

TITLE: *IN VITRO* ASSOCIATION BETWEEN *Mentha piperita* ESSENTIAL OIL AND THREE ANTIMICROBIAL DRUGS

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ABSTRACT:

The development of bacterial resistance is known as one of the main public health problems, phenomenon that has encouraged the search for substances with selective toxicity and ability to inhibit microbial growth efficiently. Natural products are compounds with a wide structural diversity and remain an important source of new chemical entities and new drug prototypes. Essential oils (EO) are among the main components extracted from plants with great potential for the development of new antibacterial drugs. Among the medicinal plants producing EO is *Mentha piperita*, commonly used for colds, sore throats, cramps, toothache, also as antifungal and antibacterial. In most cases, the use of medicinal plants is done together with the conventional medicines, and when used this way the plants themselves and/or their by-products can inhibit or intensify the drugs therapeutic effect. The purpose of this study was to evaluate the antibacterial potential of *M. piperita* EO and to verify the existence of synergisms and/or antagonisms when the EO is associated with the drugs. The EO was obtained by donation from a company specialized in aromatherapy (By Samia). The EO antimicrobial activity tests were performed by the method of disc-diffusion (Kirby-Bauer), and Minimum Inhibitory Concentration (MIC) was determined using microbroth dilution method. The association between EO and antimicrobial drugs, ciprofloxacin, gentamycin and penicillin G, was tested by disc-diffusion method as well. The essential oil and the associations were tested against 5 bacterial strains: *Enterococcus faecalis* (ATCC 29212), *Escherichia coli* (ATCC 25922), *Klebsiella pneumoniae* (ATCC 700603), *Pseudomonas aeruginosa* (ATCC 27853) and *Staphylococcus aureus* (ATCC 25923). *M. piperita* EO showed strong activity against *S. aureus*, intermediate activity against *E. coli*, weak activity against *E. faecalis* and *K. pneumoniae*, and no activity against *P. aeruginosa*. In the association tests, it was observed the existence of 4 antagonisms and 3 synergisms with ciprofloxacin, gentamycin and penicillin G. Penicillin G was the one that presented more interference, with 1 synergism and 2 antagonisms. The results suggest that *M. piperita* essential oil show relevant antimicrobial activity on the tested strains. Also, the results indicate the existence of interactions between the essential oil and the antimicrobial drugs, what can be used to promote more research and improve clinical practice with antibiotics.

KEYWORDS: antagonism, antimicrobial drugs, bacterial resistance, Natural products, synergism.

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