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Liquid and vapour phase antibacterial activity of *Eucalyptus globulus* essential oil = susceptibility of selected respiratory tract pathogens

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Essential oils (EO) produced by medicinal plants have been traditionally used for respiratory tract infections, and are used nowadays as ethical medicines for colds. Although several studies of *Eucalyptus globulus* essential oil (EGEO) have been reported, there are no reports describing vapour activity of EGEO against bacterial respiratory tract pathogens. The aim of this study was to test the efficacy of the Algerian EGEO against some respiratory tract pathogens by disc diffusion and vapour diffusion methods at different concentrations.

Chemical composition of the EGEO was analysed by Gas Chromatography-Mass Spectrometry. Fresh leaves of *E. globulus* on steam distillation yielded 0.96 % (v/w) of essential oil whereas the analysis resulted in the identification of a total of 11 constituents, 1.8 cineole (85.8%), α -pinene (7.2%), and β -myrcene (1.5%) being the main components.

By disc diffusion method, EGEO showed potent antimicrobial activity against Gram-positive more than Gram-negative bacteria. The Diameter of Inhibition zone (DIZ) varied from 69 mm to 75 mm for *Staphylococcus aureus* and *Bacillus subtilis* (Gram +) and from 13 to 42 mm for *Enterobacter sp.* and *E.coli* (Gram -), respectively. However, the results obtained by both agar diffusion and vapour diffusion methods were different. Significantly higher antibacterial activity was observed in the vapour phase at lower concentrations. *A. baumannii* and *Klebsiella pneumoniae* were the most susceptible strains to the oil vapour with DIZ varied from 38 to 42 mm. Therefore, smaller doses of EO in the vapour phase can be inhibitory to pathogenic bacteria. Else, the DIZ increased with increase in concentration of the oil.

There is growing evidence that EGEO in vapour phase are effective antibacterial systems and appears worthy to be considered for practical uses in the treatment or prevention of patients with respiratory tract infections or as air decontaminants in hospital. The present study indicates that EGEO has considerable antimicrobial activity, deserving further investigation for clinical applications.

Keywords: *Eucalyptus globulus*; Essential oils; Respiratory tract pathogens; Antimicrobial activity; Vapour phase.

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