

# Chemical composition and antimicrobial activity of essential oils of selected Apiaceous plants growing in Egypt

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## Abstract

Antimicrobial properties of essential oils of plants are continuously being investigated in order to use them as potential drug candidates to overcome the problem of microbial drug resistance [1]. The aim of this research is to study the antibacterial and antifungal effects of ten traditional Apiaceous essential oils; *Pimpinella anisum* L. (Anise), *Carum carvi* L. (Caraway), *Apium graveolens* L. (Celery), *Coriandrum sativum* L. (Coriander), *Cuminum cyminum* L. (Cumin), *Anethum graveolens* L. (Dill), *Foeniculum vulgare* (Fennel), *Petroselinum crispum* L. (Parsely), *Daucus carota* L. var. *sativus* (Red Carrot) and *D. carota* L. var. *boissieri* (Yellow Carrot). GC/MS was carried out to identify the chemical composition of the most active antimicrobial essential oils. Results of agar-well diffusion method revealed that the maximum inhibition zones were obtained with cumin, coriander and caraway oils against the standard bacterial strains *Escherichia coli*, *Bordetella bronchiseptica* followed by *Staphylococcus aureus*. On the other hand, the remaining essential oils showed much smaller inhibition zones or no inhibition at all.

The three most active essential oils; cumin, caraway and coriander were selected to confirm their antibacterial activity by using viable count time-kill method. Results of this experiment revealed that the coriander essential oil had the highest antimicrobial activity with more than 99.999% killing of the exposed cells of the standard *E. coli* and *Bordetella bronchiseptica* standard strains during 5 minutes exposure. These results are in accordance with previously published data [2]. The percentage of identified compounds by GC/MS was 92.5, 99.43 and 98.66 for the cumin, coriander and caraway oils respectively. Monoterpenes were the most abundant components in the three oils.

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