

OTICYS – TECHNICAL DATA SHEET

***Calendula officinalis* (marigold) flower extract**

Calendula officinalis (pot marigold) flower extracts have a long-lasting tradition in ethnopharmacology. Currently, the European Medicines Agency (EMA) has approved its lipophilic and aqueous alcoholic extracts as traditional medicinal products for the treatment of minor inflammation of the skin and as an aid in the healing of minor wounds¹. The effect of three different extracts from *Calendula* flowers (n-hexanic, ethanolic, aqueous) on the inflammatory phase of wound healing was studied in human immortalized keratinocytes and human dermal fibroblasts. The effect of *Calendula* extracts on the new tissue formation phase of wound healing was evaluated by studying the migratory properties of these extracts, triterpene mixtures and single compounds in human immortalized keratinocytes using the scratch assay. Finally, the effect of the extracts on the formation of granulation tissue in wound healing was studied using bacterial collagenase isolated from *Clostridium histolyticum* and the determination of soluble collagen in the supernatant of human dermal fibroblasts². *C. officinalis* Linn. (Pot marigold) has been traditionally used for inflammations of the oral and pharyngeal mucosa, wounds and burns³. *Calendula* tea is used as eyewashes, gargles, diaper rashes and other inflammatory conditions of the skin and mucous membranes⁴. In veterinary practice, Marigold was proven to have antibacterial and antifungal effects of a rather broad-spectrum including antibiotic-resistant bacteria. This makes it an interesting new option for the treatment of pyoderma, otitis externa, infected wounds and dermatophytosis. In the same research, it showed wound-healing properties and is thus promising candidates in line to fill the therapeutic gap in canine wound-healing agents⁵.

***Origanum vulgare* essential oil**

The efficacy of oregano oil against pathogenic bacteria has been investigated in numerous studies. In one of them⁶, oregano oil showed a significant anti-bacterial activity against 11 MDR clinical isolates including four *Acinetobacter baumannii*, three *Pseudomonas aeruginosa*, and four methicillin-resistant *Staphylococcus aureus* (MRSA), with a MIC ranging from 0.08 mg/ml to 0.64 mg/ml. Oregano oil also effectively eradicated biofilms formed by each of the 13 pathogens above at similar MICs. In vivo study using the third-degree burn wounds infected with PA01 or USA300 demonstrated that oregano oil, topically applied 24 h after bacterial inoculation, sufficiently reduced the bacterial load in the wounds by 3 log₁₀ in 1 h, as measured by drastic reduction of bacterial bioluminescence. This bactericidal activity of oregano oil concurred with no significant side effect on the skin histologically or genotoxicity after three topical applications of oregano oil at 10 mg/ml for three consecutive days. The investigation suggests potentials of oregano oil as an alternative to antibiotics for the treatment of wound-associated infections regardless of antibiotic susceptibility.

Origanum vulgare essential oil has also proven to be active against clinical isolates of oral candida, showing 30±3mm of zone of inhibition as against 19mm for fluconazole⁷. In another study⁸, in vitro activity of the essential oil extracted from *Origanum vulgare* was evaluated against sixteen *Candida* species isolates. Standard strains tested comprised *C. albicans* (ATCC strains 44858, 4053, 18804 and 3691), *C. parapsilosis* (ATCC 22019), *C. krusei* (ATCC 34135), *C. lusitanae* (ATCC 34449) and *C. dubliniensis* (ATCC MY646). Six *Candida albicans* isolates from the vaginal mucous membrane of female dogs, one isolate from the cutaneous tegument of a dog and one isolate of a capuchin monkey were tested in parallel. All isolates tested in vitro were sensitive to *O. vulgare* essential oil. The chromatographic analysis revealed that the

main compounds present in the essential oil were 4-terpineol (47.95%), carvacrol (9.42%), thymol (8.42%) and α -terpineol (7.57%). The antifungal activity of *O. vulgare* essential oil against *Candida* spp. observed in vitro suggests its administration may represent an alternative treatment for candidiasis.

Research conducted in 2003/2004 documented and validated (in a non-experimental way) ethnoveterinary medicines used by small-scale, organic livestock farmers in British Columbia (BC), Canada⁹. During this study, the essential oils of *Origanum vulgare* L., and *Thymus vulgaris* L. exhibited very strong free radical scavenging activity. The essential oil of *T. vulgaris* exhibited the highest OH radical scavenging activity, although it did not reach 50% of neutralization (IC (50)). The antimicrobial activity was tested against 13 bacterial strains and six fungi. The most effective antibacterial activity was expressed by the essential oil of oregano, even on multiresistant strains of *Pseudomonas aeruginosa* and *Escherichia coli*. Oregano essential oil was tested along with other essential oils (EOs) which are recommended by some veterinarians to treat otitis externa in pets, against bacterial and fungal pathogens previously isolated from dogs and cats with otitis externa¹⁰. In particular, the analyses were carried out against *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Staphylococcus pseudointermedius*, *Aspergillus niger*, *Aspergillus fumigatus*, *Aspergillus terreus*, *Candida albicans*, *Candida tropicalis*, *Trichosporon* sp., and *Rhodotorula* sp. *O. vulgare* showed superior antibacterial activity, even if not against all the strains. Also, most fungi were inhibited by *O. vulgare*.

References

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