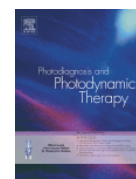


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Visible light enhances the antimicrobial effect of some essential oils

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Highlights

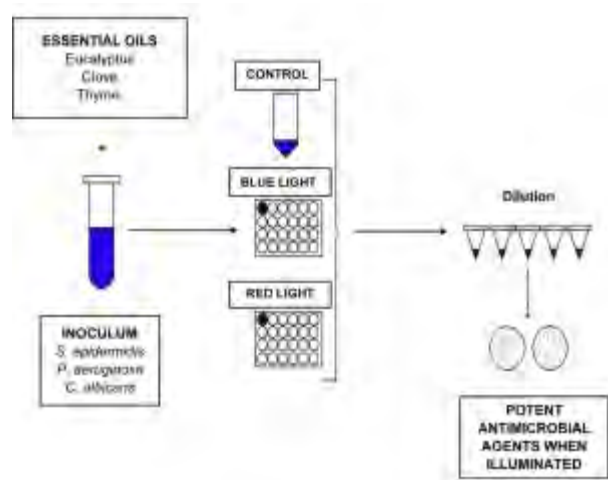
- For the first time, **antimicrobial** essential oils and visible light is analysed.
- Blue light always enhances the innate antimicrobial activity of oils especially of **phenols**.
- Regardless of gram character both bacteria are easier to kill than yeast.
- Visible light with essential oils can be effective in several industries and medical applications.

Abstract

The photodisinfection is a topical, broad spectrum antimicrobial technology, targeting bacteria, virus, fungi, and protozoa effective for single cells as for biofilms. Natural molecules have been studied less than synthetic agents in the process but they are currently receiving great interest. Therefore, the aim of this study is to evaluate for the first time if non-coherent blue and red light enhances the antimicrobial activity of some essential oils when standard strains for antibiotic or

fungicide tests are enlightened *in vitro*. *Staphylococcus epidermidis*, *Pseudomonas aeruginosa* and *Candida albicans* collection strains were irradiated with monochromatic visible light from light emitting diodes in the presence of 5% and 0.5% eucalyptus (*Eucalyptus globulus*), clove (*Eugenia caryophyllata*), and thyme (*Thymus vulgaris*) essential oils. Microbial levels were measured by plate count on culture media. In this preliminary report, the results differ according to the kind and concentration of antimicrobial oils, the wavelength of light, and the prokaryotic or eukaryotic microorganism. The results support the idea that mainly blue light enhances the innate antimicrobial activity of the essential oils, especially phenols, and could offer a very efficient and natural way to combat microorganisms in several industries and medical applications (cutaneous and oral infections, medical textiles, foodstuffs and fruit surface, etc.).

Graphical abstract



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Keywords

Photodisinfection, ; Visible light, ; Essential oils, ; *Staphylococcus epidermidis*, ; *Pseudomonas aeruginosa*, ; *Candida albicans*, ;

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