



# Melissa officinalis oil affects infectivity of enveloped herpesviruses.

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## Abstract

Extracts and essential oils of medicinal plants are increasingly of interest as novel drugs of antimicrobial and antiviral agents, since herpes simplex virus (HSV) might develop resistance to commonly used antiviral agents. *Melissa officinalis* essential oil was phytochemically examined by GC-MS analysis, its main constituents were identified as monoterpenaldehydes citral a, citral b and citronellal. The antiviral effect of lemon balm oil, the essential oil of *Melissa officinalis*, on herpes simplex virus was examined.

The inhibitory activity against herpes simplex virus type 1 (HSV-1) and herpes simplex virus type 2 (HSV-2) was tested in vitro on monkey kidney cells using a plaque reduction assay. The 50% inhibitory concentration (IC<sub>50</sub>) of balm oil for herpes simplex virus plaque formation was determined at high dilutions of 0.0004% and 0.00008% for HSV-1 and HSV-2, respectively. At noncytotoxic concentrations of the oil, plaque formation was significantly reduced by 98.8% for HSV-1 and 97.2% for HSV-2, higher concentrations of lemon balm oil abolished viral infectivity nearly completely. In order to determine the mode of antiviral action of this essential oil, time-on-addition assays were performed. Both herpesviruses were significantly inhibited by pretreatment with balm oil prior to infection of cells. These results indicate that *Melissa* oil affected the virus before adsorption, but not after penetration into the host cell, thus lemon balm oil is capable of exerting a direct antiviral effect on herpesviruses.

Considering the lipophilic nature of lemon balm essential oil, which enables it to penetrate the skin, and a high selectivity index, *Melissa officinalis* oil might be suitable for topical treatment of herpetic infections.

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