Plagiarism Checker X Originality Report

Similarity Found: 20%

Date: Thursday, July 22, 2021
Statistics: 541 words Plagiarized / 2754 Total words
Remarks: Medium Plagiarism Detected - Your Document needs Selective Improvement.

Syahrida Dian Ardhany, Nurul Chusna, Zulkhurnain Utar, Zuraini Zakaria, Briliano Pascalo Page | 739 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, 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 *corresponding author e-mail address: chass501@gmail.com | Scopus ID 57204181828 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 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 has the second highest number of people (54 million) in the world that practice open deafaecation, 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 were higher ed 5 – 9 years 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 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). 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. Volume 8, Issue 4, 2019, 739 - 742 ISSN 2284-6808 Open Access Journal

Received: 01.11.2019 / Revised: 20.12.2019 / Accepted: 22.12.2019 / Published on-line: 27.12.2019 Original Research Article Letters in Applied NanoBioScience https://nanobioletters.com/ https://doi.org/10.33263/LIANBS84.739742 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). 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]. % 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 ey's compartest. results 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 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 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 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 Antidiarrheal activity of ethanolic extract of leaves of Sangkareho (Callicarpa longifolia Lam) from Central Kalimantan Page | 741 Table 2. 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 1.83 ± 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 1. Mekonnen, B.; Asrie, A.B.; Wubneh, Z.B. Antidiarrheal activity of 80% methanolic leaf extract of Justicia schimperiana. eCAM 2018, 2018, https://doi.org/10.1155/2018/3037120. 2. Fratiwi, Y.

The potential of guava leaf (Psidium guajava L.) for diarrhea. J Majority 2015, 4, 113-118 3. Komarulzaman, A.; Smits, J.; De Jong, E. Clean water, sanitation and diaarhoea in Indonesia: Effects of household and community factors. Glob Pub Health 2017, 12, 1141-1155, https://doi.org/10.1080/17441692.2015.1127985. 4. 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/s12889-018-6266-z. 5. 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. 6. 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. 7. Zhou, Y.; Zhu, X.; Hou, H.; Lu, Y.; Yu, J.; Mao, L.; 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.

8. Gupta, P.D.; Birdi, 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. 9. Ardhany, S.D.; Novaryatiin, S. Antibacterial activity of ethanolic extract bawang dayak (Eleutherine bulbosa (Mill.) Urb) in cream against Propionibacterium acnes. Int J App Pharm 2019, 11, https://doi.org/10.22159/ijap.2019.v11s5.T0020. 10. Uddin, M.M.N.; Zahan, 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. (Borss) leaves. J App Pharm Sci 2016, 6, 056- 060, https://doi.org/10.7324/JAPS.2016.601208.

11. Tadesse, E.; Engidawork, E.; Nedi, T.; Mengistu, G. Evaluation of the anti-diarrheal activity of the aquaeous stem extract of Lantana camara Linn (Verbenaceae) in mice. BMC Complement Altern Med 2017, 17, https://doi.org/10.1186/s12906-017-1696-1. 12. Mojab, F.; Kamalinejad, 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 13. Hossain, M.A.; Al-Raqmi, K.A.S.; Al-Mijizy, 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 14.

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. 15. 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. Asian Pac J Trop Med 2012, 5, 147-150, https://doi.org/10.1016/S1995-7645(12)60014-5. 16. Ihekwereme, P.C.; Erhirhie, E.O.; Mbagwu, I.S.; Ilodigwe, E.E.; Ajaghaku, D.L.; Okoye, F.B. 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.

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

extract of Trigonella foenum- Graecum. Int J Pharm Res, 2014, 4, 130-133. 18. Birru, E.M.; Asrie, A.B.; Adinew, G.M.; Tsegaw, 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. 19. Degu, A.; Engidawork, E.; Shibeshi, 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. 20. Ihwan, Koda Sari HA.

Antimalarial herbal plants in Kupang, Indonesia. Biosaintifika 2017, 9, 95-104, https://doi.org/10.15294/biosaintifika.v9i1.5811. 21. 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. 22. Susilawati, E.; Selifiana, N.; Aligita, W.; Fionna, E.; Betharia, P.S.C. 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. 23. 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. Syahrida Dian Ardhany, Nurul Chusna, Zulkhurnain Utar, Zuraini Zakaria, Briliano Pascalo Page | 742 24. 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. 25. Sisay, M.; Engidawork, E.; Shibeshi, 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. 26. 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. 27. 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. 28. Russo, M.; Coppola, V.; Giannetti, E.; Buonavolonta, 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.

INTERNET SOURCES:

<1% - https://www.researchgate.net/profile/Susi-Novaryatiin-2
3% - https://bmccomplementmedtherapies.biomedcentral.com/articles/10.1186/s12906-017-1696-1
<1% - https://ijddt.com/volume11issue2/
<1% - https://data.unicef.org/topic/child-health/diarrhoeal-disease/
<1% - https://silo.pub/health-care-in-malaysia-the-dynamics-of-provision-financing-and-access-routledge-malaysian-studies-series.html
1% - https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-018-6266-z
<1% - https://www.scielo.br/j/rimtsp/a/WM8vWqjgJjzcsBB8nT8RRXq/?format=pdf
<1% - https://www.academia.edu/4044774/Studies_on_the_anti_diarrheal_properties_of_leaf_extract_of_Desmodium_pulchellum
<1% - https://www.scribd.com/document/389121480/prosiding-icpaps-2017
<1% - http://www.technicaljournalsonline.com/ijpsr/VOL%20II/IJPSR%20VOL%20II%20ISSUE%20I%20JANUARY%20MARCH%202011/IJPSR%20VOL%20II%20ISSUE%20I%20Article%201.pdf
<1% - https://issuu.com/hasanibrahimkozan/docs/1001_abstractbook_bookofabstracts
1% - https://www.sciencedirect.com/science/article/pii/S1319016420302668
1% - https://jmhg.springeropen.com/articles/10.1186/s43042-020-00065-5
<1% - https://jnanobiotechnology.biomedcentral.com/articles/10.1186/s12951-018-0379-5
<1% - https://pdfs.semanticscholar.org/f8c4/5f67a4da52cdc5adce0683187a49386bf2b8.pdf
<1% - https://www.hindawi.com/journals/ecam/2017/3701349/
<1% - https://uin-malang.academia.edu/ALCHEMY
1% - https://www.frontiersin.org/articles/10.3389/fphar.2018.01037/full
3% - https://downloads.hindawi.com/journals/aps/2015/257057.xml
<1% - https://medworm.com/journal/evidence-based-complementary-and-alternative-medicine.xml
<1% - https://ijponline.biomedcentral.com/track/pdf/10.1186/s13052-018-0497-6.pdf
<1% - https://1library.net/title/isolation-coumarin-compound-bark-bauhinia-purpurea
<1% - https://www.sciencedirect.com/science/article/pii/S1995764510600090
1% - https://europepmc.org/articles/PMC88101

1% - https://link.springer.com/article/10.1007/s11033-020-06047-5
1% - https://bmccomplementmedtherapies.biomedcentral.com/articles/10.1186/s12906-021-03290-6
1% - https://link.springer.com/article/10.1007/s12649-021-01413-1
1% - https://link.springer.com/article/10.1007/s42452-021-04513-8
<1% - https://journals.sagepub.com/doi/full/10.1177/2515690X19853264
1% - https://ijponline.biomedcentral.com/articles/10.1186/s13052-019-0727-6
1% - https://digital.library.adelaide.edu.au/dspace/bitstream/2440/105784/3/hdl_105784.pdf