Indonesian Journal of Global Health Research
Volume 8 Number 3, June 2026
e-ISSN 2715-1972; p-ISSN 2714-9749
http://jurnal.globalhealthsciencegroup.com/index.php/IJGHR

THE ROLE OF LAVENDER IN WOUND HEALING: A REVIEW OF CLINICAL, IN VIVO, AND IN VITRO STUDIES

Karinnia[1]*, Linda Julianti Wijayadi[2], Kelvin[3]
[1]Department of DermatoVenereology, Faculty of Medicine, Universitas Tarumanagara, Jl. Taman S. Parman No.1, Tomang, Grogol Petamburan, Jakarta Barat, Jakarta 11440, Indonesia
[2]Faculty of Medicine, Universitas Tarumanagara, Jl. Taman S. Parman No.1, Tomang, Grogol Petamburan, Jakarta Barat, Jakarta 11440, Indonesia
*k.karinnia@gmail.com

ABSTRACT
Wound healing is a dynamic and complex biological process involving haemostasis, inflammation, proliferation, and tissue remodelling. Disruption of any phase can lead to delayed healing or chronic wounds, the number of which is increasing nowadays. This give rise to growing interest in natural products, particularly essential oils as complementary wound-care agents. This literature review summarizes recent evidence (2015–2025) from in vitro, in vivo, and clinical studies evaluating the wound-healing effects of lavender (Lavandula angustifolia) and related species. Literature searches and screening were conducted in PubMed, SpringerLink, ProQuest, and Google Scholar from 2015 to 2025 using specific keywords. A total of 7,068 studies were retrieved, and after screening, 5 studies were included. Findings indicate that lavender, largely through its major constituents linalool and linalyl acetate, exhibits antioxidant, antimicrobial, and anti-inflammatory properties that support granulation, re-epithelialization, and collagen remodelling. Advances in formulation are further enhancing the therapeutic efficacy of lavender, but clinical evidence remains limited and heterogeneous. Trials with standardized doses and formulations are needed to elucidate the effectiveness of lavender, particularly in wound management.

Keywords: anti-inflammatory; antimicrobial; antioxidant; lavender; wound healing

How to cite (in APA style)
Karinnia, K., Wijayadi, L. J., & Kelvin, K. (2026). The Role of Lavender in Wound Healing: A Review of Clinical, in Vivo, and in Vitro Studies. *Indonesian Journal of Global Health Research*, *8*(3), 1119–1126. https://doi.org/10.37287/ijghr.v8i3.1121.

INTRODUCTION

Wound healing is a critical physiological process that restores the integrity of the skin following injury. It involves four overlapping phases: haemostasis, inflammation, proliferation, and tissue remodeling (Tottoli, et al., 2020; Riyahi, Riahy, & Yousefpour, 2021). Any disruption can lead to chronic wounds, infection, or impaired tissue repair (Falanga, et al., 2022). There are estimated 32.1% prevalence of chronic wounds across Asian population, which are found mainly in the developing countries, Southeast Asia, and hospital setting (Burhan, et al., 2025). As the burden of chronic wounds continues to rise globally, there has been growing interest in natural agents (Jaramillo, Díaz, Muñoz, & González-Barrios, 2023; Wijayadi , Kelvin, Gravianto, & Kartawijaya, 2024; Albhari, et al., 2023).

Natural oils can enhance healing outcomes through antimicrobial, anti-inflammatory, and antioxidant mechanisms. Lavender (Lavandula angustifolia) has attracted some research attention. Traditionally valued for its aromatic and calming properties, lavender possesses pharmacological activities relevant to wound healing, including antimicrobial, antioxidant, and anti-inflammatory effects. The main active components, linalool and linalyl acetate, modulate oxidative stress and inflammatory signalling pathways, thereby promoting granulation, re-epithelialization, and reinforce collagen production (Mori, Kawanami, Kawahata, & Aoki, 2016; Boukhatem, et al., 2021; Ao, et al., 2023).

Lavender can upregulate TGF-β which important for collagen modulator and tissue remodelling. Furthermore, through myofibroblast activity, lavender able to enhance wound contraction (Mori, Kawanami, Kawahata, & Aoki, 2016). In addition, it has been used and proofed to be an effective for episiotomy wound healing and pain reduction (Moradi, Niazi, Mazloumi, Mousavi , & Lopez, 2020). A promising effect on oral pathology such as gingivitis, candidiasis and aphthous ulcer also seen in lavender (Kajjari, Joshi, Hugar, Gokhale, & Mehar, 2022).

Despite increasing use of lavender on wound healing, focus are mainly towards its contain and potential. Studies including human trials are still limited and variable in methods and outcome. This literature review aims to summarise available clinical, in vivo, and in vitro evidence regarding the role of lavender in wound healing, exploring its mechanisms of action, formulation advancements, and therapeutic outcomes.

METHOD

A comprehensive literature search was conducted using PubMed, SpringerLink, ProQuest, and Google Scholar with the following search terms: lavender AND ("wound healing" OR granulation OR erythema) AND (clinical trial OR in vivo OR in vitro). Inclusion criteria were: (1) studies involving lavender extracts or essential oils; (2) wound healing-related outcomes; (3) clinical trials, in vivo, or in vitro designs; and (4) studies of 10 years back (2015 – 2025). Excluding criteria were: (1) reviews without primary data; (2) studies unrelated to skin repair and (3) language other than English. A total of 7,068 records were screened (PubMed: 35, SpringerLink: 255, Google Scholar: 6,770 , ProQuest: 8). After eliminating irrelevant, non-English, duplicates and studies older than 10 years, a total of 5 studies were selected for this review (Figure 2).

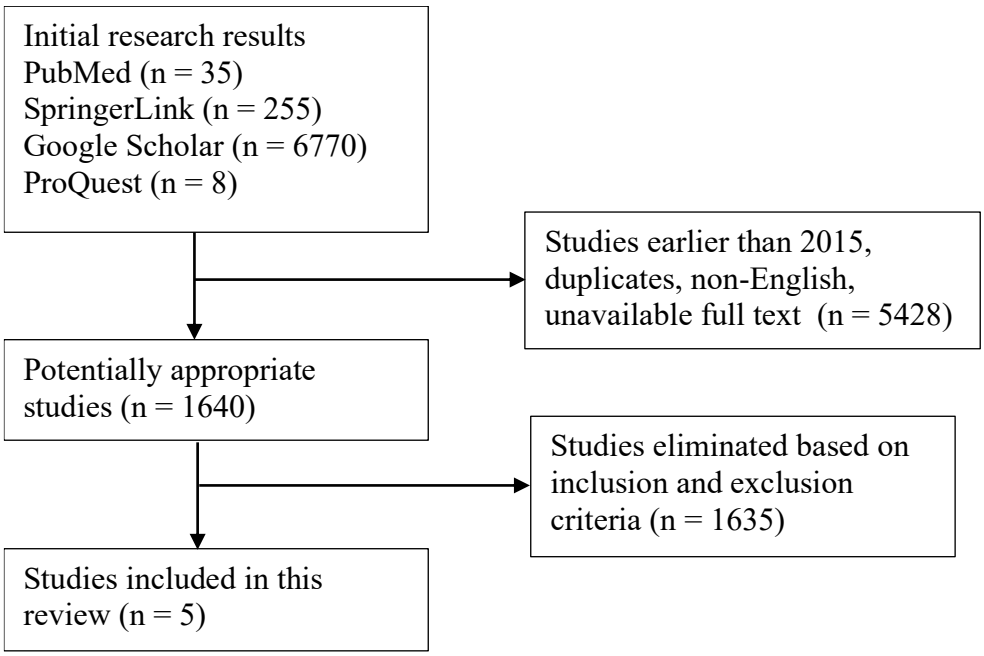

Figure 2. Flow diagram for study selection

RESULT

Based on the article search, 7,068 studies were obtained and after screening, 5 studies were included in this review. Lavender showed wound healing properties in all study designs namely in vitro, in vivo, and clinical trials. A summary of these studies is displayed in Table 1.

Table 1.
Application of Lavender for wound healing

No	Authors	Study Type	Study Subject	Intervention	Result
1	Mori *et al*. (2016)	In vivo	Male Sprague-Dawley rats (3 groups, n=6 in each group)	Topical 1% lavender oil (*Lavandula angustifolia*) applied on alternating days for 14 days.	Reduction in wound area was significant in lavender treated wound (at day 4,6,8: $p<0.01$, at day 10:$p<0.05$). Expression of collagen type I and III was significantly increased in lavender treated wound ($p<0.01$). TGF-β in Lavender oil treated lesion was significantly increased compared to control group (at day 4: $p<0.05$, at day 7: $p<0.01$).
2	Moradi *et al*. (2020)	Systematic Review	Women who had a vaginal delivery with episiotomy (n = 5, sample size = 635)	Application of 1-2% lavender essential oil (species not specified) via sitz bath or inhalation	All five clinical trials shows the use of lavender essential oil (mainly by sitz bath twice a day) was effective in episiotomy pain relief ($p<0.05$) with one study reported no significant pain difference ($p>0.05$). Only three clinical trials evaluate the wound healing properties of lavender essential oil, and all resulted effective ($p<0.05$). Cochrane risk of bias were listed as low risk in selection bias, performance bias, attrition boas and reporting bias. A high risk of bias noted on detection bias.
3	Boukhatem *et al*. (2021)	In vivo	Male Wistar rats (3 groups, n = N/A)	Topical application of 0.5% *Lavandula stoechas* essential oil	Wound contraction in lavender treated group was significantly improved by day 16 ($p<0.05$) Histological examination demonstrated that lavender treated wound showed reduced inflammation, better tissue perfusion and regeneration, remodelling, and re-epithelization. More collagen and less macrophage seen in lavender-treated mice, resulting in less scar formation.
4	Ao *et al.* (2023)	In vivo	Male C57BL/6 mice (2 groups, n = 10 per group)	Topical 2% lavender essential oil (species not specified) on LPS (*Escherichia coli* O111:B4)-induced chronic wound	Faster wound closure was seen on lavender treated group ($p<0.05$). Normalisation of inflammatory protein expression was seen on lavender treated group ($p<0.05$). Levels of inflammatory cytokines: IL-1b, IL-6 and TNF-a were also lower in lavender treated group ($p<0.05$). It was due to its ability to inhibit macrophage-pyroptosis which responsible for high IL-1 and LDH production, thus result in inhibition of inflammatory cytokines ($p<0.05$). It also inhibit caspase-11 mediated pyroptotic activation pathway ($p<0.05$).
5	El-Naggar *et al*. (2023)	In vitro	*Lavendula angustifolia* leaves extract	Biosynthesize chitosan nanoparticle using 0.5% chitosan and 75% lavender leaves extract under artificial intelligence analysis	Biosynthesized chitosan nanoparticle are environmentally friendly, non-toxic, more stable, and energy-efficient. Its bio fabrication using Lavandula angustifolia leaves extract exhibited wound healing property by exhibiting antibiofilm activity against *P. aeruginosa, S. aureus,* and *C. albicans* ($p<0.05$).

Mori *et al*. (2016) elaborate the effects of lavender oil in a rat model. His study found an accelerated wound contraction and enhance fibroblast proliferation by upregulation of transforming

growth factor-beta (TGF-β), which is an important mediator of collagen synthesis and tissue remodelling (Mori, Kawanami, Kawahata, & Aoki, 2016). Similarly, Boukhatem *et al*. (2021) demonstrated that lavender *Lavandula stoechas* – another species of lavender – essential oil significantly improved cutaneous wound repair in rats, as demonstrated by reduced inflammation, increased collagen deposition, and minimized scar formation (Boukhatem, *et al*., 2021). Major compounds identified included linalool, linalyl acetate, and β-farnesene. Study by Ao *et al*. (2023) showed that topical lavender essential oil improved chronic wound healing in LPS-induced inflammatory wounds in mice by inhibiting macrophage pyroptosis via caspase-11 suppression, result in decreasing inflammatory cytokine levels and accelerated wound healing (Ao, *et al*., 2023). For better application technology, El-Naggar *et al.* (2023) demonstrated that lavender leaf extract can be utilized to bio fabricate chitosan nanoparticles with potent antibiofilm and antimicrobial activity, indicating potential for infection control in wound environments (El-Naggar, Eltarahony , Hafez, & Bashir , 2023).

Clinical data on lavender and wound healing are still limited, primarily focusing on postpartum episiotomy wounds. Moradi *et al*. (2020) conducted a systematic review of randomized controlled trials assessing lavender oil for episiotomy healing. Results showed significant reductions in pain, erythema, and inflammation, as well as accelerated tissue recovery compared to controls. However, there are limitation for implication due to variability in formulations, dosages, and assessment tools (Moradi, Niazi, Mazloumi, Mousavi , & Lopez, 2020). Among those studies, *Lavandula angustifolia* were the most common species evaluated. Lavender belongs to *Laminaceae* family. There are three most common cultivated lavender species, namely *L. angustifolia, L. latifolia*, and *L. intermedia*. According to Boukhatem, et al., several species of lavender, *L. stoechas, L. angustifolia, L. intermedia, L. aspic,* and *L. allardii*, were capable to heal acute and chronic wound by managing infection, suppress inflammation, and aid in tissue regeneration (Boukhatem, *et al*., 2021).

In animal studies, lavender was shown to modulate inflammatory mediators important in chronic or delayed wound healing. Ao, *et al*. (2023) found that topical lavender essential oil significantly suppressed IL-1β and HMGB1 expression by inhibiting caspase-11–mediated macrophage pyroptosis. It result in accelerated closure of LPS-induced chronic wounds (Ao, *et al*., 2023). Similarly, Mori, *et al.* (2016) demonstrated that lavender enhanced fibroblast proliferation and upregulated transforming growth factor-β (TGF-β), a critical regulator of extracellular matrix formation and collagen remodeling (Mori, Kawanami, Kawahata, & Aoki, 2016). This was further supported by which showed faster wound contraction and mature scar tissue formation (Salimi, Nazemi, & Yadegari, 2025). Findings from Boukhatem, *et al*. (2021) further supported these studies, reporting reduced inflammation, increased collagen deposition, and minimized scar formation in rat wounds treated with Lavandula stoechas essential oil (Boukhatem, *et al*., 2021). Overall, these results highlight lavender's ability to modulate each phases of wound healing.

DISCUSSION

Lavender (Lavandula angustifolia), as shown in Figure 1, has long been known to possess pharmacological activities in wound healing, including antimicrobial, antioxidant, and anti-inflammatory effects (Mori, Kawanami, Kawahata, & Aoki, 2016; Boukhatem, *et al*., 2021; Ao, *et al.*, 2023). Antioxidant mechanisms also appear to play a significant role. Application of lavender exosome-like nanoparticle was found to improve epidermal thickness, collagen preseration, and skin integrity (Li, et al., 2025).

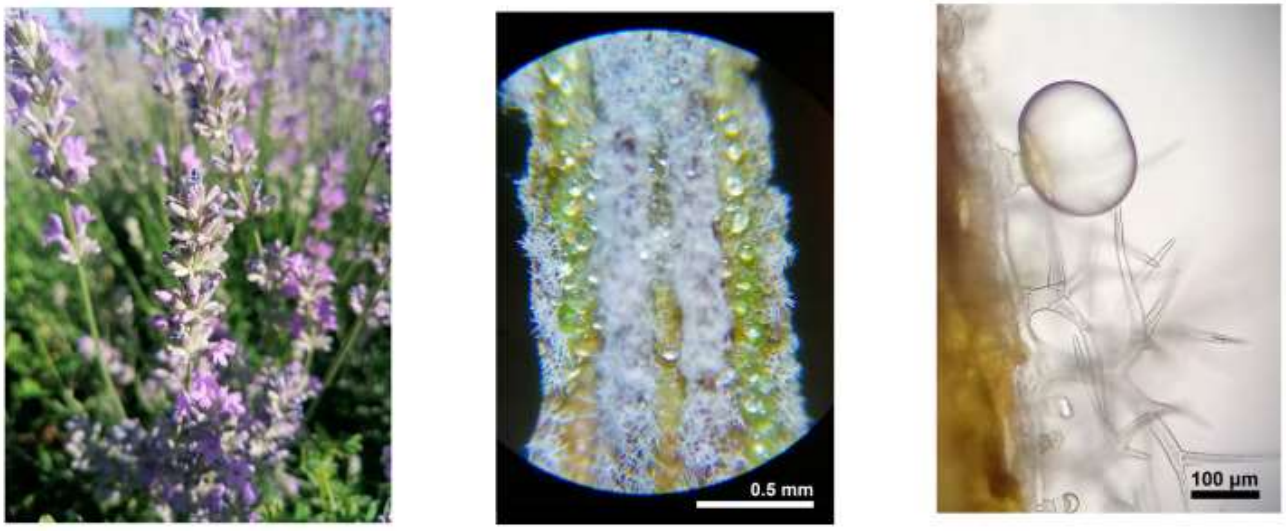

Figure 1. Lavender : (a) inflorescence; (b) 160x magnification; (c) 400x magnification (Crișan, *et al.*, 2023)

Ben Djemaa, *et al*. demonstrated that Lavandula aspic L. ointment reduced malondialdehyde (MDA)—a marker of oxydative stress—while increasing antioxidant activity, namely glutathione peroxidase (GPx) and superoxide dismutase (SOD). This biochemical activity corresponded histologically as faster epithelial regeneration and more organized dermal and epidermal layers compared with placebo (Ben Djemaa, Bellassoued, Zouari, El Feki, & Ammar, 2016).

Another study by Kazemi, showed lavender-based formulations were associated with reduced oxidative stress and enhanced extracellular matrix formation through elevated TGF-β1 and type I collagen expression (Kazemi, et al., 2020). An experiment supporting lavender's antioxidant properties was evidence by administering lavender oil intraperitoneally, which gained best efficacy in reducing oxidative stress (MDA, NOx, TOS) in an experimental rat with thrombosis compared to oral route (But, et al., 2023). This antioxidant and anti-inflammatory properties were also promising in managing renal ischemia/reperfusion injury (Aboutaleb, Jamali, Abolhasani, & Toroudi, 2019).

Lavender also exhibits antimicrobial activity, helping to control some wound pathogens such as *Pseudomonas aeruginosa, Staphylococcus aureus,* and *Candida albicans* (El-Naggar, Eltarahony , Hafez, & Bashir , 2023). Another species of lavender, *L. dentata* also showed antimicrobial potential against *S. aureus* and *S. chromogenes* (Lopes, *et al*., 2023). This antimicrobial effect is especially relevant for chronic or contaminated wounds. Its wound healing and antimicrobial properties are further enhanced when lavender is incorporated into modern delivery systems.

Nanotechnology-based formulations have markedly improved lavender's stability, penetration, and wound healing efficacy. El-Naggar, *et al.* (2023) demonstrated that lavender leaf extract can bio-fabricate chitosan nanoparticles to potent antibacterial and antibiofilm properties, providing a promising modality for infected wounds (El-Naggar, Eltarahony , Hafez, & Bashir , 2023). Flekka, *et al*. (2024) reported that lavender nanoemulsions resulted in better skin hydration, barrier repair, and chemical stability compared with conventional emulsions. Nanoemulsion preparation also facilitate better topical absorption and therapeutic effect (Flekka , *et al*., 2024). Carbone, *et al*. also showed that combining ferulic acid with lavender in nanostructured lipid carriers improved fibroblast migration and proliferation. In addition, the use of lavender provide a stable, homogenous formulations suitable for long-term storage (Carbone, et al., 2020).

Recent evidence suggests that combining lavender with other bioactive compounds may produce synergistic effects. Jaramillo et al. found that co-administration of lavender essential oil with peptide CW49 accelerated wound closure, improved epithelialization and granulation tissue formation, and demonstrated antibacterial activity against E. coli and S. aureus ($p < 0.05$), indicating potential usage for infected wounds (Jaramillo, Díaz, Muñoz, & González-Barrios, 2023). Advanced biotechnology is also promising. Teymouri *et al*. (2024) demonstrated that collagen hydrogel loaded with lavender essential oil nanoemulsion were better than plain collagen hydrogel, silver sulfadiazine, and untreated controls in second-degree burn wounds infected with P. aeruginosa. Lavender application showed reduced acute inflammation, increased collagen production, faster epithelialization, and significant antimicrobial effects (Teymouri, *et al*., 2024).

Clinical evidence remains limited and largely focused on postpartum episiotomy wounds. Moradi *et al*. (2020) reported that lavender oil reduced pain, erythema, and inflammation, and improved healing compared with controls. (Moradi, Niazi, Mazloumi, Mousavi , & Lopez, 2020). However, those results were varied in formulations, dosages, and outcome measurements. Another study were done comparing lavender with povidone iodine for episiotomy wound healing. Application of twice daily lavender oil result in faster wound healing compared to povidone iodine as measured with REEDA scale in the first 3 days, but no difference found on day 5 (Harpreet, Monika, & Bhupinder, 2016). On the other hand, comparative data suggest that other agents—such as aloe vera—may provide superior analgesia in some contexts (Menezes, 2017). Beside skin wound, lavender oil reported to be effective in oral pathology, such as mucositis, stomatitis, post operative wound, recurrent aphthous, gingivitis, and candidiasis (Păcurar, Cocoș, & Earar, 2025). An adverse effect of lavender was reported to be associated with premature thelarche, which was reversible after discontinuation of lavender product (Ramsey, *et al*., 2019). However, another study denied this association, stated lavender exposed children had the same risk of endocrine disorder as control (Hawkins, Hires, Dunne , & Keenan , 2022).

Overall, current evidence demonstrates consistent promising effect of lavender as a wound-healing agent, supported by anti-inflammation, antioxidant activity, improved fibroblast function, collagen remodeling, and antimicrobial effects. However, the clinical literature remains limited, heterogeneous, and lacking standardization. Future research should conduct well-designed randomized controlled trials, standardized formulation, and uniform outcome measurement to help define lavender efficacy in wound healing.

CONCLUSION

Evidence from in vitro, in vivo, and clinical studies consistently demonstrates that lavender possesses a good wound-healing activity through multiple biological pathways. Further clinical studies using standardized preparations are needed to confirm its effectiveness in wound management modalities.

REFERENCES

Aboutaleb, N., Jamali, H., Abolhasani, M., & Toroudi, H. P. (2019, Feb). Lavender oil (Lavandula angustifolia) attenuates renal ischemia/reperfusion injury in rats through suppression of inflammation, oxidative stress and apoptosis. Biomed Pharmacother, 110, 9-19.

Albhari, G., Badran, A., Hijazi, A., Daou, A., Baydoun, E., Nasser, M., & Merah O. (2023, Jan 23). The Therapeutic Wound Healing Bioactivities of Various Medicinal Plants. Life (Basel), 13(2), 317.

Ao, X., Yan, H., Huang , M., Xing, W., Ao, L. Q., Wu, X. F., . . . Guo , W. (2023). Lavender essential oil accelerates lipopolysaccharide-induced chronic wound healing by inhibiting caspase-11-mediated macrophage pyroptosis. Kaohsiung J Med Sci, 39(5), 511–21.

Ben Djemaa, F. G., Bellassoued, K., Zouari, S., El Feki, A., & Ammar, E. (2016, Oct 5). Antioxidant and wound healing activity of Lavandula aspic L ointment. Journal of Tissue Viability, 25(4), 193-200.

Boukhatem, M. N., Chader, H., Houche , A., Oudjida , F., Benkebaili, F., & Hakim, Y. (2021). Topical emulsion containing Lavandula stoechas essential oil as a therapeutic agent for cutaneous wound healing. J, 4(3), 288–307.

Burhan, A., Syafiqah, N., Ruangdet, K., Oanh, L., MacLeod, E. R., Roy, A. D., . . . Susanti, I. (2025, Oct). Hidden Wounds: Prevalence of Chronic Wounds in Asia, A Systematic Review and Meta Analysis. Java Nursing Journal, 3(3), E-ISSN: 2988-4152.

But, V. M., Bulboaca, A. E., Rus, V., Ilyés, T., Gherman , M. L., & Bolboaca, S. D. (2023). Anti-inflammatory and antioxidant efficacy of lavender oil in experimentally induced thrombosis. Thrombosis Journal, 21, 85.

Carbone, C., Caddeo, C., Grimaudo, M. A., Manno, D. E., Serra A, & Musumeci , T. (2020, May 8). Ferulic Acid-NLC with Lavandula Essential Oil: A Possible Strategy for Wound-Healing? Nanomaterials (Basel), 10(5), 898.

Crișan, I., Ona, A., Vârban , D., Muntean, L., Vârban, R., Stoie, A., . . . Morea, A. (2023, Jan 12). Current Trends for Lavender (Lavandula angustifolia Mill.) Crops and Products with Emphasis on Essential Oil Quality. Plants (Basel), 12(2), 357.

El-Naggar, N. E., Eltarahony , M., Hafez, E. E., & Bashir , S. I. (2023). Green fabrication of chitosan nanoparticles using Lavandula angustifolia, optimization, characterization and in-vitro antibiofilm activity. Sci Rep, 13, 11127.

Falanga, V., Isseroff, R. R., Soulika , A. M., Romanelli , M., Margolis D, Kapp S, . . . Harding K. (2022, Jul 21). Chronic wounds, 8(1), 50.

Flekka , K., Dimaki, V. D., Mourelatou, E., Avgoustakis, K., Lamari, F. N., & Hatziantoniou, S. (2024). Stability and retention of nanoemulsion formulations incorporating lavender essential oil. Cosmetics, 11(3), 65.

Harpreet, K., Monika, & Bhupinder, K. (2016, Apr-Jun). A study to assess the effectiveness of Lavender oil versus povidone iodine on healing of episiotomy wound among postnatal mothers. Indian J Public Health Research & Develoment, 7(2), 5.

Hawkins, J., Hires, C., Dunne , E., & Keenan , L. (2022, Jun). Prevalence of endocrine disorders among children exposed to lavender essential oil and tea tree essential oils. Int J Pediatr Adolesc Med, 9(2), 117-124.

Jaramillo, V., Díaz, E., Muñoz, L. N., & González-Barrios, A. F. (2023, Jun 15). Enhancing Wound Healing: A Novel Topical Emulsion Combining CW49 Peptide and Lavender Essential Oil for Accelerated Regeneration and Antibacterial Protection. Pharmaceutics, 15(6), 1739.

Kajjari, S., Joshi, R. S., Hugar, S. M., Gokhale, N., & Mehar, P. (2022, May-Jun). The Effects of Lavender Essential Oil and its Clinical Implications in Dentistry: A Review. Int J Clin Pediatr Dent, 15(3), 385–388.

Kazemi, M., Mohammadifar, M., Aghadavoud, E., Vakili, Z., Aarabi, M. H., & Talaei, S. A. (2020, May). Deep skin wound healing potential of lavender essential oil and licorice extract in a nanoemulsion form: Biochemical, histopathological and gene expression evidences. J Tissue Viability, 29(2), 116-124.

Li, S., Liu , F., Zhang, S., Sun, X., Li, X., Yue , Q., . . . Zhao, L. (2025, Jul 1). Lavender Exosome-Like nanoparticles attenuate UVB-Induced Photoaging via miR166- Mediated inflammation and collagen regulation. Sci Rep, 15(1), 21286.

Lopes, T. S., Fussieger , C., Theodoro, H., Silveira, S., Pauletti, G. F., Ely, M. R., . . . Streck, A. F. (2023, Jun 20). Antimicrobial activity of essential oils against Staphylococcus aureus and Staphylococcus chromogenes isolated from bovine mastitis. Braz J Microbiol, 54(3), 2427–2435.

Menezes, P. M. (2017). Effectiveness of Aloe Vera Gel Vs Lavender Oil on Episiotomy Wound among Postnatal Mothers in a Selected Hospital, Mangalore. Int J Nurs Midwif Res, 4(3), 48-54.

Moradi, M., Niazi, A., Mazloumi, E., Mousavi , S. F., & Lopez, V. (2020). Effect of Lavender on Episiotomy Wound Healing and Pain Relief: A Systematic Review. Evidence Based Care, 10(1), 61-69.

Mori, H. M., Kawanami, H., Kawahata, H., & Aoki, M. (2016, May 26). Wound healing potential of lavender oil by acceleration of granulation and wound contraction through induction of TGF-β in a rat model. BMC Complement Altern Med, 16, 144.

Păcurar, M., Cocoș, D. I., & Earar, K. (2025, Jul-Sep). Anti inflammatory and antimicrobial effects of lavender oil in the management of oral diseases. Romanian J Oral Rehabilitation., 17(3), 241-251.

Ramsey, J. T., Li, Y. W., Arao, Y., Naidu, A., Coons, L. A., Diaz A, & Korach, K. S. (2019, Nov). Lavender Products Associated With Premature Thelarche and Prepubertal Gynecomastia: Case Reports and Endocrine-Disrupting Chemical Activities. The Journal of Clinical Endocrinology & Metabolism, 104(11), 5393-5405.

Riyahi, F., Riahy, S., & Yousefpour, M. (2021). Reviewing the Physiology of cutaneous Wound Healing and Evaluating the Effect of Exercise on It: A Narrative Review Article. Ann Mil Health Sc Res, 19(3), e115926.

Salimi, F., Nazemi, A., & Yadegari, M. (2025, Jul-Sep). Determination the effect of lavender ethanolic extract derived ointment on wound healing in Alloxan-induced diabetic Wistar rats. Brazilian J Animal Hygiene and Health., 19(3), 1-7.

Teymouri, H., Mohammadimehr , M., Ahanjan , M., Sheidaei, S., Saeedi , M., & Mellati , A. (2024, Jun). Effect of collagen hydrogel containing Lavandula officinalis essential oil nanoemulsion in wound healing of infectious burn. Iran J Microbiol, 16(3), 376-388.

Tottoli, E. M., Dorati, R., Genta, I., Chiesa, E., Pisani, S., & Conti, B. (2020). Skin wound healing process and new emerging technologies for skin wound care and regeneration. Pharmaceutics, 12(8), 735.

Wijayadi , L. J., Kelvin, K., Gravianto, E. D., & Kartawijaya, F. N. (2024). Management of cutaneous wounds with herbal essential oils. Int J Glob Health Res, 6(6), 4105–18.