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102 <https://oamjms.eu/index.php/mjms/index> Scientific Foundation SPIROSKI, Skopje, Republic of Macedonia Open Access Macedonian Journal of Medical Sciences. 2022 Jan 03; 10(T8):102-107. <https://doi.org/10.3889/oamjms.2022.9497> eISSN: 1857-9655 Category: T8 –“APHNI: Health Improvement Strategies Post Pandemic Covid-19” Section: Systematic Review Article The of Betel and Oil Antibacterial Anti-inflammatory Perineal A Scoping Review Ratih Devi Alfiana 1\* , Sundari Mulyaningsih 1 , Emelda Emelda 2 , Dyah Pradnya Paramita 1 , Amanah Rahma Delia 1 , Shofi Salsabila 2 1Department of Midwifery, Faculty of Health Science, Universitas Alma Ata, Yogyakarta 55183, Indonesia; 2Department of Pharmacy, Faculty of Health Science, Universitas Alma Ata, Yogyakarta 55183, Indonesia Abstract BACKGROUND: A tear in the perineum experienced by postpartum women can occur due to an episiotomy process or spontaneous This in to curiosity, also infection not or appropriately.

on research the treatment perineal is administration antiseptic, and orally topically. Indonesian plants be to the of wounds the due the of plants antibacterial anti-inflammatory. These plants include red betel leaf and cinnamon oil. AIM: The objective of the study was to review the literature from research results that discuss the activity of red betel leaf and cinnamon oil as antibacterial and anti-inflammatory both orally and topically. SEARCH for through on Scholar, the years, is, 2008–2021. INCLUSION: Review articles involving research on experimental animals with in vitro and in vivo activity tests using the Completely Randomized Design method.

RESULTS: As well as, 12 relevant articles showed that both red betel leaf and cinnamon oil were tested in vitro and in vivo , showing that these two plants effectively act as antibacterial and anti-inflammatory. CONCLUSION: Two plants betel and oil the to and the healing of perineal tears through their antibacterial and anti-inflammatory activities.

Edited by: Sinisa Stojanoski Citation: Alfiana RD, Mulyaningsih S, Emelda E, Paramita DP, Delia AR, Salsabila S. The Effectiveness of Red Betel Leaf and Cinnamon Oil for Antibacterial and Anti-inflammatory in Perineal Tears: A Scoping Review. Open-Access Maced J Med Sci. 2022 Jan 03; 10(T8):102- 107.

<https://doi.org/10.3889/oamjms.2022.9497> Keywords: Red betel leaf; Cinnamon oil; Anti-inflammatory; Antibacterial; Perineal tears \*Correspondence: Ratih Devi Alfiana, Department of Midwifery, Faculty of Health Science, Universitas Alma Ata, DI. Yogyakarta, 55183, Indonesia. E-mail: [ratihdevi@almaata.ac.id](mailto:ratihdevi@almaata.ac.id) Received: 13-Oct-2021 Revised: 21-Nov-2021 Accepted: 02-Dec-2021 Copyright: © 2022 Ratih Devi Alfiana, Sundari Mulyaningsih, Emelda Emelda, Dyah Pradnya Paramita, Amanah Rahma Delia, Shofi Salsabila Funding: This research did not receive any financial support Competing Interest: The authors have declared that no competing interest exists Open Access: This is an open-access article distributed under the terms of the Creative Commons Attribution- NonCommercial 4.0 International License (CC BY-NC 4.0) Introduction (SIs a eue.However, use opioids limited to reduce the risk of constipation.hrfr,ts process [3], [4], [5]. Methods Study design This used scoping design. This was because provides broad coverage a field. scoping procedure through stages.

first formulating research and then appropriate then research then and chart ing and concluding analyzing results the research [6]. Literature search strategy Literature were out several The was out two researchers, conducted searches Google Scholar. The keywords used are a combination Open Access Maced J Med Sci. 2022 Jan 03; 10(T8):102-107. 103 of Subheading using Logic to the article specifics. combination of terms use ("Red Leaf Anti- inflammatory," Betel as and "Cinnamon as and Oil as Antibacterial." Identification and selection relevant articles The search results of the two researchers then compared the and discuss there any differences which were then discussed and made a decision get same of Articles that meet the criteria are entered into a chart (PRISMA) to report search progress ( Fig ure 1 ).

Result of literature searching: Google Scholar: (n = 13) Total n = 13 Identification Screening Record remaining after screening the title and abstract Red Betel Leaf: 8 Record remaining after screening the title and abstract Cinnamon Oil: 5 Exclude literature because reason for exclusion: 1 Full text articles that were assessable; 8 of Red betel leaf Full text articles that were assessable: 4 of Cinnamon oil Included literatures (n = 12) Eligibility Included Figure 1: PRISMA flowchart for scoping review Inclusion criteria The following criteria were included in the study: 1. Research aims determine content of betel extract antibacterial anti-inflammatory 2. Research samples in vivo and in vitro 3. In English 4.

Full-text articles Exclusion criteria We articles use literature review method. Data

extraction Articles the criteria put together, then extracted on an Excel worksheet. The data extracted include title, author, date of publication, country and research study targets study, number of samples, study settings, data collection, key findings, research domain, and subdomain. Summarizing the findings All in inclusion were summarized into the regarding the of betel and oil their effect inhibiting growth wounds. methodological of articles also evaluated an spreadsheet. article will rated the design, target, sample, and results.

Results Characteristic of published articles We 12 based and criteria. articles published from (2), Ilmu (1), of Pharmaceutical sciences and research (1), International Research of Engineering Science (1), Journal of Natural Remedies (1), IOP Conf. Series: Earth and Environmental Science (1), Journal of International Oral Health (1), Journal of Pharmaceutical Biology BMC (1), of and WILEY and of 2 nd Annual Conference Kuala University (1). Data extraction of the included articles The data is in Table 1 , articles the regarding content red leaf cinnamon and effect on inhibiting bacterial growth in wounds. However, some not in the and number samples. information be clearly in Table 1.

Discussion Perineal involves type damage to female during which occur spontaneously iatrogenically episiotomy or delivery) [8]. than of females undergo vaginal will from some of tear, 0.6–11% all vaginal resulting a or degree Fortunately, incidence perineal tears with births, 90.4% women are to in who are undergoing deliveries [10]. While is high for trauma any birth, is important note risk that to perineal (third and degree). risks be best into following Maternal, fetal, and intrapartum risk factors [1], [2]. Perineal tears 104 <https://oamjms.eu/index.php/mjms/index> Table 1: Data extraction of the included articles (n = 12) Author (s) and date of publication Country/region Aim Extract Data collection Key findings Anugrahwati et al .,

2016 Indonesia To investigate separation process in extraction of red betel leaves using ethanol, followed by performing cytotoxicity test on HeLa cell line from cervix tumor/cancer. Red betel leaves Fresh leaves of red betel were picked, thinly cut and dried in atmospheric air. First, dried leaves of red betel were taken about 25 g and were extracted with ethanol as a solvent using Soxhlet apparatus in temperature of ca. 78°C. Second, this fraction was then concentrated under reduced pressure using a rotary evaporator to afford a concentrated extract.

Then, the extract was analyzed using GC–MS to identify its phytochemical contents Bioactive compounds have the potential to inhibit the proliferation of HeLa cells. Rinanda and Alga, November 22–24, 2012 Indonesia This research was conducted for test the antibacterial activity of the red betel leave extract against the growth of MRSA.

Red betel leaves The test applied the Kirby–Bauer disk diffusion method using Mueller-Hinton Agar (MHA) medium, in accordance with the procedures of European Committee on Antimicrobial Susceptibility Testing/EUCAST Red betel leaf extract tested for concentration showed antibacterial activity against MRSA. The higher the concentration of the extract, the larger the inhibition zone formed. Reveny, 2011 Indonesia This study aims to test the activity of red betel (Piper betel) antimicrobial Linn.)

from the n-hexane fraction ethanol extract and ethyl acetate, against Staphylococcus aureus, Escherichia coli and Candida albicans, MIC value testing, and content analysis chemical thin-layer chromatography (TLC) for identify the group of compounds that are suspected have antimicrobial properties. Red betel leaves Simplicia powder was macerated with 80% ethanol, left at room temperature (28–32°C) for 2 days protected from light and stirred frequently, then separated, the pulp was macerated again with 80% ethanol solvent and carried out in the same way as above until clear maceration were obtained. Evaporation process using a rotavapor until a thick ethanol extract was obtained, then the extract was dried in a freeze dryer (-40°C) to obtain a dry extract of red betel leaf.

the ethanol extract showed a higher inhibitory effect on Escherichia coli, while the ethyl acetate fraction showed a higher effect on Staphylococcus aureus and Candida albicans Li et al., October 2019 China The aim of our study was to explore the effects of CEO on the composition of intestinal microbiota in the mouse model with dextran sodium sulfate (DSS)-induced colitis. These results would provide a reference for the better use of CEO as a promising therapeutic agent for IBD and other intestinal dysfunctions. Cinnamon oil The pure cinnamon essential oil (containing approximately 68.95% cinnamaldehyde) was provided by Professor Huang Qingrong (State University of New Jersey, USA). Ceftriaxone sodium (CFT) was purchased from Xi'an Seasons Biotechnology Co., Ltd. (Xi'an, China).

Dextran sodium sulfate (36–50 kDa, > 98%) was purchased from Shanghai ZZBIO Co., Ltd. (Shanghai, China). Oral administration of CEO enriched with cinnamaldehyde effectively reduces the development of DSS-induced colitis. Kwon et al., November 14, 2019 Republic of Korea Identified that anti-tumor effect of cinnamon extracts is also linked with their enhanced pro-apoptotic activity by inhibiting the activities of NF- $\kappa$ B and AP1 in mouse melanoma model. Cinnamon oil Dried Cinnamomum cassia bark (Hwajin Distribution Co., Seoul, Korea) was pulverized and extracted for 3 h in a hot water extractor. The extract was filtered and the supernatant was concentrated with a rotary evaporator.

The extract was then freeze dried resulting in a powder extract. The powder extract was suspended in sterilized distilled water at appropriate concentrations. Cinnamon extract strongly inhibits tumor cell proliferation in vitro and induces active cell death of tumor cells by regulating pro-apoptotic molecules while inhibiting NF- $\kappa$ B and AP1 activity. Oral administration of cinnamon extract in transplanted melanoma models significantly inhibited tumor growth by the same mechanism of action observed in vitro. Tung et al.,

September 03, 2010 Taiwan The anti-inflammatory activity of leaf essential oils and their main compounds from seven origins of *C. osmophloeum* was investigated here for the 1st time. Cinnamon oil The leaves of seven *Cinnamomum osmophloeum* provenances (COA–COG) were collected at the end of October 2005 from the Taiwan Sugar Company Research Center located in Nantou County in Central Taiwan. The species were confirmed by Yen-Ray Hsui of the Taiwan Forestry Research Institute and voucher specimens (CO0109, CO4407, CO1709, CO0403, CO0902, CO0502, and CO0609) were deposited at the laboratory of wood chemistry (School of Forestry and Resource Conservation, National Taiwan University). Leaf essential oil of cinnamaldehyde and mixed types strongly inhibited the production of nitric oxide, with IC values ranging from 9.7–15.5 g/mL.

Furthermore, trans-cinnamaldehyde is responsible for cinnamaldehyde-type inhibitory activity, and  $\gamma$ -cadinol and  $\beta$ -cadinol are responsible for mixed-type activity inhibition. Tung et al., September 10, 2008 Taiwan The anti-inflammatory activity of leaf essential oils and their main compounds from seven origins of *C. osmophloeum* is provided here for further testing Cinnamon oil The twigs of a 13-year-old *C. osmophloeum* Kaneh. were collected at the end of July 2004 from the Taiwan Sugar Company Research Center located in Nantou County in Central Taiwan. Diameter of the twigs selected was below 1.5 cm. The species was confirmed by Dr.

Yen-Ray Hsui of the Taiwan Forestry Research Institute and voucher specimens were deposited at the laboratory of wood chemistry (School of Forestry and Resource Conservation, National Taiwan University). Cinnamon essential oil has anti-inflammatory activity Meidarlina et al., June 18, 2021 Indonesia This study carried out to assess the efficacy of red betel leaf against *C. albicans* over acrylic denture surface as an herbal-based denture cleanser. Red betel leaves The extraction of red betel leaves (*P. crocatum*) was carried out by the maceration method, which was immersed in a 96% ethanol solution for 1×24 h with a 1:4 ratio of ingredients and solvents.

The resulting filtrate was filtered with filter paper (Whatman no. 1). The maceration process was repeated for 6 consecutive days. The results of the filtrate from filtering with a filter paper were evaporated by a rotary vacuum evaporator at 40°C, and then,

the extract was stored in a dark container at 4°C [13]. Red betel leaf has efficacy against *C. albicans* compared to acrylic denture surface at a concentration of 30%. (contd...) Open Access Maced J Med Sci. 2022 Jan 03; 10(T8):102-107. 105 can a of maternal and mortality. wound behavior postpartum women is very important.

This is related to susceptibility to incidence postpartum According the results of research conducted by Lestari (2016), age is dominantly to behavior perineal wound in women parity [11]. Based the of by (2018), which the signed-ranks statistical test, significant was which that was relationship pregnant women were about massage and implementation perineal for pregnant [12]. antibiotics recommended the post-operative to reduce the risk of infections and wound. Paracetamol and anti-inflammatory (NSAIDs) can used. the of is to the of Therefore, herbal are that antibacterial and so they help wound healing process [3], [4], [5].

Analysis of red betel leaf extract and cinnamon oil research et al . Rinanda et al . Reveny et al . Li et al . Kwon et al . Tung et al . Tung et al . (2008), et al . Hafizah et al . Pradikdo et al . Kusuma et al . and Lister et al . overall that bioactive compounds red leaf cinnamon have potential inhibit proliferative antibacterial, anti-inflammatory In with the of research Emelda et al . the results that combination cinnamon and betel the and of the decreased inflammatory infiltration, and the endothelial factor expression [13]. The conducted Anugrahwati et al .

which to the process extraction red leaves ethanol, followed performing cytotoxicity on cell line cervical it found Table 1: ( Continued ) Author (s) and date of publication Country/region Aim Extract Data collection Key findings A total of 10 g of 100% thick red betel leaf extract were dissolved in dimethyl sulfoxide (DMSO) 25% and then diluted with sterile distilled water to obtain concentrations of 10%, 20%, 30%, and 40% with the dilution formula  $C1.V1 = C2.V2$  (C1: Initial concentration, C2: Desired concentration, V1: Initial volume, and V2: Desired volume). Hafizah et al ., 2021 Indonesia To identify the effects of red and green betel by applying its ethanol extract as an ingredient of soap.

The use of red betel and green betel is expected to serve as a substitute of synthetic antibacterial substances which are commonly used nowadays. Red betel leaves Fresh betel leaves were washed clean then dried using the oven at 40°C for 24 h, until the betel leaves became dry. Dried betel leaves were crushed into powder using a blender. Betel powder was soaked using 96% ethanol with a ratio of 1:5 for 72 h. The separation of filtrate and residue was carried out by filtering using filter paper.

Then, the filtrate was evaporated using a rotary vacuum evaporator to separate the extract from the solvent Transparent soap with the addition of 2.5% red betel extract has

the best quality, as well as organoleptic and antibacterial activity characteristics when compared to other glycerin bar soaps. Pradikdo et al., February 2020 Indonesia Evaluated the effect of red betel leaf extract (RBLE) as a feed additive on gut and villi characteristics in broiler chickens. Red betel leaves Extraction of red betel leaf was carried out according to the previous method [4].

Red betel leaf powder was macerated for 24 hours with ethanol 70%. Ratio of red betel with ethanol was 1:6. After that, red betel leaf was extracted in the microwave oven for 10–15 min at controlled temperature 40°C and then cooled down until reach room temperature. After that, the liquid extract of red betel leaf was obtained by filtering with sterile muslin cloth. The addition of RBLE up to 1.5% did not have a negative effect on the characteristics of the intestines and villi in broiler chickens Kusuma et al.,

2017 Indonesia Determine the antimicrobial activity of red betel leaf ethanol extract as a natural antiseptic against several airborne pathogens as follows: Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli, and Candida albicans. Red betel leaves Extraction of dried piper betel leaf was made by maceration method. The antimicrobial activity of the extract was tested using the agar diffusion method, then continued with the determination of the minimum inhibitory concentration test (MIC) carried out by the macrodilution method.

While the determination of the minimum concentration of bactericide (MBC) was carried out by subculture of overnight incubation results of MIC results to Mueller-Hinton agar medium surface. The minimum inhibition time required for each test microbe was carried out by incubating the test medium at a temperature range of 1.5–6 minutes, followed by subculture to MHA using the streak plate method. It can be concluded that the red betel ethanol extract is very effective as a natural antiseptic against airborne pathogens with a minimum effective inhibition time. Lister et al.,

2020 Indonesia To determine the antioxidant activity of red betel leaf extract (Piper crocatum Ruiz and Pav.) (RBLE) compared to eugenol and Hydroxychavicol compounds. Red betel leaves The radical scavenger DPPH, H<sub>2</sub>O<sub>2</sub> HAI scavenging, ABTS reduction, and FRAP were tested for reduction. Results: In scavenging DPPH, RBLE showed IC<sub>50</sub> values of 3.98 g/mL, eugenol 2.98 g/mL, and hydroxycavikol of 18.00 g/mL. Meanwhile, H<sub>2</sub>O<sub>2</sub> HAI scavenging activity showed IC values of RBLE, eugenol, and hydroxycavikol of 186.33 g/mL, 97.36 g/mL, and 41.06 g/mL, respectively. The ABTS reduction test showed IC<sub>50</sub> values of 38.43 g/mL, 181 g/mL, and 3.10 g/mL for RBLE, eugenol, and hydroxychavicol, respectively. The highest FRAP reduction activity was shown by eugenol with a concentration of 50 g/mL, which was 424.67 M Fe (II)/ μg.

RBLE and its compounds (eugenol and hydroxychavicol) have antioxidant activity as indicated by the results of DPPH scavenging, H 2 HAI scavenging, ABTS reduction, and FRAP reduction tests. However, RBLE had the lowest antioxidant activity compared to other compounds. 106 <https://oamjms.eu/index.php/mjms/index> compounds to the of HeLa [14]. research by Rinanda et al. (2012) and aimed to test the antibacterial activity of the red betel leave extract against the growth of The of red leaf that was for showed activity MRSA. higher concentration the the the zone [15].

The of study (2011) to the activity red from ethanolic extract the and acetate against *Staphylococcus aureus*, *Escherichia coli*, and *Candida albicans*, value and analysis, that ethanol showed a inhibitory on *Escherichia coli*, the acetate showed higher on *Staphylococcus aureus* and *Candida albicans* [16]. Activity red leaf cinnamon was researched Li et al. which to the of on composition intestinal in mouse with sodium (DSS)-induced These would a for better of as promising agent IBD other intestinal Results that administration CEO cinnamaldehyde, effectively the of induced colitis.

Furthermore, from et al. (2019) which aims to identify that the effect of cinnamon extract an shows increase its apoptotic by the of and AP1 mouse Cinnamon inhibits tumor proliferation in vitro induces cell of cells regulating molecules inhibiting and activity. administration cinnamon in melanoma significantly tumor by same of observed in vitro [18]. line the conducted Tung et al. (2010) aimed be here the time the activity leaf oils and their main compounds from seven origins of C.

osmophloeum, results leaf oil cinnamaldehyde and mixed types strongly inhibited the production nitric with values from 9.7 15.5 g/mL. trans-cinnamaldehyde is for inhibitory activity, T-cadinol responsible mixed-type activity inhibition [19]. A similar study conducted by Tung et al. (2008) with aim providing for testing the anti-inflammatory of essential and main compounds from seven origins of C. osmophloeum, obtained results Cinnamon oil anti-inflammatory activity Similar in betel extract a Meidarlina et al. (2021) which aims to assess the efficacy of betel as herbal-based cleanser on growth C.

*albicans* the of dentures the that betel has against *C. albicans* compared to acrylic denture surface at a concentration of 30% [21]. The effectiveness of red betel leaf is also proven from research by Hafizah et al. (2021) which aims to identify the effects of red betel leaf and betel by its extract an of The of betel green betel expected serve a of antibacterial which commonly nowadays. transparent with addition 2.5% betel has best as as organoleptic antibacterial characteristics when compared to other glycerin bar soaps [22].

The of betel extract (RBLE) as a feed additive on gut and villi characteristics in chickens



also The showed that the addition of RBLE up to 1.5% did not have a negative effect on the characteristics of the intestines and in chickens The of the red leaf proven research et al . which to the activity red leaf extract a antiseptic several pathogens follows: Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli, and Candida albicans

Showing result, can concluded the betel extract very as natural antiseptic airborne with minimum effective time The article Lister et al . (2020) aimed to determine the antioxidant activity of red betel leaf extract ( Piper crocatum Ruiz and Pav.) (RBLE) to and compounds. and compounds and hydroxychavicol) were produced which have antioxidant activity, indicated the of scavenging activity on and HAI, reduction on and However, has lowest antioxidant activity compared to other compounds [25]. Conclusion Two plants betel and oil have the potential to treat and accelerate the healing of tears their and inflammatory activities. Acknowledgments All would to the and judges in APHNI International Conferences of Alma Ata University.

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Tung Chua Wang Chang Anti-inflammation activities essential and constituents **indigenous cinnamon Cinnamomum osmophloeum** ) Bioresource Technol. ;99(9):3908-13. [biortech.2007.07.050](https://doi.org/10.1088/1755-1315/667/1/012016) PMid:17826984 21. Piper crocatum Candida albicans in vitro 2021;13(3):281. 22. Hafizah Aisyah Hasni Effect betel ( Piper sp) concentration betel extract quality antibacterial of e soap. Conf Ser Environ 2021;6<https://doi.org/10.1088/1755-1315/667/1/012016> 23. Pradikdo Wardhani Widodo Sudjarwo Effect of betel extract Piper crocatum ) digestive and villi in r. Res Adv Sci. 2020;5:185-7. 24. Kusuma Hendriani Genta Antimicrobial **of red Piper betel** extract Piper crocatum & as natural against pathogens. Pharm Res.

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