Melissa officinalis (Lemon balm)

Lemon balm well known in antiviral phytotherapy[11]. Extracts from plants of the Lamiaceae family have been described for antioxidant [12] and antibacterial effects [13-14], which have been linked to their polyphenolic composition.

The extract of M. officinalis has been reported to inhibit protein synthesis and exhibit antiviral action against the Herpes simplex virus type 1 (HSV-1) .Lemon balm essential oil could inhibit influenza virus replication through different replication cycle steps especially throughout the direct interaction with the virus particles. It could inhibit replication of avian influenza virus (AIV) subtype H9N2 through the different virus replication phase.[1]

Aqueous extracts from Lamiaceae can drastically and rapidly reduce the infectivity of HIV-1 virions at non-cytotoxic concentrations. An extract-induced enhancement of the virion's density prior to its surface engagement appears to be the most likely mode of action. By harbouring also a strong activity against herpes simplex virus type 2, these extracts may provide a basis for the development of novel virucidal topical microbicides.[2]

A virucidal activity of extracts from lemon balm has been reported for herpes simplex virus type 1 (HSV-1) and type 2 (HSV-2) [3-5] The major antiviral activity of these tea-like extracts from lemon balm, peppermint, and sage targets the HIV-1 virion. The extracts inhibited the capacity of virions to enter into target cells at concentrations typically two orders of magnitude below the cytotoxic concentrations. A strong antiviral activity was observed for different types of virions carrying a broad spectrum of viral envelopes, but not against the non-enveloped adenovirus type 5[2].

HSV-1 is transmitted through contact with saliva and causes recurrent herpes labialis, whereas HSV-2 is transmitted sexually and is associated with urogenital and neonatal infections. plant-derived antivirals are of increasingly interest for the development of new, more effective and specific anti-herpesvirus agents. Antiviral activity of some essential oils against enveloped and nonenveloped viruses, e.g. tea tree oil against tobacco mosaic virus[7], peppermint oil and thyme oil against herpesvirus[8-9], have been reported.

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. 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.[6]

The application of tea tree oil, the essential oil of Melaleuca alternifolia, for the treatment of recurrent herpes labialis has been reported recently as well as preparations containing lemon balm aqueous extracts [10-11]. Both tea tree oil and lemon balm oil possess antiviral activity against herpes simplex virus in vitro. The topical use of balm essential oil for the treatment of HSV infections seems promising, especially for those patients who experience frequent recurrences.

Enterovirus 71 (EV71) infection is endemic in the Asia-Pacific region. Lemon balm exhibits anti-EV71 activity. RA(rosmarinic acid (RA) as a biologically active constituent), identified as an antiviral constituent of Lemon balm, inhibits viral replication, and offers protective effect against EV71 infection in vivo. Mechanistically, RA suppresses attachment of virion to host cells. Lemon balm inhibited plaque formation, cytopathic effect, and viral protein synthesis in EV71-infected cells.[15]

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