 DC
https://www.lib.teiep.gr/images/stories/acta/Acta%20576/576_15.pdf

% 0

wrds: 0

RDF :: GRF :: The underlying connection was closed: An unexpected error occurred on a send. dt: 24,77 DC
<https://www.lib.teiep.gr/images/stories/acta/Acta>

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC
https://www.researchgate.net/publication/307954382_Oral_frozen_fecal_microbiota_transplant...

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 1 DC
https://www.researchgate.net/publication/326325807_General_Safety_Rules_Identification_of_...

% 0

wrds: 0
RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 1 DC
<https://www.researchgate.net/publication/8457973> RSV and influenza Treatment and preventio...
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 1,51 DC
https://www.researchgate.net/profile/Jean_Francois_Bisson/publication/313258856 Antidiarrh...
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 0,5 DC
<https://www.researchgate.net/.../8457973> RSV and influenza Treatment and prevention
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC
<https://www.researchgate.net/publication/336590773> Short review on the prospects of human ...
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC
https://www.researchgate.net/profile/Gulcan_Demirel/publication/11883409 Investigation of ...
% 0
wrds: 0
RDF :: GRF :: The underlying connection was closed: The connection was closed unexpectedly. dt: 27,82 DC
<http://juke.kedokteran.unila.ac.id/index.php/majority/article/download/510/511>
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC
<https://www.researchgate.net/publication/303756368> Effect of silver nanoparticles on biofi...
% 0
wrds: 0
RDF :: Timeouted :: dt: 30,57 DC https://www.thegef.org/sites/default/files/project_documents/8-4-12%2520%2520ID4991%2520GE...
% 0
wrds: 0
RDF :: GRF :: Too many automatic redirections were attempted. dt: 5,01 DC <https://www.beautyhealtheasy.com/article/415468-is-pectin-vegetarian/>
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1 DC <https://doi.org/10.1155/2018/3037120>.
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1,02 DC <https://doi.org/10.15294/biosaintifika.v9i1.5811>.
% 0

wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1 DC <https://doi.org/10.1186/s12906-016-1357-9>.
% 0
wrds: 0
RDF :: GRF :: Unable to connect to the remote server dt: 2,51 DC <https://www.science.gov/topicpages//lactuca>
% 0
wrds: 0
RDF :: PlaintextExtractionFailed :: dt: 4,51 DC <http://phcogj.com/articles/export/bibtex>
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1,01 DC <https://doi.org/10.33263/LIANBS00.000000>
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1,5 DC <https://doi.org/10.1186/s12906-016-1252-4>.
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1,02 DC <https://doi.org/10.1080/17441692.2015.1127985>.
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (403) Forbidden. dt: 0,5 DC http://www.old.unibuc.ro/e/prof/cimpean_a/Manunet-31-2017/docs/2017/noi/28_10_42_12BioTiDe...
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1 DC <https://doi.org/10.1186/s12889-018-6266-z>.
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1 DC <https://doi.org/10.1016/j.jegh.2017.07.003>.
% 0
wrds: 0
RDF :: Timeouted :: Thread was being aborted. dt: 31,02 DC <https://www.thermofisher.com/order/catalog/product/AM1964>
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 0,51 DC <https://doi.org/10.1155/2018/8387218>.
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC https://www.researchgate.net/publication/286867871_The_chronotropic_and_inotropic_effects_...
% 0

wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 0,5 DC <https://doi.org/10.1186/s12879-017-2936-1>.
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1 DC <https://doi.org/10.1016/j.jaim.2017.05.004>.
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1 DC <https://doi.org/10.22159/ijap.2019.v11s5.T0020>.
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1 DC <https://doi.org/10.7324/JAPS.2016.601208>.
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1 DC <https://doi.org/10.1186/s12906-017-1696-1>.
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1,01 DC <https://doi.org/10.7324/JAPS.2016.60317>.
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1,02 DC <https://doi.org/10.29313/jiff.v2i1.4059>.
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1 DC [https://doi.org/10.1016/S1995-7645\(12\)60014-5](https://doi.org/10.1016/S1995-7645(12)60014-5).
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1 DC <https://doi.org/10.24843/ATBES.2019.v03.i02.p01>.
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,53 DC
<https://www.researchgate.net/publication/335823956> Dual Case Reports for Lipid Loss from H...
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC
<https://www.researchgate.net/publication/332274491> molecules Investigation of the Biologic...
% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC
<https://www.researchgate.net/publication/327437158> Strategy for Tackling Flood and Water S...

% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,54 DC
https://www.researchgate.net/profile/Mudiganti_Ram_krishna_rao/publication/269098793_Preliminary...

% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,57 DC
[https://www.researchgate.net/profile/Amarvani_Kanjikar2/publication/321764173_Preliminary ...](https://www.researchgate.net/profile/Amarvani_Kanjikar2/publication/321764173_Preliminary_...)

% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC
[https://www.researchgate.net/profile/Erhirhie_Earrest/publication/301200873_Antidiarrheal ...](https://www.researchgate.net/profile/Erhirhie_Earrest/publication/301200873_Antidiarrheal_...)

% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1 DC <http://dx.doi.org/10.1155/2015/257057>.

% 0
wrds: 0
RDF :: GRF :: The remote name could not be resolved: 'www.' dt: 13,75 DC <https://www.>

% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1 DC <https://doi.org/10.1186/s12906-017-1625-3>.

% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC
[https://www.researchgate.net/publication/301200873_Antidiarrheal_property_of_Napoleona imp...](https://www.researchgate.net/publication/301200873_Antidiarrheal_property_of_Napoleona_imp...)

% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1,01 DC <https://doi.org/10.26502/acmcr.96550070>.

% 0
wrds: 0
RDF :: GRF :: The underlying connection was closed: An unexpected error occurred on a send. dt: 1,5 DC
[https://www.reshealth.org/documents/about/community-reports/SJH_Chicago_Community_Health P...](https://www.reshealth.org/documents/about/community-reports/SJH_Chicago_Community_Health_P...)

% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC
[https://www.researchgate.net/profile/Joko_Gunawan/publication/279538879_Indonesia_health c...](https://www.researchgate.net/profile/Joko_Gunawan/publication/279538879_Indonesia_health_c...)

% 0
wrds: 0
RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC
https://www.researchgate.net/profile/Francisco_Rogerlandio_Martins-Melo/publication/319258...

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC
https://www.researchgate.net/profile/Tushar_Bera/publication/258204986_Protective_effect_o...

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,51 DC
https://www.researchgate.net/publication/295943687_Effect_of_aqueous_seed_extract_of_trigo...

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (429) Too Many Requests. dt: 0,5 DC
https://www.researchgate.net/publication/335401651_Archives_of_Clinical_and_Medical_Case_R...

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (999) Request denied. dt: 1 DC <https://fr.linkedin.com/in/dr-sradhanjali-singh-7a9a1221>

% 0

wrds: 0

RDF :: GRF :: The remote server returned an error: (404) Not Found. dt: 1,01 DC <https://doi.org/10.1155/2014/497606>.

% 6

wrds: 178

dt: -1 DC <https://journals.sagepub.com/doi/full/10.1177/2515690X19853264>

% 4

wrds: 125

dt: -1 DC <https://science.news/2018-07-31-evaluating-the-anti-diarrheal-activity-of-the-lantana-cama...>

% 4

wrds: 125

dt: -1 DC <http://medicine.news/2018-07-31-evaluating-the-anti-diarrheal-activity-of-the-lantana-cama...>

% 4

wrds: 122

dt: -1 DC <https://bmcpublihealth.biomedcentral.com/articles/10.1186/s12889-018-6266-z>

% 4

wrds: 115

dt: -1 QC http://nanobioletters.com/wp-content/uploads/2019/08/LIANBS_2019_V1.docx

% 3

wrds: 104

dt: -1 DC <https://bmcpublihealth.biomedcentral.com/track/pdf/10.1186/s12889-018-6266-z>

% 3

wrds: 85

dt: -1 DC <https://www.mdpi.com/1420-3049/24/7/1367/htm>
% 3
wrds: 73

dt: -1 DC <https://www.ncbi.nlm.nih.gov/pubmed/29866147>
% 2
wrds: 51

dt: -1 DC https://www.academia.edu/34133743/Antidiarrheal_property_of_Napoleona_imperialis_may_be_du...
% 1
wrds: 48

dt: -1 DC <https://www.who.int/bulletin/volumes/87/3/08-052175/en/>
% 1
wrds: 48

dt: -1 DC <https://www.who.int/bulletin/volumes/87/3/08-052175/en>
% 2
wrds: 45

dt: -1 DC <https://clinicaltrials.gov/ct2/show/NCT03356327>
% 2
wrds: 40

dt: -1 DC <https://doi.org/10.22037/ijpr.2010.16>
% 1
wrds: 38

dt: -1 DC <https://www.bibliomed.org/?mno=207274>
% 1
wrds: 34

dt: -1 DC <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6412823/>
% 1
wrds: 34

dt: -1 DC <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6412823>
% 1
wrds: 34

dt: -1 DC <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6721159/>
% 1
wrds: 34

dt: -1 DC <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6721159>
% 1
wrds: 32

dt: -1 QC <https://nanobioletters.com/wp-content/uploads/2019/10/2284680884692697.pdf>

% 1
wrds: 32
dt: -1 QC <https://nanobioletters.com/wp-content/uploads/2019/10/2284680884711714.pdf>

% 1
wrds: 32
dt: -1 QC https://www.researchgate.net/publication/335892457_Biosynthesis_of_metal_nanoparticles_by_...

% 0,9
wrds: 30
dt: -1 DC <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4418062/>

% 0,7
wrds: 21
dt: -1 DC <http://www.fortunejournals.com/articles/persistent-hypoglycemia-in-venlafaxine-overdose.pd...>

% 0,7
wrds: 21
dt: -1 DC <http://www.fortunejournals.com/articles/a-case-of-insulin-autoimmune-syndrome.pdf>

% 0,6
wrds: 21
dt: -1 DC http://ajp.mums.ac.ir/article_3937_5af51255ef6057cd4d8e901ae677b3b9.pdf

% 0,7
wrds: 19
dt: -1 DC <http://www.pri.sld.cu/wp-content/uploads/2019/04/Enfermedad-Diarreica-Aguda.pdf>

% 0,6
wrds: 19
dt: -1 DC https://www.unina.it/documents/11958/18351500/STAIANO_Annamaria_2019.pdf

% 0,5
wrds: 19
dt: -1 DC <https://www.sumathipublications.com/index.php/ijcbr/article/download/225/259>

% 0,7
wrds: 18
dt: -1 DC <https://journal.uniga.ac.id/index.php/JFB/article/view/653>

% 0,6
wrds: 17
dt: -1 DC <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6620335>

% 0,6
wrds: 17
dt: -1 DC <https://reizdarm.one/medikamente/tannacomp>

% 0,6

wrds: 17
dt: -1 DC <https://reizdarm.one/medikamente/tannacomp/>
% 0,6

wrds: 17
dt: -1 DC <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6620335/>
% 0,6

wrds: 17
dt: -1 DC <https://www.nature.com/articles/s41598-019-46480-6>
% 0,6

wrds: 15
dt: -1 DC <https://ejournal.unisba.ac.id/index.php/Farmasyifa/article/view/Elis%20Susilawati%2C%20Nit...>
% 0,5

wrds: 12
dt: -1 DC <https://id.123dok.com/document/y933v1jy-uji-aktivitas-antimikroba-ekstrak-etanol-daun-cayr...>
% 0,3

wrds: 10
dt: -1 DC <https://www.ncbi.nlm.nih.gov/pubmed/29033994>
% 0,3

wrds: 10
dt: -1 DC <http://ijrpc.com/files/15-426.pdf>
% 0,3

wrds: 10
dt: -1 DC <http://www.medicunaplanta.com/spip.php?article75>
% 0,3

wrds: 10
dt: -1 DC <https://albertahealthservices.ca/assets/about/publications/ahs-pub-ahs-female-physician-le...>
% 0,3

wrds: 9
dt: -1 DC <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3874089>
% 0,3

wrds: 9
dt: -1 DC <http://www.bioflux.com.ro/abah/docs/2018.9-17.pdf>
% 0,3

wrds: 9
dt: -1 DC <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3874089/>
% 0,3

wrds: 9

dt: -1 DC <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3289602/>
% 0,3
wrds: 8

dt: -1 DC <http://jurnalscientia.org/index.php/scientia/article/view/118>
% 0,2
wrds: 8

dt: -1 DC <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3881529/>
% 0,2
wrds: 8

dt: -1 DC <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3881529>
% 0,2
wrds: 8

dt: -1 DC <https://www.hindawi.com/journals/ijmicro/2013/746165/>
% 0,2
wrds: 8

dt: -1 DC <https://www.hindawi.com/journals/ijmicro/2013/746165>
% 0,2
wrds: 7

dt: -1 DC <http://annalsofplantsciences.com/index.php/aps/article/view/382>
% 0,3
wrds: 7

dt: -1 DC <https://paperity.org/p/199328397/the-amazing-potential-of-fungi-50-ways-we-can-exploit-fun...>
% 0,3
wrds: 6

dt: -1 DC <https://www.mestecc.gov.my/web/en/>
% 0,3
wrds: 6

dt: -1 DC http://jurnal.akfarsam.ac.id/index.php/jim_akfarsam/article/download/24/23/
% 0,3
wrds: 6

dt: -1 DC <https://www.mestecc.gov.my/web/en>
% 0,2
wrds: 6

dt: -1 DC <http://journal.umpalangkaraya.ac.id/index.php/bjop/article/download/427/389/>
% 0,2
wrds: 6

dt: -1 DC <https://www.lowyat.net/2019/192558/disney-plus-movie-tv-series>

% 0,1
wrds: 6
dt: -1 DC <https://www.ema.europa.eu/en/documents/herbal-references/final-list-references-supporting-...>

% 0,1
wrds: 6
dt: -1 DC <https://id.123dok.com/document/y600674y-basics-science-for-improving-survival-and-quality-...>

% 0,2
wrds: 6
dt: -1 DC <http://www.nmcp.or.ke/index.php/resource-centre/download-centre>

% 0,2
wrds: 6
dt: -1 DC <https://www.hinnews.com/news/world-food-day-nigeria-has-the-2nd-highest-number-of-malnouri...>

% 0,2
wrds: 6
dt: -1 DC <https://www.lowyat.net/2019/192558/disney-plus-movie-tv-series/>

% 0,2
wrds: 6
dt: -1 DC <https://www.mendeley.com/catalogue/fenugreek-seed-extract-inhibit-fat-accumulation-amelior...>

% 0,2
wrds: 6
dt: -1 DC <https://castoroil-guide.com/castor-oil-for-beards>

% 0,2
wrds: 6
dt: -1 DC <https://bpspubs.onlinelibrary.wiley.com/doi/10.1111/j.1476-5381.1987.tb08992.x>

% 0,2
wrds: 6
dt: -1 DC <https://www.ncbi.nlm.nih.gov/pubmed/3594072>

% 0
wrds: 0
dt: -1 DC <https://echa.europa.eu/registration-dossier/-/registered-dossier/11407/7/3/1>

% 0
wrds: 0
dt: -1 DC https://www.academia.edu/36796370/Analysis_of_phytochemical_profile_and_genotoxicity_of_cr...

% 0
wrds: 0
dt: -1 DC <https://www.turmericforhealth.com/turmeric-benefits/100-awesome-health-benefits-of-turmeri...>

% 0

wrds: 0
dt: -1 DC <https://www.youtube.com/watch?v=HJQhVLvKtK8>
% 0
wrds: 0
dt: -1 DC <https://www.turmericforhealth.com/.../100-awesome-health-benefits-of-turmeric-curcumin>
% 0
wrds: 0
dt: -1 DC <https://www.ncbi.nlm.nih.gov/pubmed/28759754>
% 0
wrds: 0
dt: -1 DC <https://www.youtube.com/watch?v=1rJe-jU7flo>
% 0
wrds: 0
dt: -1 DC <https://www.ncbi.nlm.nih.gov/pubmed/28282295>
% 0
wrds: 0
dt: -1 DC https://www.academia.edu/40015309/Archives_of_Clinical_and_Medical_Case_Reports_250_Case_R...
% 0
wrds: 0
dt: -1 DC <https://www.youtube.com/watch?v=S0a9hJrSWAY>
% 0
wrds: 0
dt: -1 DC <https://reference.medscape.com/medline/abstract/11833860>
% 0
wrds: 0
dt: -1 DC https://app.dimensions.ai/discover/publication?search_text=Farmasyifa&search_type=kws&...
% 0
wrds: 0
dt: -1 DC <http://jurnalstikesborneolestari.ac.id/index.php/borneo/article/view/206/0>
% 0
wrds: 0
dt: -1 DC <https://ejournal.unisba.ac.id/index.php/Farmasyifa/article/view/Elis>
% 0
wrds: 0
dt: -1 DC <https://www.nursingessayhub.com/indian-women-that-are-mothers-are-primarily-responsible-fo...>
% 0
wrds: 0

dt: -1 DC <https://id.123dok.com/document/oz13r9dq-kajian-aktivitas-antidiabetes-nori-kombinasi-daun-...>

% 0

wrds: 0

dt: -1 DC <https://quizlet.com/68880055/microbio-chapter-2-flash-cards/>

% 0

wrds: 0

dt: -1 DC <https://apps.who.int/iris/handle/10665/118837?show=full>

% 0

wrds: 0

dt: -1 DC <https://www.timesnownews.com/mirror-now/in-focus/article/air-pollution-a-national-emergenc...>

% 0

wrds: 0

dt: -1 DC <https://mafiadoc.com/community-health-profile-riverside-county-department-of-public- 59da5...>

% 0

wrds: 0

dt: -1 DC https://www.answers.com/Q/The_highest_number_of_electrons_in_the_second_shell_is_what

% 0

wrds: 0

dt: -1 DC <https://www.youtube.com/watch?v=IHKSr-wT4IM>

% 0

wrds: 0

dt: -1 DC https://www.answers.com/Q/Which_country_has_highest_number_of_elephants

% 0

wrds: 0

dt: -1 DC https://en.wikipedia.org/wiki/Tourism_in_the_United_States

% 0

wrds: 0

dt: -1 DC <https://nootriment.com/ashwagandha-for-sleep/>

% 0

wrds: 0

dt: -1 DC <https://towardsdatascience.com/visualizing-the-pedestrian-flow-through-the-iiit-bombay-main...>

% 0

wrds: 0

dt: -1 DC <https://www.nutreance.com/products/redimind/ingredient-research>

% 0

wrds: 0

dt: -1 DC <https://www.ncbi.nlm.nih.gov/pubmed/22840457>

% 0
wrds: 0
dt: -1 DC <https://www.youtube.com/watch?v=eNKzWIRZtSM>
% 0
wrds: 0
dt: -1 DC <https://livebytheword.blog/philippians-38-daily-wisdom-for-friday-september-6-2019/>
% 0
wrds: 0
dt: -1 DC <https://livebytheword.blog/philippians-38-daily-wisdom-for-friday-september-6-2019>
% 0
wrds: 0
dt: -1 DC <https://www.facebook.com/SchaefflerGroup/photos/a.260761797267323/2181440011866149/>
% 0
wrds: 0
dt: -1 DC <https://www.coursehero.com/file/p40057g/Statistical-analysis-All-data-were-analyzed-using-...>
% 0
wrds: 0
dt: -1 QC <https://www.researchgate.net/project/Utilization-of-Natural-Resources>
% 0
wrds: 0
dt: -1 DC <https://www.coursehero.com/file/p3878v2/34-Data-Analysis-The-data-collected-were-analyzed-...>
% 0
wrds: 0
dt: -1 DC <https://woodethic.blogspot.com/2016/03/is-pectin-vegetarian.html>
% 0
wrds: 0
dt: -1 DC <https://www.slideshare.net/AmandaBlake4/final-poster-48348865>
% 0
wrds: 0
dt: -1 DC <https://www.mset.gov.jm/>
% 0
wrds: 0
dt: -1 DC <https://www.mset.gov.jm>
% 0
wrds: 0
dt: -1 DC <https://www.mset.gov.jm/ministers-office/>
% 0

wrds: 0
dt: -1 DC <http://mset.gov.jm/mission>
% 0
wrds: 0
dt: -1 DC <https://www.mset.gov.jm/technology-overview/>
% 0
wrds: 0
dt: -1 DC <https://www.youtube.com/watch?v=E5096LgqxaU>
% 0
wrds: 0
dt: -1 DC [https://doi.org/10.1016/S2221-1691\(13\)60142-2](https://doi.org/10.1016/S2221-1691(13)60142-2)
% 0
wrds: 0
dt: -1 DC http://www.radiowienband.at/photogallery.php?photo_id=292
% 0
wrds: 0
dt: -1 DC <https://www.ncbi.nlm.nih.gov/pubmed/9228639>
% 0
wrds: 0
dt: -1 DC <https://pubs.rsc.org/en/content/articlelanding/2016/fo/c6fo00897f>
% 0
wrds: 0
dt: -1 DC <https://edujandon.com/2019/08/nigerian-student-dies-in-horrific-auto-crash-in-malaysia-pho...>
% 0
wrds: 0
dt: -1 DC <https://resource-recycling.com/recycling/2019/06/03/putting-it-all-in-perspective/>
% 0
wrds: 0
dt: -1 DC https://www.academia.edu/17698800/OA1mjms2212_1
% 0
wrds: 0
dt: -1 DC <http://garuda.ristekdikti.go.id/author/view/331970>
% 0
wrds: 0
dt: -1 DC <https://glosbe.com/en/en/negative%20control>
% 0
wrds: 0

dt: -1 DC <https://glosbe.com/en/en/negative>
% 0
wrds: 0

dt: -1 DC <https://reference.medscape.com/medline/abstract/23247044>
% 0
wrds: 0

dt: -1 DC <https://www.ncbi.nlm.nih.gov/pubmed/10518855>
% 0
wrds: 0

dt: -1 DC <https://reference.medscape.com/medline/abstract/22403987>
% 0
wrds: 0

dt: -1 QC <https://nanobioletters.com/>
% 0
wrds: 0

dt: -1 DC <https://www.washingtonpost.com/business/what-the-streaming-wars-mean-for-the-future-of-tv/...>
% 0
wrds: 0

dt: -1 DC <https://www.sportingnews.com/au/afl/news/afl-draft-2019-club-by-club-selections-player-pro...>
% 0
wrds: 0

dt: -1 DC <https://quizlet.com/76540587/bsc-121-exam-3-flash-cards/>
% 0
wrds: 0

dt: -1 DC <https://www.youtube.com/watch?v=wyM0ImFZ1w8>
% 0
wrds: 0

dt: -1 DC <https://www.thoughtco.com/types-of-chemical-bonds-in-proteins-603889>
% 0
wrds: 0

dt: -1 DC <https://soundcloud.com>
% 0
wrds: 0

dt: -1 DC https://en.m.wikipedia.org/wiki/Weekly_Arizona_Journal-Miner
% 0
wrds: 0

dt: -1 DC https://paperity.org/search/3?f_country=MY&f_publisher=BioMed

% 0
wrds: 0
dt: -1 DC <https://echa.europa.eu/ro/registration-dossier/-/registered-dossier/16039/7/7/3>
% 0
wrds: 0
dt: -1 DC <http://www.animalproduction.net/index.php/JAP/article/view/241>
% 0
wrds: 0
dt: -1 DC <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3633438/>
% 0
wrds: 0
dt: -1 DC http://proseanet.org/prosea/e-prosea_prephase.php?ta=Psidium%20guajava&at=L
% 0
wrds: 0
dt: -1 DC <https://www.sciencedirect.com/science/article/pii/S1876034119301662>
% 0
wrds: 0
dt: -1 DC <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3633438>
% 0
wrds: 0
dt: -1 DC <https://www.sciencedirect.com/science/article/pii/S0378874199000227>
% 0
wrds: 0
dt: -1 DC <https://www.e-jurnal.com/2018/08/uji-toksisitas-akut-ekstrak-etanol-daun.html>
% 0
wrds: 0
dt: -1 DC <https://www.coursehero.com/file/p13mqmp/It-is-possible-to-establish-an-overall-unity-in-th...>
% 0
wrds: 0
dt: -1 DC <https://www.ncbi.nlm.nih.gov/pubmed/154942>
% 0
wrds: 0
dt: -1 DC <https://www.onlinelibrary.wiley.com/doi/10.1002/pol.1961.1204915215>
% 0
wrds: 0
dt: -1 DC <https://www.sciencedirect.com/science/article/pii/S0009308416301475>
% 0

wrds: 0
dt: -1 DC https://en.wikipedia.org/wiki/Reaction_mechanism
% 0
wrds: 0
dt: -1 DC <http://pubs.acs.org/doi/10.1021/acs.energyfuels.6b00826>
% 0
wrds: 0
dt: -1 DC <http://www.abah.bioflux.com.ro/>
% 0
wrds: 0
dt: -1 DC <https://erj.ersjournals.com/content/36/5/1174>
% 0
wrds: 0
dt: -1 DC <https://cordis.europa.eu/project/rcn/98089/reporting/en>
% 0
wrds: 0
dt: -1 DC https://www.e-jurnal.com/2018/08/uji-aktivitas-antibakteri-ekstrak_4.html
% 0
wrds: 0
dt: -1 DC <http://www.patentsencyclopedia.com/app/20110144103>
% 0
wrds: 0
dt: -1 DC <https://www.practiceupdate.com/content/asco-2018-shorter-trastuzumab-treatment-for-her2nda...>
% 0
wrds: 0
dt: -1 DC <https://www.change.org/p/cbse-board-cbse-maths-re-examination>
% 0
wrds: 0
dt: -1 DC [https://en.m.wikipedia.org/wiki/The_Orange_Leader_\(New_South_Wales\)](https://en.m.wikipedia.org/wiki/The_Orange_Leader_(New_South_Wales))
% 0
wrds: 0
dt: -1 DC http://journals.ekb.eg/article_27388_3a00ff8189858a45a309092fefa2f099.pdf
% 0
wrds: 0
dt: -1 DC <https://s3.amazonaws.com/coldsore/prevention-and-treatment-of-hepatitis-c.html>
% 0
wrds: 0

dt: -1 DC <https://www.youtube.com/watch?v=PWjb2IM5WaE>
% 0
wrds: 0

dt: -1 DC <https://www.sciencedirect.com/topics/medicine-and-dentistry/airway-smooth-muscle-contracti...>
% 0
wrds: 0

dt: -1 DC <https://www.sakaltimes.com/pune/bcom-paper-changed-halls-15859>
% 0
wrds: 0

dt: -1 DC <https://www.pinterest.com/milliemtz/castor-oil/>
% 0
wrds: 0

dt: -1 DC <https://docplayer.com.br/22695025-Universidade-federal-de-juiz-de-fora-programa-de-pos-gra...>
% 0
wrds: 0

dt: -1 DC <https://www.youtube.com/watch?v=sfrwfTgmvsU>
% 0
wrds: 0

dt: -1 DC https://slidelegend.com/the-impact-of-water-supply-and-sanitation-on-population-council_59...
% 0
wrds: 0

dt: -1 DC <https://futorzweb.com/jee-advanced-2015-change-in-paper-pattern-might-affect-the-scores>
% 0
wrds: 0

dt: -1 DC <http://www.atmph.org/article.asp?issn=1755-6783;year=2017;volume=10;issue=1;spage=187;epag...>
% 0
wrds: 0

dt: -1 DC https://www.academia.edu/29060415/Urban_Water_Challenges_in_the_Americas
% 0
wrds: 0

dt: -1 DC <https://issuu.com/ireporter/docs/environmental-pollution-in-china>
% 0
wrds: 0

dt: -1 DC <https://www.ncbi.nlm.nih.gov/pubmed/29422820>
% 0
wrds: 0

dt: -1 DC <https://quizlet.com/205106068/ch-20-m-icro-flash-cards/>

% 0
wrds: 0
dt: -1 DC <https://reference.medscape.com/medline/abstract/28376868>

% 0
wrds: 0
dt: -1 DC https://www.answers.com/Q/The_increasing_resistance_of_Mycobacterium_tuberculosis_to_strep...

% 0
wrds: 0
dt: -1 DC <https://publications.inschool.id/index.php/ghmj/article/view/458>

% 0
wrds: 0
dt: -1 DC <https://www.neliti.com/id/publications/128936/formulation-of-bawang-dayak-eleutherine-bulb...>

% 0
wrds: 0
dt: -1 DC <https://e-journal.unair.ac.id/JVHS/article/view/11471/6489>

% 0
wrds: 0
dt: -1 DC <https://tanaman-herbal.blogspot.com/2017/03/manfaat-dan-khasiat-tanaman-bawang.html>

% 0
wrds: 0
dt: -1 DC <https://faturzweb.com/jee-advanced-2015-change-in-paper-pattern-might-affect-the-scores/>

% 0
wrds: 0
dt: -1 DC <https://quizlet.com/215058949/microbiology-chapter-20-antimicrobial-medication-flash-cards...>

% 0
wrds: 0
dt: -1 DC <http://castoroil.in/b/tag/castor-oil-polyurethanes/page/4/>

% 0
wrds: 0
dt: -1 DC <http://castoroil.in/b/page/51/>




% 0
wrds: 0
dt: -1 DC https://slidelegend.com/the-brat-diet-for-acute-diarrhea-in-children-practical-_59df3fc817...

% 0
wrds: 0
dt: -1 DC <https://academicjournals.org/journal/JCMR/cited-by-article/932787D4425>

% 0

wrds: 0
dt: -1 DC <https://www.shantiaromatherapy.com/allproducts/castor-oil-organic>
% 0
wrds: 0
dt: -1 DC <https://www.spokeo.com/Mao-Sun>
% 0
wrds: 0
dt: -1 DC <https://iopscience.iop.org/article/10.1088/1757-899X/162/1/012028/pdf>
% 0
wrds: 0
dt: -1 DC <https://academicjournals.org/journal/JMPR/article-full-text-pdf/32AF03716802>
% 0
wrds: 0
dt: -1 DC <https://www.bizapedia.com/phonebook/california/mao-sun.html>
% 0
wrds: 0
dt: -1 DC <https://www.youtube.com/watch?v=PXCTrP03IAE>
% 0
wrds: 0
dt: -1 DC <https://www.youtube.com/watch?v=2z2xJ3Tn8fE>
% 0
wrds: 0
dt: -1 DC <https://www.living.anveya.com/articles/castor-oil-for-massage-tips-how-to-use/?inref=inlin...>
% 0
wrds: 0
dt: -1 DC <https://www.whitepages.com/name/Mao-Suan>

Important notes:

Wikipedia:	Google Books:	Ghostwriting services:	Anti-cheating:
			
[not detected]	[not detected]	[not detected]	[not detected]

Excluded Urls:

Included Urls:

Detailed document analysis:

id: 1

Plagiarism detected: **1,36%** <http://nanobioletters.com/wp-content...>

Volume 8, Issue ..., 2019, .. - ...

Volume 8, Issue ..., 2019, .. - ...

Letters in Applied NanoBioScience

<https://nanobioletters.com/>

<https://doi.org/10.33263/LIANBS00.000000>

Letters in Applied NanoBioScience

<https://nanobioletters.com/>

<https://doi.org/10.33263/LIANBS00.000000>

Original Research Arti

cle

Original Research Article

id: 2

Plagiarism detected: **1,07%** <http://nanobioletters.com/wp-content...>

Open Access Journal

Open Access Journal

ISSN 2284-6808

ISSN 2284-6808

Received: / Revised: / Accepted: / Published on-line:

Received: / Revised: / Accepted: / Published on

-line:

Antidiarrheal Activity of Ethanolic Extract of Leaves of Sangkareho (*Callicarpa longifolia* Lam) from Central Kalimantan

Syahrida Dian Ardhany 1, *, Nurul Chusna 1, Zulkhurnain Utar 2, Zuraini Zakaria 3, Briliano Pascalo 1

1Department of Pharmacy, Faculty of Health Sciences, Muhammadiyah University of Palangkaraya, 73111 Palangka Raya, Indonesia

2Malaysian Institute of Pharmaceuticals and Nutraceuticals (IPharm), National Institutes of Biotechnology Malaysia,

id: 3

Plagiarism detected: **0,19%** <https://www.mestec.gov.my/web/en/> + 2 more resources!

Ministry of Energy, Science, Technology, Environment

and Climate Change(MESTECC), Block 5D Halaman Bukit Gambir, 11700 Penang, Malaysia

3Biology Program School of Distance Education, Universiti Sains Malaysia 11800 Minden Penang, Malaysia

id: 4

Plagiarism detected: **0,39%** <http://nanobioletters.com/wp-content...>

Nota bene: for each author please provide ORCID

*corresponding author e-mail

address: chass501@gmail.com 57204181828

id: 5

Plagiarism detected: **0,39%** <http://nanobioletters.com/wp-content...>

Please add Scopus ID for the corresponding author:

ABSTRACT

Diarrhea is one of the leading causes of preventable death in developing countries including in Indonesia and Malaysia.

id: 6

Plagiarism detected: **0,19%** <https://www.lowyat.net/2019/192558/...> + 2 more resources!

It has been reported that the

leaves of sangkareho (*Callicarpa longifolia* Lam) is used traditionally as an antidiarrheal treatment in Central Kalimantan. The present study was aimed to evaluate the pharmacological activity against diarrhea using the ethanolic extract of sangkareho leaves. The extract was used for

id: 7

Plagiarism detected: **0,16%** <https://journals.sagepub.com/doi/fu...> + 2 more resources!

castor oil-induced diarrhea in mice.

The extracts were given orally to the mice at 200, 300, 400 mg/kg bodyweight and

id: 8

Plagiarism detected: **0,19%** <https://www.mdpi.com/1420-3049/24/7...>

loperamide was used as a standard

drug for diarrhea. The results showed % inhibition of diarrhea with values of no detected, 42.62%, 81.97%, 70.49% at 200, 300, 400 mg/kg bodyweight dose levels of the extract and loperamide, respectively as compared to the negative control. It can be considered at a dose level of 400 mg/kg bodyweight the extract has a greater anti-diarrheal effect than loperamide. In conclusion, ethanolic extract of sangkareho leaves (*Callicarpa longifolia* Lam) has anti-diarrheal activity and this supports the use of this plant as antidiarrhea in traditional treatment.

Keywords: Antidiarrheal; *Callicarpa longifolia*; Central Kalimantan; Loperamide; Sangkareho.

1. INTRODUCTION

According to the WHO and UNICEF reports, 1.9 million children below 5 years of age die because of diarrhea each year, of who most are from developing countries [1]. Diarrhea is one of the public health problems in Indonesia and Malaysia, based on data from the Indonesia health profile in 2010, the number of diarrhea cases found was around 213.435 patients with 1.289 deaths and 70-80% of these occurred in children especially those under the age of 5 years [2], Indonesia

id: 9

Plagiarism detected: **0,19%** <https://www.hinnews.com/news/world-...>

has the second highest number of

people (54 million) in the world that practice open defaecation, this increase health problems especially diarrhea because of poor quality of water and sanitation [3], Although in

id: 10

Plagiarism detected: **0,26%** <https://bmcpublihealth.biomedcentr...> + 2 more resources!

Malaysia enjoys a high coverage of treated water,

diarrhea episodes among children are still reported,

id: 11

Plagiarism detected: **1,46%** <https://bmcpublihealth.biomedcentr...> + 2 more resources!

based on the 2006 National Health and Morbidity Survey (NHMS), the overall prevalence of diarrhea in children below 5 years old in Malaysia was 4.5%, detailed analysis of the NHMS done in 2011 found that children below 5 years old were 33% higher compared to

5–9 years old aged group [4], from these data it can be estimated that over the next 20-30 years diarrhea will be the center of attention in Indonesia and Malaysia. Infection like diarrhea is primarily associated with enteric bacteria most common of which is *Escherichia coli* [5, 6, 7].

During the 20th century, due to increasing resistance to antibacterial agents, the side effects and the cost of treatments, the interest in traditional medicine and herb has been progressively increased [8-9]. WHO has encouraged studies for treatment of diarrheal conditions, therefore, as alternative medicinal plants were needed in discovering and developing for new anti-diarrhea agents [10]

id: 12

Plagiarism detected: 0,19% <http://journal.umpalangkaraya.ac.id...>

. Central Kalimantan is one of the

islands in Indonesia that have varieties of traditional plants. Sangkareho (*Callicarpa longifolia* Lam) is one medicinal plants in Central Kalimantan (Fig. 1), that locals used against diarrhea, dengue, and gastric disorders. Therefore, the present study was

id: 13

Plagiarism detected: 0,23% <https://www.ncbi.nlm.nih.gov/pmc/ar...> + 2 more resources!

aimed to evaluate the antidiarrheal activity of

Sangkareho (*Callicarpa longifolia* Lam) in experimentally induced acute diarrhea in mice.

Figure 1. Sangkareho leaves (*Callicarpa longifolia* Lam).

2. MATERIALS AND METHODS

Drug and Chemicals.

Loperamide HCl 2 mg, Castor oil and CMC Na 1%.

Preparation of Plant Extract.

The fresh leaves of Sangkareho were used as plant materials. The leaves were dried under the sun for 5-7 days. The leaves were crushed by a grinder. A total of 500 g of powder was extracted with 96% ethanol by using a percolator and the extract was concentrated in a rotary evaporator.

Experimental Animals.

Adult male swiss albino mice with age of 2-3 months, weighing between 20-50 g were used for experiment. The mice were obtained from the Animal Unit of Faculty of Mathematics and Science Lambung Mangkurat University. The animals were housed in a proper plastic cages at room temperature and acclimatized for a week before the commencement of dosing. During the entire period of the study, the animals were supplied

id: 14

Plagiarism detected: **0,23%** <https://www.sumathipublications.com...>

with standard pellet diet and water ad

libitum [11].

Animal grouping and dosing.

Animals were randomly divided into five groups (negative control, positive control and three treatment groups) comprising of three animals in each group. Negative control group received the CMC Na 1% and positive control group received the loperamide (2 mg usual dosage for human) at 0.0052 mg/20 g of bodyweight. The treatment groups received different doses levels of sangkareho leaves (200, 300 and 400 mg/kg respectively).

Preliminary Phytochemical Screening.

Qualitative phytochemical screening test was carried to determine the presence or absence of alkaloid, tannins, flavonoid, saponin, steroid in the 96% ethanolic leaf extract of (*Callicarpa longifolia* Lam) [12,13,14].

Castor Oil Induced Diarrhea.

Adult male swiss albino mice were fasted for 18 h with free access to water grouped and treated as described under the grouping and dosing section.

id: 15

Plagiarism detected: **0,26%** <https://www.ncbi.nlm.nih.gov/pmc/ar...> + 2 more resources!

One hour after treatment, diarrhea was induced by

giving oral administration of 1 ml castor oil to each mouse. The animals were housed in a separate transparent plastic cage in which the floor is

id: 16

Plagiarism detected: **0,26%** <https://journals.sagepub.com/doi/fu...>

lined with white paper. The paper was changed

hourly every hour for a total of four hours. During the observational period, the onset of diarrhea, number and weight of wet stools, total number and the total weight of faeces were recorded for 4 hours after the administration of castor oil. The percentage of diarrhea

inhibition was calculated with wet faeces using the published formula [11, 15-17].

% Inhibition = (control - test)/ control x 100%.

Statistical analysis.

The experimental

id: 17

Plagiarism detected: **0,45%** <https://journals.sagepub.com/doi/fu...> + 3 more resources!

results were analyzed using the Statistical Package for the Social Sciences (SPSS) version 20.

0 software. All the experimental data are expressed

id: 18

Plagiarism detected: **0,19%** <https://id.123dok.com/document/y600...>

as mean ± standard error of

means. Statistical significance of differences between groups was assessed

id: 19

Plagiarism detected: **0,16%** <https://www.ncbi.nlm.nih.gov/pmc/ar...> + 3 more resources!

by one-way ANOVA followed by

post-hoc Tukey's multiple comparison test. The results were considered significant at p-value 0.05 [18-19].

3. RESULTS

Sangkareho leaves (*Callicarpa longifolia* Lam) according to Purukcahu (Kabupaten Murung Raya, Central Kalimantan) community is effective as an anti-diarrheal however research on sangkareho as anti-diarrheal has not been widely studied. Based on some conducted phytochemical studies in Indonesia sangkareho (*Callicarpa longifolia* Lam) contains alkaloid, flavonoid, tanin, saponin and steroid [20-22], Our preliminary phytochemical screening on *Callicarpa longifolia* has confirmed the presence of alkaloid, flavonoid and steroid (Table 1). Flavonoids that exist in the extracts could play an important role, and the phenolic compounds have several pharmacological properties such as anti-diarrheal activities and spasmolytic. The alkaloid and steroid have been reported to have antibacterial and antifungal which can help in treating diarrhea [23-24]. Flavonoid, tannin and alkaloid are the major constituents that are primarily responsible for antidiarrheal activity with a specific mechanism [25].

Isolation and identification of flavonoid compounds from sangkareho leaves have been studied by Pasaribu et al the group of flavonoids derived from the ethyl acetate fraction of

sangkareho leaves (*Callicarpa longifolia* Lam) was thought to be a flavonol group, flavonoid compounds have a very high level of toxicity against *Artemia salina* leach indicated by the LC50 value of 26.8824 ppm and indicate that the isolates have potential for a high bioactive compounds [26].

This study aims to evaluate anti-diarrheal activity of sangkareho leaves by inducing diarrhea using castor oil. Recent study claims that nitric oxide

id: 20

Plagiarism detected: 0,19% <https://castoroil-guide.com/castor-...>

in castor oil is responsible for

the diarrheal effect, there are several mechanisms proposed to explain the diarrheal effect of castor oil one of which is inhibition of intestinal Na⁺ K⁺ ATPase activity, consequently reducing normal fluid absorption. Usually, castor oil is metabolized into ricinoleic acid in the gut, which causes irritation and inflammation in the intestinal mucosa, resulting in the release of inflammatory mediators (prostaglandins). The released prostaglandins initiate vasodilation,

id: 21

Plagiarism detected: 0,19% <https://www.ncbi.nlm.nih.gov/pubmed...> + 2 more resources!

smooth muscle contraction and mucus secretion

in the small intestines, in experimental it can be considered to be good diarrheagenic agents [27].

In this study compared to the negative controls, the three dose levels of ethanolic extract *Callicarpa longifolia* leaves significantly inhibited castor-oil induced enteropooling in mice at dose levels of 200, 300, 400 mg/kg bodyweight of extract, respectively. The percent inhibition of diarrhea calculated for the positive control (loperamide) was 70.49% (Table 2.). At 200, 300, 400 mg/kg bodyweight dose levels of the ethanolic extract, the means weight of faeces were 5.16 g ± 0.025, 1.05 g ± 0.015 and 0.33 g ± 0.031, respectively observed for 4 hours. At dose level of 200 mg/kg bodyweight of the ethanolic extract did not show inhibitory effects as compared to negative control (1.83 ± 0.021) and has a higher number of faeces weight (5.16 ± 0.025). The highest dose level of the plant extract (400 mg/kg bodyweight) showed a more significant reduction of faeces weight and has a percent inhibition of diarrhea 81.97, higher than loperamide (70.49%). The leaves of sangkareho (*Callicarpa longifolia* Lam) contain alkaloid and flavonoids which may be responsible for its pharmacological antidiarrheal activity. Based on the study by Russo et al oral administration of tannins flavonoids

id: 22

Plagiarism detected: 0,32% <https://www.ncbi.nlm.nih.gov/pubmed...>

seems safe and effective treatment in shortening the duration of

acute gastroenteritis [28] .

Table 1. Preliminary phytochemical composition of ethanolic leaf extract of *Callicarpa longifolia* Lam .

Test

Alkaloid

Flavonoid

Saponin

Tanin

Steroid

Tanin

Inference

+

+

-

-

+

-

+ = Presence; - = Absence

Table 2. Effect of ethanol extract *Callicarpa longifolia* Lam leaves

id: 23

Plagiarism detected: 0,23% <https://journals.sagepub.com/doi/fu...> + 2 more resources!

on castor oil induced diarrhea in mice

.

Groups

Onset (minute)

Weight of faeces (g) ± SD

% inhibition of diarrhea

Negative control (CMC na 1%)

10.44 ± 0.663

1.83 ± 0.021

-

Positive control (loperamid)

7.49 ± 0.465*

0.54 ± 0.025*

70.49

ES 200 mg/Kg

11.42 ± 0.526

5.16 ± 0.025*

-

ES 300 mg/Kg

8.90 ± 0.344*

1.05 ± 0.015*

42.62

ES 400 mg/Kg

10.50 ± 0.600

0.33 ± 0.031*

81.97

*P 0.05 vs control negative

4. CONCLUSIONS

In conclusion, the ethanolic extract of sangkareho leaves (*Callicarpa longifolia* Lam) has an

antidiarrheal activity as revealed by reductions weight of faeces. Hence, this study supports the use of the plant in the treatment of diarrhea in the traditional settings, but further studies are also required to identify the phytoconstituents responsible for these pharmacological activity and to establish the mechanism of action of antidiarrheal activity.

5. REFERENCES

Mekonnen, B.; Asrie , A .B.; Wubneh , Z .B.

id: 24

Plagiarism detected: **0,26%** <https://journals.sagepub.com/doi/fu...>

Antidiarrheal activity of 80% methanolic leaf extract of

Justicia schimperiana. eCAM 2018, 2018, <https://doi.org/10.1155/2018/3037120>.

Fратиwi, Y. The potential of guava leaf (Psidium guajava L.) for diarrhea. J Majority 2015, 4, 113-118

Komarulzaman, A.; Smits , J.; De Jong , E. Clean water, sanitation and diarrhoea in Indonesia: Effects of household and community factors. Glob Pub Health 2017, 12, 1141-1155, <https://doi.org/10.1080/17441692.2015.1127985>.

Abdul, A.F.A.; Ahmad , N .A.; Abdul , R.M.A.; Omar , M.; Kasim , N .M.; Yusof , M.; Sooryanarayana , R.; Jamaludin , R.; Ying , Y .C.

id: 25

Plagiarism detected: **0,62%** <https://bmcpublichealth.biomedcentr...> + 2 more resources!

Prevalence of and factors associated with diarrhoeal diseases among children under five in Malaysia: a cross-sectional study 2016. BMC

Pub Health 2018, 18, 1363,

id: 26

Plagiarism detected: **0,1%** <https://bmcpublichealth.biomedcentr...> + 2 more resources!

<https://doi.org/10.1186/s12889-018-6266->

z.

Raghavan, P .R.; Roy , S.; Thamizhmani , R.; Purushothaman , S .A. Diarrheagenic Escherichia coli infections among the children of Andaman Islands with special reference to pathotype distribution and clinical profile. J Epid Glob Health 2017, 7, 305 -308, <https://doi.org/10.1016/j.jegh.2017.07.003>.

Peirano, V.; Bianco , M .N.; Navarro , A.; Schelotto , F.; Varela ,

id: 27

Plagiarism detected: **0,62%** <http://www.pri.sld.cu/wp-content/up...> + 3 more resources!

G. Diarrheogenic Escherichia coli associated with acute gastroenteritis in children from soriano, Uruguay. Can J Infect Dis Med Microbiol

2018, 2018, <https://doi.org/10.1155/2018/8387218>.

Zhou, Y.; Zhu , X.; Hou , H.; Lu , Y.; Yu , J.; Mao , L.; Mao , L.; Sun , Z. Characteristics of diarrheogenic Escherichia coli among

id: **28**

Plagiarism detected: **0,19%** <https://www.who.int/bulletin/volume...> + 2 more resources!

children under 5 years of age

with acute diarrhea: a hospital based study. BMC Inf Dis 2018, 18, <https://doi.org/10.1186/s12879-017-2936-1>.

Gupta, P .D.; Birdi , T .J.

id: **29**

Plagiarism detected: **0,23%** <https://www.ncbi.nlm.nih.gov/pmc/ar...> + 2 more resources!

Development of botanicals to combat antibiotic resistance.

J Ayurveda Integr Med 2017, 8, 266-275, <https://doi.org/10.1016/j.jaim.2017.05.004>.

Ardhany, S .D.; Novaryatiin , S. Antibacterial activity of ethanolic extract

id: **30**

Plagiarism detected: **0,19%** <https://journal.uniga.ac.id/index.p...>

bawang dayak (Eleutherine bulbosa (Mill.) U

rb) in cream against Propionibacterium acnes. Int J App Pharm 2019, 11, <https://doi.org/10.22159/ijap.2019.v11s5.T0020>.

Uddin, M .M.N.; Zahan , S.; Islam , A.; Ahmed , S.; Mowla , T .E.; Rahman , M .S.; Sultan , R .A.; Emran , T .B.

id: **31**

Plagiarism detected: **0,19%** <https://journals.sagepub.com/doi/fu...> + 4 more resources!

Evaluation of the anti-diarrheal activity of

methanol extract and its fractions of Urena sinuata L. (Borss) leaves. J App Pharm Sci 2016, 6, 056-060, <https://doi.org/10.7324/JAPS.2016.601208>.

Tadesse, E.; Engidawork , E.; Nedi , T.; Mengistu ,

id: **32**

Plagiarism detected: **0,55%** <https://journals.sagepub.com/doi/fu...> + 4 more resources!

G. Evaluation of the anti-diarrheal activity of the aqueous stem extract of *Lantana camara* Linn (Verbenaceae) i

n mice . BMC Complement Altern Med 2017, 17,

id: 33

Plagiarism detected: **0,1%** <https://science.news/2018-07-31-eva...> + 2 more resources!

<https://doi.org/10.1186/s12906-017-1696->

1.

Mojab, F.; Kamalinejad , M.; Ghaderi , N.; Vahidipour , H .R.

id: 34

Plagiarism detected: **0,36%** <https://journals.sagepub.com/doi/fu...> + 5 more resources!

Phytochemical screening of some species of Iranian plants. Iran J Pharm

Res 2003, 2, <https://doi.org/10.22037/ijpr.2010.16>

Hossain, M .A.; Al-Raqmi , K .A.S.; Al-Mijzy , Z .H.; Weli , A .M.; Al-Riyami , Q. Study of total phenol, flavonoids contents and phytochemical screening of various leaves crude extracts of locally grown *Thymus vulgaris*. Asian Pac J Trop Biomed 2013, 3, 707-710, [https://doi.org/10.1016/S2221-1691\(13\)60142-2](https://doi.org/10.1016/S2221-1691(13)60142-2)

Mujeeb, F.; Bajpai , P.; Pathak , N. Phytochemical evaluation, antimicrobial activity and determination of bioactive components from leaves of *Aegle marmelos*. Biomed Res Int, 2014, 2014, <https://doi.org/10.1155/2014/497606>.

Maxwell, I .E.; Ihechiluru , I .E.; Kelechi , G .M.; Nkiru , E .U.; Iheanacho , A .U.; Stella , C .A.; Daniel , C .I. Antidiarrheal activity of *Pterocarpus erinaceus* methanol leaf extract in experimentally-induced diarrhea.

id: 35

Plagiarism detected: **0,19%** <https://www.ema.europa.eu/en/docume...>

Asian Pac J Trop Med 2012,

5, 147-150, [https://doi.org/10.1016/S1995-7645\(12\)60014-5](https://doi.org/10.1016/S1995-7645(12)60014-5).

Ihekwereme, P .C.; Erhirhie , E .O.; Mbagwu , I .S.; Ilodigwe , E .E.; Ajaghaku , D .L.; Okoye , F .B.

id: 36

Plagiarism detected: **0,42%** <https://www.academia.edu/34133743/A...> + 2 more resources!

Antidiarrheal property of *Napoleona imperialis* may be due to procyanidins and ellagic acid derivatives. J App Pharm Sci 2016, 6, 101-106, <https://doi.org/10.7324/JAPS.2016.60317>.

Boyina, R.; Kosanam , S.; Rani , T .T. Evaluation of anti-diarrheal activity

id: 37

Plagiarism detected: **0,19%** <https://www.mendeley.com/catalogue/...>

of aqueous extract of *Trigonella foenum-*

Graecum. Int J Pharm Res, 2014, 4, 130-133.

Birru, E .M.; Asrie , A .B.; Adinew , G .M.; Tsegaw ,

id: 38

Plagiarism detected: **0,36%** <https://journals.sagepub.com/doi/fu...>

A. Antidiarrheal activity of crude methanolic root extract of *Idigofera spicata*

Forssk. (Fabaceae). BMC Complement Altern Med 2016, 16,
<https://doi.org/10.1186/s12906-016-1252-4>.

Degu, A.; Engidawork , E.; Shibeshi ,

id: 39

Plagiarism detected: **0,75%** <https://journals.sagepub.com/doi/fu...> + 4 more resources!

W. Evaluation of the anti-diarrheal activity of the leaf extract of *Croton macrostachyus* Hocsht. ex Del. (Euphorbiaceae) in mice model. BMC Complement Altern

Med 2016, 16, <https://doi.org/10.1186/s12906-016-1357-9>.

Ihwan, Koda Sari HA. Antimalarial herbal plants in Kupang, Indonesia. Biosaintifika 2017, 9, 95-104, <https://doi.org/10.15294/biosaintifika.v9i1.5811>.

Syamsul, E .S.; Andani , F.; Soemarie , Y .B. Analgesic activity study of ethanolic extract of *Callicarpa longifolia* Lamk. in mice. Trad Med J 2016, 21, 99-103.

Susilawati, E.; Selifiana , N.; Aligita , W.; Fionna , E.; Betharia , P .S.C.

id: 40

Plagiarism detected: **0,49%** <https://ejournal.unisba.ac.id/index...> + 3 more resources!

Aktivitas ekstrak etanol daun kerehau (*Callicarpa longifolia* Lamk.) sebagai antidiabetes pada mencit jantan yang diinduksi

aloksan. Jurnal ilmiah Farmasi Farmasyifa 2019, 2, <https://doi.org/10.29313/jiff.v2i1.4059>.

Sudira, I .W.; Merdana , I .M.; Qurani , S .C. Preliminary phitochemical analysis of guava leaves (*Psidium guajava* L.) as antidiarrheal in calves. Adv Trop Bio Environ Sci 2019, 3, <https://doi.org/10.24843/ATBES.2019.v03.i02.p01>.

Ebbo, A .A.; Bello , A.; Liman , Y .M. Anti-Diarrheal studies of aqueous leaf extract of *Chrozophora Senegalensis* in Albino Rats. Arch Clin Med Case Rep 2019, 3, <https://doi.org/10.26502/acmcr.96550070>.

Sisay, M.; Engidawork , E.; Shibeshi ,

id: 41

Plagiarism detected: **0,68%** <https://journals.sagepub.com/doi/fu...>

W. Evaluation of the antidiarrheal activity of the leaf extracts of *Myrtus communis* Linn (Myrtaceae) in mice model. BMC Complement Altern

Med 2017, 17, <https://doi.org/10.1186/s12906-017-1625-3>.

Pasaribu, S .P.; Erwin, I.P. Isolasi dan identifikasi senyawa flavonoid dari daun tumbuhan kerehau (*Callicarpa longifolia* Lam.). Jurnal Kimia Mulawarman 2014, 11, 80-83 .

Rahman, K .M.; Chowdhury , A .U.M.; Islam , M .T.; Chowdhury , A.M.; Uddin , M .E.; Sumi , C .D. Evaluation of antidiarrheal activity of methanolic extract of *Maranta arundinacea* Linn. leaves. Adv Pharm Sci 2015, 2015, <http://dx.doi.org/10.1155/2015/257057>.

Russo, M.; Coppola , V.; Giannetti , E.; Buonavolonta , R.; Piscitelli , A.; Staiano ,

id: 42

Plagiarism detected: **0,58%** <https://www.ncbi.nlm.nih.gov/pubmed...> + 5 more resources!

A. Oral administration of tannins and flavonoids in children with acute diarrhea: a pilot, randomized, control-case study. Ital

J Pediatr 2018, 44, <http://dx.doi.org/10.1186/s13052-018-0497-6>.

id: 43

Plagiarism detected: **0,94%** <https://bmcpublikealth.biomedcentr...> + 18 more resources!

© 2019 by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).



Plagiarism Detector

Your right to know the authenticity!

Antidiarrheal activity of ethanolic extract of leaves of Sangkareho (*Callicarpa longifolia* Lam) from Central KalimantanSyahrida Dian Ardhanay^{1,*}, Nurul Chusna¹, Zulkhurnain Utar², Zuraini Zakaria³, Briliano Pascalo¹¹Department of Pharmacy, Faculty of Health Sciences, Muhammadiyah University of Palangkaraya, 73111 Palangka Raya, Indonesia; ²Malaysian Institute of Pharmaceutical and Nutraceuticals (MIPAN), National Institute of Biotechnology Malaysia, Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC), Block 3D Halaman Bukit Gambir, 11700 Penang, Malaysia; ³Biology Program School of Distance Education, Universiti Sains Malaysia 11800 Minden Penang, Malaysia

*Corresponding author e-mail address: ehas198@gmail.com

Scopus: 57284181828

Please add Scopus ID for the corresponding author

Admin Deleted: / Review Article / Editorial

Admin Formatted: Highlight

Admin Formatted: Highlight

ABSTRACT

Diarrhea is one of the leading causes of preventable death in developing countries including in Indonesia and Malaysia. It has been reported that the leaves of sangkareho (*Callicarpa longifolia* Lam) is used traditionally as an antidiarrheal treatment in Central Kalimantan. The present study was aimed to evaluate the pharmacological activity against diarrhea using the ethanolic extract of sangkareho leaves. The extract was used for castor oil-induced diarrhea in mice. The extracts were given orally to the mice at 200, 300, 400 mg/kg bodyweight and loperamide was used as a standard drug for diarrhea. The results showed % inhibition of diarrhea with values of no detected, 42.62%, 81.97%, 70.49% at 200, 300, 400 mg/kg bodyweight dose levels of the extract and loperamide, respectively as compared to the negative control. It can be considered at a dose level of 400 mg/kg bodyweight the extract has a greater anti-diarrheal effect than loperamide. In conclusion, ethanolic extract of sangkareho leaves (*Callicarpa longifolia* Lam) has anti-diarrheal activity and this supports the use of this plant as antidiarrhea in traditional treatment.

Keywords: Antidiarrheal, *Callicarpa longifolia*, Central Kalimantan, Loperamide, Sangkareho.

1. INTRODUCTION

According to the WHO and UNICEF reports, 1.9 million children below 5 years of age die because of diarrhea each year, of whom most are from developing countries [1]. Diarrhea is one of the public health problems in Indonesia and Malaysia, based on data from the Indonesia health profile in 2010, the number of diarrhea cases found was around 213,435 patients with 1,289 deaths and 78-80% of these occurred in children especially those under the age of 5 years [2]. Indonesia has the second highest number of people (54 million) in the world that practice open defecation, this increase health problems especially diarrhea because of poor quality of water and sanitation [3]. Although in Malaysia enjoys a high coverage of treated water, diarrhea episodes among children are still reported, based on the 2006 National Health and Morbidity Survey (NHMS), the overall prevalence of diarrhea in children below 5 years old in Malaysia was 4.5%, detailed analysis of the NHMS done in 2011 found that children below 5 years old were 33% higher compared to 5-9 years old aged group [4], from these data it can be estimated that over the next 20-30 years diarrhea will be the center of attention in Indonesia and Malaysia. Infection like diarrhea is primarily associated with enteric bacteria most common of which is *Escherichia coli* [5, 6, 7].

During the 20th century, due to increasing resistance to antibacterial agents, the side effects and the cost of treatments, the interest in traditional medicine and herb has been progressively

increased [8-9]. WHO has encouraged studies for treatment of diarrheal conditions, therefore, as alternative medicinal plants were needed in discovering and developing for new anti-diarrhea agents [10]. Central Kalimantan is one of the islands in Indonesia that have varieties of traditional plants. Sangkareho (*Callicarpa longifolia* Lam) is one medicinal plant in Central Kalimantan (Fig. 1), that locals used against diarrhea, dengue, and gastric disorders. Therefore, the present study was aimed to evaluate the antidiarrheal activity of Sangkareho (*Callicarpa longifolia* Lam) in experimentally induced acute diarrhea in mice.



Figure 1. Sangkareho leaves (*Callicarpa longifolia* Lam).

Admin Deleted: =

Page | 1

Syahrida Dian Ardhanay, Nurul Chusna, Zulkhurnain Utar, Zuraini Zakaria, Briliano Pascalo

2. MATERIALS AND METHODS

Drug and Chemicals.

Loperamide HCl 2 mg, Castor oil and CMC Na 1%.

Preparation of Plant Extract.

The fresh leaves of Sangkareho were used as plant materials. The leaves were dried under the sun for 5-7 days. The leaves were crushed by a grinder. A total of 500 g of powder was extracted with 96% ethanol by using a percolator and the extract was concentrated in a rotary evaporator.

Experimental Animals.

Adult male Swiss albino mice with age of 2-3 months, weighing between 20-50 g were used for experiment. The mice were obtained from the Animal Unit of Faculty of Mathematics and Science Lambung Mangkurat University. The animals were housed in a proper plastic cages at room temperature and acclimatized for a week before the commencement of dosing. During the entire period of the study, the animals were supplied with standard pellet diet and water *ad libitum* [11].

Animal grouping and dosing.

Animals were randomly divided into five groups (negative control, positive control and three treatment groups) comprising of three animals in each group. Negative control group received the CMC Na 1% and positive control group received the loperamide (2 mg usual dosage for human) at 0.0052 mg/20 g of bodyweight. The treatment groups received different doses levels of sangkareho leaves (200, 300 and 400 mg/kg respectively).

3. RESULTS

Sangkareho leaves (*Callicarpa longifolia* Lam) according to Purnakaha (Kabupaten Murung Raya, Central Kalimantan) community is effective as an anti-diarrheal however research on sangkareho as anti-diarrheal has not been widely studied. Based on some conducted phytochemical studies in Indonesia sangkareho (*Callicarpa longifolia* Lam) contains alkaloid, flavonoid, tannin, saponin and steroid [20-22]. Our preliminary phytochemical screening on *Callicarpa longifolia* has confirmed the presence of alkaloid, flavonoid and steroid (Table 1). Flavonoids that exist in the extracts could play an important role, and the phenolic compounds have several pharmacological properties such as anti-diarrheal activities and spasmolytic. The alkaloid and steroid have been reported to have antibacterial and antifungal which can help in treating diarrhea [23-24]. Flavonoid, tannin and alkaloid are the major constituents that are primarily responsible for antidiarrheal activity with a specific mechanism [25].

Isolation and identification of flavonoid compounds from sangkareho leaves have been studied by Pasaribu *et al* the group of flavonoids derived from the ethyl acetate fraction of sangkareho leaves (*Callicarpa longifolia* Lam) was thought to be a flavonol group. Flavonoid compounds have a very high level of toxicity against *Artemia salina* leach indicated by the LC50 value of 26.8824 ppm and indicate that the isolates have potential for a high bioactive compounds [26].

Preliminary Phytochemical Screening.

Qualitative phytochemical screening test was carried to determine the presence or absence of alkaloid, tannins, flavonoid, saponin, steroid in the 96% ethanolic leaf extract of (*Callicarpa longifolia* Lam) [12,13,14].

Castor Oil Induced Diarrhea.

Adult male Swiss albino mice were fasted for 18 h with free access to water grouped and treated as described under the grouping and dosing section. One hour after treatment, diarrhea was induced by giving oral administration of 1 ml castor oil to each mouse. The animals were housed in a separate transparent plastic cage in which the floor is lined with white paper. The paper was changed hourly every hour for a total of four hours. During the observational period, the onset of diarrhea, number and weight of wet stools, total number and the total weight of faeces were recorded for 4 hours after the administration of castor oil. The percentage of diarrhea inhibition was calculated with wet faeces using the published formula [11, 15-17].

$$\% \text{ Inhibition} = (\text{control} - \text{test}) / \text{control} \times 100\%$$

Statistical analysis.

The experimental results were analyzed using the Statistical Package for the Social Sciences (SPSS) version 20.0 software. All the experimental data are expressed as mean \pm standard error of means. Statistical significance of differences between groups was assessed by one-way ANOVA followed by post-hoc Tukey's multiple comparison test. The results were considered significant at p -value < 0.05 [18-19].

This study aims to evaluate anti-diarrheal activity of sangkareho leaves by inducing diarrhea using castor oil. Recent study claims that nitric oxide in castor oil is responsible for the diarrheal effect, there are several mechanisms proposed to explain the diarrheal effect of castor oil one of which is inhibition of intestinal Na^+/K^+ ATPase activity, consequently reducing normal fluid absorption. Usually, castor oil is metabolized into ricinoleic acid in the gut, which causes irritation and inflammation in the intestinal mucosa, resulting in the release of inflammatory mediators (prostaglandins). The released prostaglandins initiate vasodilation, smooth muscle contraction and mucus secretion in the small intestines, in experimental it can be considered to be good diarrheagenic agents [27].

In this study compared to the negative controls, the three dose levels of ethanolic extract *Callicarpa longifolia* leaves significantly inhibited castor-oil induced enteropooling in mice at dose levels of 200, 300, 400 mg/kg bodyweight of extract, respectively. The percent inhibition of diarrhea calculated for the positive control (loperamide) was 70.49% (Table 2). At 200, 300, 400 mg/kg bodyweight dose levels of the ethanolic extract, the means weight of faeces were 5.16 ± 0.025 , 1.05 ± 0.015 and 0.33 ± 0.031 , respectively observed for 4 hours. At dose level of 200 mg/kg bodyweight of the ethanolic extract did not show inhibitory effects as compared to negative control (1.83 ± 0.021) and has a higher number of faeces weight (5.16 ± 0.025). The

Admin Deleted: were

Page | 2

Antidiarrheal Activity of Ethanolic Extract of Leaves of Sangkarcho (*Calliurus longifolia* Lam) from Central Kalimantan

highest dose level of the plant extract (400 mg/kg bodyweight) showed a more significant reduction of faeces weight and has a percent inhibition of diarrhea 81.97, higher than loperamide (70.49%). The leaves of sangkarcho (*Calliurus longifolia* Lam) contain alkaloid and flavonoids which may be responsible for its

pharmacological antidiarrheal activity. Based on [the study by Russo et al](#) oral administration of tannins flavonoids seems safe and effective in shortening the duration of acute gastroenteritis [28].

Table 1. Preliminary phytochemical composition of ethanolic leaf extract of *Calliurus longifolia* Lam.

Reference	Alkaloid	Flavonoid	Saponin	Tannin	Terpeno	Toxin
++ Presence, -- Absence						

Table 2. Effect of ethanolic extract *Calliurus longifolia* Lam leaves on castor oil induced diarrhea in mice.

Group	Onset (min)	Weight of feces (g) ± SD	% Inhibition of diarrhea
Negative control (CMC na 1%)	13.42 ± 0.526	1.56 ± 0.035*	70.49
Positive control (loperamide)	7.89 ± 0.463*	0.54 ± 0.035*	70.49
ES 200 mg/kg	11.82 ± 0.526	1.56 ± 0.035*	42.62
ES 300 mg/kg	9.90 ± 0.344*	1.03 ± 0.035*	42.62
ES 400 mg/kg	10.50 ± 0.600	0.33 ± 0.031*	81.97

*P<0.05 vs control (negative)

4. CONCLUSIONS

In conclusion, the ethanolic extract of sangkarcho leaves (*Calliurus longifolia* Lam) has an antidiarrheal activity as revealed by reductions weight of faeces. Hence, this study supports the use of [the plant](#) in the treatment of diarrhea in the

traditional settings, but further studies are also required to identify the phytoconstituents responsible for these pharmacological activity and to establish the mechanism of action of antidiarrheal activity.

5. REFERENCES

- Mekonnen, B., Asrie, A.B., Wubneh, Z.B. Antidiarrheal activity of 80% methanolic leaf extract of *Banisteria acuminata*. *eCAM* 2018, 2018. <https://doi.org/10.1155/2018/3037120>.
- Fraitwa, Y. The potential of guava leaf (*Psidium guajava* L.) for diarrhea. *J Magny* 2016, 4, 113-118.
- Komaruzaman, A., Smits, J., De Jong, E. Clean water, sanitation and diarrhoea in Indonesia: Effects of household and community factors. *Glob Pub Health* 2017, 12, 1141-1155. <https://doi.org/10.1080/17441092.2015.1127285>.
- Abdul, A.F.A., Ahmad, N.A., Abdul, R.M.A., Omar, M., Kasim, N.M., Yusof, M., Sooryanarayana, R., Jamaludin, R., Ying, Y.C. Prevalence of and factors associated with diarrhoeal diseases among children under five in Malaysia: a cross-sectional study 2016. *BMC Pub Health* 2018, 18, 1363. <https://doi.org/10.1186/s12889-018-6269-2>.
- Raghavan, P.R., Roy, S., Thambiah, R., Parasothaman, S.A. Diarrheogenic *Escherichia coli* infections among the children of Andaman Islands with special reference to subtype distribution and clinical profile. *J Epidemiol Glob Health* 2017, 7, 305-308. <https://doi.org/10.1016/j.jegh.2017.07.003>.
- Perrino, A.V., Bianco, M.N., Navarra, A., Scatolon, F., Varela, G. Diarrheogenic *Escherichia coli* associated with acute gastroenteritis in children from soriano, Uruguay. *Cas J Infect Dis Med Microbiol* 2018, 2018. <https://doi.org/10.1155/2018/838718>.
- Zhou, Y.; Zhu, X.; Hou, H.; Lu, Y.; Yu, J.; Mao, L.; Mao, L.; Sun, Z. Characteristics of diarrheogenic *Escherichia coli* among children under 5 years of age with acute diarrhea: a hospital based study. *BMC Inf Dis* 2018, 18, <https://doi.org/10.1186/s12879-017-2593-1>.
- Gupta, P.D., Bardi, T.J. Development of botanicals to combat antibiotic resistance. *J Ayurveda Integr Med* 2017, 8, 266-275. <https://doi.org/10.1016/j.jaim.2017.05.005>.
- Arduhny, S.D., Novaryanti, S. Antibacterial activity of ethanolic extract bawang daeah (*Eleusine indica* (MILL.) Urb) in cream against *Propionibacterium acnes*. *Int J App Pharm* 2019, 11, <https://doi.org/10.21203/rs.2019.05.17000>.
- Uddin, M.M.N.; Zahan, S.; Islam, A.; Ahmed, S.; Mowla, T.E.; Rahman, M.S.; Sultan, R.A.; Ennam, T.B. Evaluation of the anti-diarrheal activity of methanol extract and its fractions of *Urena sinuata* L. (Bors.) leaves. *J App Pharm Sci* 2016, 6, 056-060. <https://doi.org/10.7124/JAPS.2016.60709>.
- Tadesse, K.; Engdawork, E.; Nesh, Y.; Mengistu, G. Evaluation of the anti-diarrheal activity of the aqueous stem extract of *Lantana camara* Linn (Verbenaceae) in mice. *BMC Complement Altern Med* 2017, 17, <https://doi.org/10.1186/s12906-017-1096-1>.
- Majidi, F.; Kamalipour, M.; Ghaderi, N.; Vahidpour, H.R. Phytochemical screening of some species of Iranian plants. *Iran J Pharm Res* 2003, 7, <https://doi.org/10.22037/ijpr.2010.16>.
- Hossain, M.A.; Al-Ragun, K.A.S.; Al-Mutiry, Z.H.; Welh, A.M.; Al-Riyami, Q. Study of total phenol, flavonoids contents and phytochemical screening of various leaves crude extracts of locally grown *Thymus vulgaris*. *Asian Pac J Trop Biomed* 2013, 3, 707-710. [https://doi.org/10.1016/S2221-1691\(13\)60143-2](https://doi.org/10.1016/S2221-1691(13)60143-2).
- Majidi, F.; Bages, P.; Fakhri, N. Phytochemical evaluation, antimicrobial activity and determination of bioactive components from leaves of *Aegle marmelos*. *Biomed Res Int* 2014, 2014. <https://doi.org/10.1155/2014/409760>.
- Maxwell, I.E.; Hechhorn, I.E.; Kelechi, G.M.; Nkiri, E.U.; Beauscho, A.U.; Stella, C.A.; Daniel, C.I. Antidiarrheal activity of *Pterocarpus erinaceus* methanol leaf extract in experimentally-induced diarrhea. *Asian Pac J Trop Med* 2012, 5, 147-150. [https://doi.org/10.1016/S1907-7045\(12\)60014-3](https://doi.org/10.1016/S1907-7045(12)60014-3).
- Bakawere, P.C.; Erhabe, E.G.; Mgbogu, I.S.; Ilojeogwe, E.E.; Ajaghaka, D.L.; Okoye, F.B. Antidiarrheal property of *Nigella arvensis* may be due to procyanidins and ellagic acid derivatives. *J App Pharm Sci* 2016, 6, 101-106. <https://doi.org/10.7124/JAPS.2016.60107>.
- Boytas, K.; Kosman, S.; Ram, T.T. Evaluation of anti-diarrheal activity of aqueous extract of *Trigonella foenum-graecum*. *Int J Pharm Res* 2014, 4, 130-133.

Page | 3

Honest-Man
Please add at least 10 references from the last 2 years (2017-2018).
Reply

Honest-Man
Please remove any citation from our journal (if applicable). This practice is not allowed by the editorial board!
Reply

Honest-Man
Please try to cite only articles with DOI (digital object identifier); also add DOI for each reference.
Reply

Syahrída Dian Ardhanay, Nurul Chusna, Zulkhurnain Utar, Zuraini Zakaria, Brilliano Fascalo

- Birru, E.M.; Asrie, A.B.; Adnew, G.M.; Tegaw, A. Antidiarrheal activity of crude methanolic root extract of *Idigofera spicata* Forsk. (Fabaceae). *BMC Complement Altern Med* 2016, 16, <https://doi.org/10.1186/s12906-016-1252-4>.
- Degu, A.; Engdawork, E.; Shibeshi, W. Evaluation of the anti-diarrheal activity of the leaf extract of *Croton macrostachyus* Hochst. ex Del. (Euphorbiaceae) in mice model. *BMC Complement Altern Med* 2016, 16, <https://doi.org/10.1186/s12906-016-1357-2>.
- Ihwan, Koda Sari HA. Antimalarial herbal plants in Kupang, Indonesia. *Biosaintifika* 2017, 9, 95-104. <https://doi.org/10.15294/biosaintifika.v9i1.5811>.
- Syamsul, E.S.; Andani, F.; Soemarie, Y.B. Analgesic activity study of ethanolic extract of *Calliurus longifolia* Lamk. in mice. *Trad Med J* 2016, 21, 99-103.
- Suailawati, E.; Selifiana, N.; Aligita, W.; Fioma, E.; Betharia, P.S.C. Aktivitas ekstrak etanol daun kerebau (*Calliurus longifolia* Lamk.) sebagai antidiabetes pada mencit jantan yang dinduksi aleksan. *Jurnal Ilmiah Farmasi Farmasif* 2019, 2, <https://doi.org/10.29813/ijff.v2i1.4099>.
- Sudira, I.W.; Merdana, I.M.; Qurani, S.C. Preliminary phytochemical analysis of guava leaves (*Psidium guajava* L.) as

- antidiarrheal in calves. *Adv Trop Bio Environ Sci* 2019, 3, <https://doi.org/10.24843/ATBES.2019.v03.i02.p01>.
- Ebbo, A.A.; Bello, A.; Liman, Y.M. Anti-Diarrheal studies of aqueous leaf extract of *Chrozophora Senegalensis* in Albino Rats. *Arch Clin Med Case Rep* 2019, 3, <https://doi.org/10.26502/acmer.96550070>.
- Sisay, M.; Engdawork, E.; Shibeshi, W. Evaluation of the antidiarrheal activity of the leaf extracts of *Myrsine communis* Linn (Myrtaceae) in mice model. *BMC Complement Altern Med* 2017, 17, <https://doi.org/10.1186/s12906-017-1025-3>.
- Pasaribu, S.P.; Erwin, I.P. Isolasi dan identifikasi senyawa flavonoid dari daun tumbuhan kerebau (*Calliurus longifolia* Lam.). *Jurnal Kimia Mulawarman* 2014, 11, 80-83.
- Rahman, K.M.; Chowdhury, A.U.M.; Islam, M.T.; Chowdhury, A.M.; Uddin, M.E.; Sumi, C.D. Evaluation of antidiarrheal activity of methanolic extract of *Maranta arundinacea* Linn. leaves. *Adv Pharm Sci* 2015, 2015, <http://dx.doi.org/10.1155/2015/257057>.
- Russo, M.; Coppola, V.; Giannetti, E.; Buonvolonta, R.; Piscitelli, A.; Staiano, A. Oral administration of tannins and flavonoids in children with acute diarrhea: a pilot, randomized, control-case study. *Ital J Pediatr* 2018, 44, <http://dx.doi.org/10.1186/s13052-018-0497-6>.



© 2019 by the authors. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).

4. Article for final proof (LIANBS)

Alex Grumezescu <al.grumezescu@gmail.com> 27 Des 2019 15.54 ☆ ↶ ⋮
 kepada saya ▾

🌐 Inggris ▾ > Indonesia ▾ [Terjemahkan pesan](#) [Nonaktifkan untuk: Inggris](#) ✕

The paper will be published today.
Alex
 ...

Syahrida dian <chass501@gmail.com> 1 Jan 2020 09.09 ☆ ↶ ⋮
 kepada Alex ▾

Thanks a lot **alex**
 ...

5. Article Published (LIANBS)

nanobioletters.com/all-issues/2019-2/issue-4

Letters in Applied NanoBioScience
 Open-Access Journal (ISSN: 2284-6808)

Home All Issues ▾ Author Guidelines ▾ Journal Info ▾ Submit an article

10) Antidiarrheal activity of ethanolic extract of leaves of Sangkareho (*Callicarpa longifolia* Lam) from Central Kalimantan

<https://doi.org/10.33263/LIANBS84.739742>

Syahrida Dian Ardhanay, Nurul Chusna, Zulkhurnain Utar, Zuraini Zakaria, Brillano Pascalo

Table 1. Effect of ethanol extract *Callicarpa longifolia* Lam leaves on castor oil induced diarrhea in mice

Groups	Onset (minute)	Weight of faeces (g) ± SD	% inhibition of diarrhea
Negative control (CMC na 1%)	10.44 ± 0.663	1.31 ± 0.021	-
Positive control (loperamide)	7.49 ± 0.465*	0.54 ± 0.025*	70.49
ES 200 mg/kg	11.42 ± 0.526	5.16 ± 0.025*	-
ES 300 mg/kg	8.90 ± 0.344*	1.05 ± 0.015*	42.62
ES 400 mg/kg	10.50 ± 0.600	0.33 ± 0.031*	81.97

*P< 0.05 vs control negative

Download

Antidiarrheal activity of ethanolic extract of leaves of Sangkareho (*Callicarpa longifolia* Lam) from Central Kalimantan

Syahrida Dian Ardhanay^{1*}, Nurul Chusna¹, Zulkhurnain Uta², Zuraini Zakaria³, Brillano Pascale⁴

¹Department of Pharmacy, Faculty of Health Sciences, Muhammadiyah University of Palangkaraya, 73111 Palangkaraya, Raya, Indonesia
²Malaysia Institute of Pharmaceutical and Nutraceuticals (Pharm), National Institute of Biotechnology Malaysia, Ministry of Energy, Science, Technology, Environment and Climate Change/MESTEC, Block 10 Halmah Rakit Gunung, 17900 Pengang, Malaysia
³Biology Program School of Distance Education, Universiti Sains Malaysia 11800 Minden Penang, Malaysia
⁴Corresponding author e-mail address: chusna59@gmail.com | Scopus ID: 5720411828

ABSTRACT

Diarrhea is one of the leading causes of preventable death in developing countries including in Indonesia and Malaysia. It has been reported that the leaves of sangkareho (*Callicarpa longifolia* Lam) is used traditionally as an antidiarrheal treatment in Central Kalimantan. The present study was aimed to evaluate the pharmacological activity against diarrhea using the ethanolic extract of sangkareho leaves. The extract was used for castor oil-induced diarrhea in mice. The extracts were given orally to the mice at 200, 300, 400 mg/kg bodyweight and loperamide was used as a standard drug for diarrhea. The results showed % inhibition of diarrhea with values of 0 not detected, 42.62%, 81.97%, 70.49% at 200, 300, 400 mg/kg bodyweight dose levels of the extract and loperamide, respectively as compared to the negative control. It can be considered as a dose level of 400 mg/kg bodyweight extract has a greater anti-diarrheal effect than loperamide. In conclusion, ethanolic extract of sangkareho leaves (*Callicarpa longifolia* Lam) has anti-diarrheal activity and this supports the use of this plant as antidiarrheal in traditional treatment.

Keywords: Antidiarrheal; *Callicarpa longifolia*; Central Kalimantan; Loperamide; Sangkareho.

1. INTRODUCTION

According to the WHO and UNICEF reports, 1.9 million children below 5 years of age die because of diarrhea each year, of whom most are from developing countries [1]. Diarrhea is one of the public health problems in Indonesia and Malaysia, based on data from the Indonesia health profile in 2010, the number of diarrhea cases found was around 213,435 patients with 1,289 deaths and 70-80% of these occurred in children especially those under the age of 5 years [2]. Indonesia has the second highest number of people (54 million) in the world that practice open defecation, this increase health problems especially diarrhea because of poor quality of water and sanitation [3]. Although in Malaysia enjoys a high coverage of treated water, diarrhea episodes among children are still reported, based on the 2006 National Health and Morbidity Survey (NHMS), the overall prevalence of diarrhea in children below 5 years old in Malaysia was 4.5%, detailed analysis of the NHMS done in 2011 found that children below 5 years old were 33% higher compared to 5-9 years old aged group [4]. From these data it can be estimated that over the next 20-30 years diarrhea will be the center of attention in Indonesia and Malaysia. Infection like diarrhea is primarily associated with enteric bacteria most common of which is *Escherichia coli* [5, 6, 7].

2. MATERIALS AND METHODS

Drug and Chemicals. Loperamide HCl 2 mg, Castor oil and CMC Na 1%.

Preparation of Plant Extract. The fresh leaves of Sangkareho were used as plant materials. The leaves were dried under the sun

During the 20th century, due to increasing resistance to antibacterial agents, the side effects and the cost of treatments, the interest in traditional medicine and herb has been progressively increased [8-9]. WHO has encouraged studies for treatment of diarrheal conditions, therefore, as alternative medicinal plants were needed in discovering and developing for new anti-diarrheal agents [10]. Central Kalimantan is one of the islands in Indonesia that have varieties of traditional plants. Sangkareho (*Callicarpa longifolia* Lam) is one medicinal plants in Central Kalimantan (Fig. 1), that locals used against diarrhea, dengue, and gastric disorders. Therefore, the present study was aimed to evaluate the antidiarrheal activity of Sangkareho (*Callicarpa longifolia* Lam) in experimentally induced acute diarrhea in mice.



Figure 1. Sangkareho leaves (*Callicarpa longifolia* Lam).

for 5-7 days. The leaves were crushed by a grinder. A total of 500 g of powder was extracted with 96% ethanol by using a percolator and the extract was concentrated in a rotary evaporator.

Syahrida Dian Ardhanay, Nurul Chusna, Zulkhurnain Uta, Zuraini Zakaria, Brillano Pascale

Experimental Animals. Adult male Swiss albino mice with age of 2-3 months, weighing between 20-50 g were used for experiment. The mice were obtained from the Animal Unit of Faculty of Mathematics and Science Lambang Mangkurat University. The animals were housed in a proper plastic cages at room temperature and acclimatized for a week before the commencement of dosing. During the entire period of the study, the animals were supplied with standard pellet diet and water *ad libitum* [11].

Animal grouping and dosing. Animals were randomly divided into five groups (negative control, positive control and three treatment groups) comprising of three animals in each group. Negative control group received the CMC Na 1% and positive control group received the loperamide (2 mg sub dosage for human) at 0.0052 mg/20 g of bodyweight. The treatment groups received different doses levels of sangkareho leaves (200, 300 and 400 mg/kg respectively).

Preliminary Phytochemical Screening. Qualitative phytochemical screening test was carried to determine the presence or absence of alkaloid, tannins, flavonoid, saponin, steroid in the 96% ethanolic leaf extract of (*Callicarpa longifolia* Lam) [12,13,14].

3. RESULTS

Sangkareho leaves (*Callicarpa longifolia* Lam) according to Puruskuha (Kabupaten Marang Raya, Central Kalimantan) community is effective as an anti-diarrheal however research on sangkareho as anti-diarrheal has not been widely studied. Based on some conducted phytochemical studies in Indonesia sangkareho (*Callicarpa longifolia* Lam) contains alkaloid, flavonoid, tannin, saponin and steroid [20-22]. Our preliminary phytochemical screening on *Callicarpa longifolia* has confirmed the presence of alkaloid, flavonoid and steroid (Table 1). Flavonoids that exist in the extracts could play an important role, and the phenolic compounds have several pharmacological properties such as anti-diarrheal activities and spasmodic. The alkaloid and steroid have been reported to have antibacterial and antifungal which can help in treating diarrhea [23-24]. Flavonoid, tannin and alkaloid are the major constituents that are primarily responsible for antidiarrheal activity with a specific mechanism [25].

Isolation and identification of flavonoid compounds from sangkareho leaves have been studied by Pasaru et al of the group of flavonoids derived from the ethyl acetate fraction of sangkareho leaves (*Callicarpa longifolia* Lam) was thought to be a flavonol group, flavonoid compounds have a very high level of toxicity against *Artemia salina* leach indicated by the LC50 value of 26.8824 ppm and indicate that the isolates have potential for a high bioactive compounds [26].

This study aims to evaluate anti-diarrheal activity of sangkareho leaves by inducing diarrhea using castor oil. Recent study claims that nitric oxide in castor oil is responsible for the diarrheal effect, there are several mechanisms proposed to explain the diarrheal effect of castor oil one of which is inhibition of

Castor Oil Induced Diarrhea. Adult male Swiss albino mice were fasted for 18 h with free access to water grouped and treated as described under the grouping and dosing section. One hour after treatment, diarrhea was induced by giving oral administration of 1 ml castor oil to each mouse. The animals were housed in a separate transparent plastic cage in which the floor is lined with white paper. The paper was changed hourly every hour for a total of four hours. During the observational period, the onset of diarrhea, number and weight of wet stools, total number and the total weight of feces were recorded for 4 hours after the administration of castor oil. The percentage of diarrhea inhibition was calculated with wet feces using the published formula [11, 15-17].

% Inhibition = (control - test) / control x 100%.
Statistical analysis. The experimental results were analyzed using the Statistical Package for the Social Sciences (SPSS) version 20.0 software. All the experimental data are expressed as mean ± standard error of means. Statistical significance of differences between groups was assessed by one-way ANOVA followed by post-hoc Tukey's multiple comparison test. The results were considered significant at p-value < 0.05 [18-19].

intestinal Na⁺ K⁺ ATPase activity, consequently reducing normal fluid absorption. Usually, castor oil is metabolized into ricinoleic acid in the gut, which causes irritation and inflammation in the intestinal mucosa, resulting in the release of inflammatory mediators (prostaglandins). The released prostaglandins initiate vasodilation, smooth muscle contraction and mucus secretion in the small intestine, in experimental it can be considered to be good diarrheagenic agents [27].

In this study compared to the negative controls, the three dose levels of ethanolic extract *Callicarpa longifolia* leaves significantly inhibited castor oil induced enteropropulsion in mice at dose levels of 200, 300, 400 mg/kg bodyweight of extract, respectively. The percent inhibition of diarrhea calculated for the positive control (loperamide) was 70.49% (Table 2). At 200, 300, 400 mg/kg bodyweight dose levels of the ethanolic extract, the means weight of feces were 5.16 g ± 0.025, 1.05 g ± 0.015 and 0.33 g ± 0.031, respectively observed for 4 hours. At dose level of 200 mg/kg bodyweight of the ethanolic extract did not show inhibitory effects as compared to negative control (1.83 ± 0.021) and has a higher number of feces weight (5.16 ± 0.025). The highest dose level of the plant extract (400 mg/kg bodyweight) showed a more significant reduction of feces weight and has a percent inhibition of diarrhea 81.97, higher than loperamide (70.49%). The leaves of sangkareho (*Callicarpa longifolia* Lam) contain alkaloid and flavonoids which may be responsible for its pharmacological antidiarrheal activity. Based on the study by Russo et al oral administration of tannins flavonoids seems safe and effective treatment in shortening the duration of acute gastroenteritis [28].

Table 1. Preliminary phytochemical composition of ethanolic leaf extract of *Callicarpa longifolia* Lam

Test	Alkaloid	Flavonoid	Saponin	Tannin	Steroid	Tannin
Inference	+	+	+	+	+	+
	= Presence; - = Absence					

Antidiarrheal activity of ethanolic extract of leaves of Sangkareho (*Callicarpa longifolia* Lam) from Central Kalimantan

Table 2. Effect of ethanolic extract *Callicarpa longifolia* Lam leaves on castor oil induced diarrhea in mice.

Groups	Onset (minutes)	Weight of feces (g) ± SD	% inhibition of diarrhea
Negative control (CMC Na 1%)	10.44 ± 0.663	1.83 ± 0.021	-
Positive control (loperamide)	7.89 ± 0.465*	5.16 ± 0.025*	70.49
ES 200 mg/kg	11.42 ± 0.526	5.16 ± 0.025*	-
ES 300 mg/kg	8.99 ± 0.344*	1.05 ± 0.015*	42.62
ES 400 mg/kg	10.50 ± 0.600	0.33 ± 0.031*	81.97

*P<0.05 vs control negative

4. CONCLUSIONS

In conclusion, the ethanolic extract of sangkareho leaves (*Callicarpa longifolia* Lam) has an antidiarrheal activity as revealed by reductions weight of feces. Hence, this study supports the use of the plant in the treatment of diarrhea in the

traditional settings, but further studies are also required to identify the phytoconstituents responsible for these pharmacological activity and to establish the mechanism of action of antidiarrheal activity.

5. REFERENCES

- Mekonnen, B.; Astric, A.B.; Wubneh, Z.B. Antidiarrheal activity of 80% methanolic leaf extract of *Artisia schimperiana*. *Cratichneumon* 2018, *2018*, https://doi.org/10.1552018/3037120.
- Fanti, Y. The potential of guava leaf (*Psidium guajava* L.) for diarrhea. *J Majoritry* 2015, *4*, 113-118.
- Komarudin, A.; Smith, I.; De Jong, E. Clean water, sanitation and diarrhoea in Indonesia: Effects of household and community factors. *Glob Pub Health* 2017, *12*, 1141-1155, https://doi.org/10.1080/17441692.2017.1327985.
- Abdul, A.; Ahmad, N.A.; Abdul, R.M.A.; Omar, M.; Kasim, N.M.; Yusof, M.; Sooryanarayan, R.; Jamaludin, R.; Ying, Y.C. Prevalence of and factors associated with diarrhoeal diseases among children under five in Malaysia: a cross-sectional study 2016. *BMC Pub Health* 2018, *18*, 1363, https://doi.org/10.1186/s12889-018-6266-z.
- Raghavan, P.R.; Roy, S.; Thammizhmani, R.; Purushothaman, S.A. Diarrheagenic *Escherichia coli* infections among the children of Andaman islands with special reference to pathotype distribution and clinical profile. *J Epid Glob Health* 2017, *7*, 305-308, https://doi.org/10.1016/j.jegh.2017.07.003.
- Peirano, V.; Bianco, M.N.; Navarro, A.; Schelotto, F.; Varela, G. Diarrheagenic *Escherichia coli* associated with acute gastroenteritis in children from soriano, Uruguay. *Can J Infect Dis Med Microbiol* 2018, *2018*, https://doi.org/10.1155/2018/8387218.
- Zhou, Y.; Zhu, X.; Hou, H.; Lu, Y.; Yu, J.; Mao, L.; Sun, Z. Characteristics of diarrheagenic *Escherichia coli* among children under 5 years of age with acute diarrhea: a hospital based study. *BMC Inf Dis* 2018, *18*, https://doi.org/10.1186/s12879-017-2936-1.
- Gupta, P.D.; Bhardi, T.J. Development of botanicals to combat antibiotic resistance. *J Ayurveda Integr Med* 2017, *8*, 266-275, https://doi.org/10.1016/j.jaim.2017.05.004.
- Ardhanay, S.D.; Novayanti, S. Antibacterial activity of ethanolic extract bawang daupak (*Eleutheria bulbosa* (Mell) Urb) in cream against *Propionibacterium acnes*. *Int J App Pharm* 2019, *11*, https://doi.org/10.22159/ijap.2019.v11i5.70020.
- Uddin, M.N.; Zahed, S.; Islam, A.; Ahmed, S.; Mowla, T.E.; Rahman, M.S.; Sultan, R.A.; Emran, T.B. Evaluation of the anti-diarrheal activity of methanol extract and its fractions of *Urena sinuata* L. (Bors) leaves. *J App Pharm Sci* 2016, *6*, 056-060, https://doi.org/10.7324/JAPS.2016.6020.
- Tadesse, E.; Engdawork, E.; Nedi, T.; Mengistu, G. Evaluation of the anti-diarrheal activity of the aqueous stem extract of *Lantana camara* Linn (Verbenaceae) in mice. *BMC Complement Altern Med* 2017, *17*, https://doi.org/10.1186/s12906-017-1696-1.
- Mojib, F.; Kamalnejad, M.; Ghaderi, N.; Vahidipour, H.R. Phytochemical screening of some species of Iranian plants. *Iran J Pharm Res* 2003, *2*, https://doi.org/10.22037/ijpr.2010.16.
- Hossain, M.A.; Al-Raqmi, K.A.S.; Al-Mijzi, Z.H.; Wei, A.M.; Al-Riyami, Q. Study of total phenol, flavonoids contents and phytochemical screening of various leaves crude extracts of locally grown *Thymus vulgaris*. *Asian Pac J Trop Biomed* 2013, *3*, 707-710, https://doi.org/10.1016/S2221-1691(13)60142-2.
- Mujib, F.; Bajpai, P.; Pathak, N. Phytochemical evaluation, antimicrobial activity and determination of bioactive components from leaves of *Aegle marmelos*. *Biomol Res Int* 2014, *2014*, https://doi.org/10.1155/2014/4927606.
- Maxwell, I.E.; Bechthaler, J.E.; Kelechi, G.M.; Nikru, E.U.; Iheanacho, A.U.; Stella, C.A.; Daniel, C.I. Antidiarrheal activity of *Pterocarpus erinaceus* methanol leaf extract in experimentally-induced diarrhea. *Asian Pac J Trop Med* 2012, *5*, 147-150, https://doi.org/10.1016/S1925-2765(12)60162-3.
- Heckwerme, P.C.; Erhirhie, E.O.; Mbagwu, I.S.; Iloidiwe, E.E.; Ajaghaku, D.L.; Okoye, F.B. Antidiarrheal property of *Napoleonias imperialis* may be due to procyanidins and ellagic acid derivatives. *J App Pharm Sci* 2016, *6*, 101-106, https://doi.org/10.7324/JAPS.2016.6017.
- Boyina, R.; Kosamam, S.; Rani, T.T. Evaluation of anti-diarrheal activity of aqueous extract of *Trigonotis foenum-graecum*. *Int J Pharm Res* 2014, *4*, 130-133.
- Birru, E.M.; Astric, A.B.; Adinew, G.M.; Tsegaw, A. Antidiarrheal activity of crude methanolic root extract of *Ligofora spicata* Forsk. (Fabaceae). *BMC Complement Altern Med* 2016, *16*, https://doi.org/10.1186/s12906-016-1252-4.
- Degu, A.; Engdawork, E.; Shibeshi, W. Evaluation of the anti-diarrheal activity of the leaf extract of *Croton macrostachyus* Hochst. ex Del. (Euphorbiaceae) in mice model. *BMC Complement Altern Med* 2016, *16*, https://doi.org/10.1186/s12906-016-1357-9.
- Ibrahim, Koda Sari HA. Antimalarial herbal plants in Kupang, Indonesia. *Biosaintifika* 2017, *9*, 95-104, https://doi.org/10.15294/biosaintifika.v9i1.5811.
- Syamsul, E.S.; Andani, F.; Soemirni, Y.B. Analgesic activity study of ethanolic extract of *Callicarpa longifolia* Lamk. in mice. *Trad Med J* 2016, *21*, 99-103.
- Susilawati, E.; Selifiana, N.; Aligita, W.; Fionna, E.; Bethara, P.S.C. Aktivitas ekstrak etanol daun keruh (*Callicarpa longifolia* Lamk.) sebagai antidiabetes pada mencit jantan yang diinduksi aloksan. *Jurnal Ilmiah Farmasi Farmasif* 2019, *2*, https://doi.org/10.29131/ijff.v2i1.4059.
- Sudira, I.W.; Merdiana, I.M.; Qurani, S.C. Preliminary phytochemical analysis of guava leaves (*Psidium guajava* L.) as antidiarrheal in calves. *Adv Trop Bio Environ Sci* 2019, *3*, https://doi.org/10.24843/ATBES.2019.v03i02.p01.



**Komite Etik Penelitian
STIKES Sari Mulia Banjarmasin**

Jl. Pramuka No.02 Banjarmasin Telp. 0511-3268105 Fax.0511-3270134

Banjarmasin, 05 Juli 2018

No. SK : 007.1/KE-LPPM/STIKES-SM/VII/2018
Lampiran : -
Perihal : Rekomendasi Penelitian

Schubungan dengan telah dilaksanakannya sidang Etik Penelitian kepada:

Nama Ketua : Syahrida Dian Ardhany

NIK : 14.0601.033

Anggota : 1. Susi Novaryatiin
2. Nurul Chusna
3. Zulkhumain Utar
4. Zuraini Zakaria
5. Briliano Pascalo

Judul : Aktivitas antibakteri ekstrak etanol daun sangkareho (*Callicarpa longifolia* Lam) asal Kalimantan Tengah

Telah **DISETUJUI** untuk dilanjutkan penelitiannya.

Demikian surat persetujuan ini diterbitkan untuk dipergunakan dengan penuh tanggung jawab.

Menyetujui

An. Ketua

Sekretaris Komite Etik Penelitian



Ali Rakhman Hakim, M.Farm., Apt
NIK. 19.44.2015.100