

Is there a role for Essential Oils in wound healing in veterinary practice?

Andrei Vultur^{1,2}, Alexandra Machado^{1,3}, Ana Margarida Costa^{1,4,5*}

¹ Licenciatura em Farmácia. Escola Superior de Tecnologia da Saúde de Lisboa, Av. D. João II Lote 4.69.01, Lisboa, Portugal

² Faculty of Pharmacy. University of Medicine and Pharmacy « Iuliu Hatieganu », Strada Victor Babeş 8, 400347, Cluj-Napoca, Romania

³ cE3C – Centre Ecology, Evolution and Environmental Change, Faculdade de Ciências da Universidade de Lisboa Edifício C2, 5º Piso, Sala 2.5.46 Campo Grande 1749-016 Lisboa, Portugal

⁴ H&TRC - Health & Technology Research Center, ESTeSL- Escola Superior de Tecnologia da Saúde, Instituto Politécnico de Lisboa, Lisboa, Portugal, ana.costa@estesl.ipl.pt

⁵ CHRC - Comprehensive Health Research Centre, Lisboa, Portugal

*Corresponding author

Background: Essential oils (EOs) from aromatic plants are now becoming widely accepted as potential alternative treatment options to the conventional pharmaceutical agents for wound healing [1]. With the increasing search for new antimicrobial agents due to the emergence of antimicrobial resistance to available drugs, there is renewed interest in investigating the role of essential oils in fighting infections [2,4].

Objective: To investigate the EOs ability to stimulate tissue healing, control microbial colonization, and modulate inflammation in veterinary practice. **Methods:** A narrative literature review was conducted based on scientific sources, addressing the effects of EOs on inflammatory responses, cell regeneration, and infection prevention. Studies searched in PubMed and ScienceDirect were analyzed, focusing effectiveness of essential oils and therapeutic properties. The search was performed using mesh and/or free text terms: “essential oils” AND “wound healing” AND “veterinary” or “secondary infection prevention” AND “essential oils” AND “animal wounds”. Selection criteria included relevance to wound healing and potential applicability in veterinary medicine. *In vivo*, *in vitro* and clinical studies were considered, while non-specific reviews and studies lacking detailed data were excluded. **Results:** In a total of 21 studies, findings indicate that EOs enhance wound healing by stimulating fibroblast proliferation, collagen synthesis, and angiogenesis. Notably, tea tree, lavender, thyme, oregano, and chamomile oils demonstrated both antibacterial and anti-inflammatory properties, reducing cytokine-mediated inflammation [5]. Many EOs exhibited potent activity against *E. coli*, *S. aureus*, *P. aeruginosa*, and *B. subtilis*, with combinations outperforming conventional antibiotics. Some oils, including chamomile and lavender, promoted faster epithelialization and reduced oxidative stress in wounds [2,3,4]. Despite some limitations, this review supports the feasibility of integrating these natural compounds into veterinary topical formulations for wound healing. **Conclusions:** Essential oils present a promising complementary approach to veterinary wound care by accelerating tissue repair, reducing inflammation and preventing infections. Further research is needed on standardized dosages and ensure safety.

Keywords: essential oils, wound healing, antimicrobial, anti-inflammatory, veterinary medicine.

Acknowledgments

Funding: This research was funded by **Concurso de Investigação, Desenvolvimento, Inovação e Criação Artística (IDI&CA)** from **Instituto Politécnico de Lisboa**, grant number **IPL/IDI&CA2024/PLANT-VET_ESTeSL**.

References

- [1] Costa, MF; Durço, AO; Rabelo, TK; Barreto, RSS; Guimarães, AG. Effects of carvacrol, thymol and essential oils containing such monoterpenes on wound healing: a systematic review. *J Pharm Pharmacol* 2019, 71(2),141-155.
- [2] El-Tarabily, KA; El-Saadony, MT; Alagawany, M; Arif, M; Batiha, GE; Khafaga, AF; Elwan, HAM; Elnesr, SS; & El-Hack, M. Using essential oils to overcome bacterial biofilm formation and their antimicrobial resistance. *Saudi J. Biol. Sci.* 2021, 28(9), 5145–5156.
- [3] Falck, CL. Essential oils in veterinary wound management: a review of current literature. *AHVMA* 2022, 67, 11-22.
- [4] Aljaafari MN, AlAli AO, Baqais L, Alqubaisy M, AlAli M, Molouki A, et al. An Overview of the Potential Therapeutic Applications of Essential Oils. *Molecules*. 2021;26:628.
- [5] Ebani VV, Mancianti F. Use of Essential Oils in Veterinary Medicine to Combat Bacterial and Fungal Infections. *Veterinary sciences*. 2020;7:193.