

# Aromatherapy Research Article

## July 2014

### Hay fever

The beautiful sunny weather that Britain has been enjoying recently is set to continue, which is excellent news for most. However, along with this we have been experiencing a surge in the pollen count to 'very high' levels. This has been predicted to bring about 'untold misery' to hay fever sufferers and has brought about a large increase in the number of people visiting the GP with symptoms.

Hay fever is a type of allergic rhinitis, an allergic disorder of the nasal airways, triggered by the inhalation of pollen. It is characterised by one or more of the following symptoms: sneezing and nasal itching, excessive nasal discharge (rhinorrhoea) and congestion. Allergic rhinitis is also commonly paired with allergic conjunctivitis, where the allergen causes itching, redness and discharge of the eyes.

The allergic reaction seen in hay fever occurs in atopic individuals, who are genetically susceptible to becoming sensitised to harmless allergens such as pollen. An antibody called immunoglobulin E (IgE) is produced in response to the pollen, and attaches to the surface of white blood cells called mast cells that sit in the nasal mucosa. When re-exposed to the allergen, IgE causes the mast cell to release inflammatory chemicals such as histamine, in a process called degranulation. The inflammatory chemicals cause blood vessels to dilate, leading to leakage of fluid and white blood cells into the nasal mucosa, which results in inflammation. Inflammation of the nasal cavity leads to congestion, itching, sneezing and rhinorrhoea. This process can also occur in the conjunctiva, causing redness, itching and watering of the eyes.

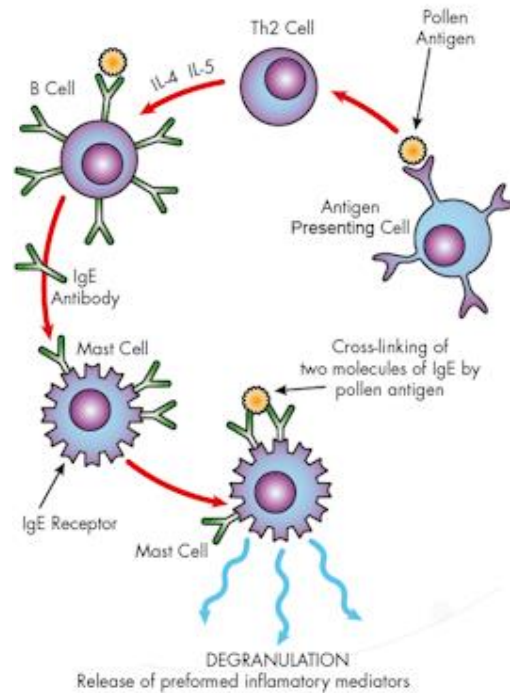


Figure 1: The mechanism of IgE mediated allergic responses in hay fever.

The most common treatment for hay fever is oral anti-histamine tablets, which prevent the action of histamine on the body. However, these may cause side effects such as drowsiness and dry mouth (Greiner et al., 2012), and many people would prefer not to take daily medication. So, natural products may be a preferable alternative therapy or be used as a supplement to conventional medication. Discussed below are some studies into the anti-allergic properties of some essential oils often recommended for hay fever. Please note that some of this information is based on animal studies which Penny Price Aromatherapy does not endorse. We include these studies to provide objective data that supports the uses of the essential oils.

### **Lavender (*Lavendula angustifolia*)**

Lavender is well known for its anti-inflammatory and skin-soothing properties, and is one of the essential oils that may be recommended for hay fever. Lavender oil was actually found to significantly reduced histamine and TNF- $\alpha$  (another inflammatory mediator important in the immediate allergic response) release from pre-sensitised rat mast cells exposed to the antigen DNP-HSA (Kim and Cho, 1999). This method simulates the allergic mechanism seen in hay fever, thus this study provides evidence for lavender's anti-allergic properties that could be exploited for hay fever.

### **German Chamomile (*Matricaria recutita*)**

German chamomile has been used in traditional oriental medicine for allergies. A recent mouse study provides scientific evidence for its anti-allergic properties. Mice were given the mast cell degranulating chemical 48/80 and mast cells isolated. When given German chamomile extract prior to 48/80, the amount of histamine and other inflammatory mediators released from mast cells was significantly lower than with no treatment. The amount of histamine and other inflammatory mediators present in the blood of mice was also significantly lower. Therefore, German chamomile significantly reduced mast cell degranulation and thus the allergic response (Chandrashekhar et al., 2011). In support of this, Kobayashi, Takahashi and Ogino (2005) found that German chamomile significantly decreased itching responses in mice to 48/80 (and so histamine) compared to controls. It also enhanced the anti-itching effect of conventional anti-histamines, so may be a useful complementary therapy for hay fever and other allergic diseases. German chamomile contains tannins, compounds that reportedly stabilise mast cells and play at least some part in German chamomile's antihistaminic activities. The flavanoids called apigenin and luteolin present in German chamomile were also found to inhibit histamine release (Chandrashekhar et al., 2011).

### **Peppermint (*Mentha piperta*)**

Using a similar method, Inoue et al. (2001) found oral administration of 50% ethanol extract of peppermint significantly reduced mast cell degranulation by 48/80. In this study an experimental model of allergic rhinitis was produced by sensitising rats to ovalbumin protein over the course of 28 days. Peppermint extract was given orally 1 hour before applying ovalbumin protein solution to the nasal cavity and the frequency of nasal rubbing and sneezing was observed. Peppermint extract significantly reduced sneezing and nasal rubbing frequency compared to no treatment. Rhinorrhea was also significantly reduced in a dose dependent manner. Further studies by Inoue et al. (2002) using the same methods determined that a flavonoid glycoside called luteolin-7-O-rutinoside isolated from peppermint significantly reduced histamine release from mast cells and nasal symptoms induced by ovalbumin, probably by preventing IgE and the allergen from interacting. This compound is an active substance in peppermint that may be useful in relieving symptoms of allergic rhinitis.

Menthol, which constitutes 28-46% of peppermint oil (Price and Price, 2011), is widely reported to be an expectorant, which aid in clearance of mucous to relieve congestion. This is supported by a study showing that steam inhalation of menthol decreased the specific gravity of mucous i.e. thinned the mucous (Eccles, 1994). Clinical trials have

also found that despite no significant effect on nasal airflow and resistance, inhalation of menthol increased perception of nasal airflow in 100% of the volunteers (Eccles, 2003). Menthol is also a major component of eucalyptus and cornmint essential oils, which could be used as alternative decongestants.

### **Hyssop (*Hyssopus officinalis*)**

Hyssop is rich in rosmarinic acid (Charles, 2013), a compound that has been found to be strongly anti-inflammatory in several animal models. A clinical trial into the effect of oral supplements of rosmarinic acid on hay fever symptoms found a significant improvement in symptoms of itchy nose and eyes and watery eyes after 21 days compared to the placebo, and a significant decrease in neutrophils and eosinophils (two types of white blood cells indicative of allergic inflammation) in nasal discharge (Osakabe et al., 2004). Hyssop essential oil is also a good source of the terpenoid camphor (Charles, 2013). Camphor is often used in decongestant preparations such as Vaporub. Like menthol, camphor does not have any real effect on nasal airflow and resistance, but increases perception of nasal airflow, thus relieving symptoms of nasal congestion (Burrow, Eccles and Jones, 1983). In addition, the flavonoid diosmin, which is also produced by hyssop, was in the top five most effective flavonoids, out of twenty two tested, at inhibiting isolated mast cell degranulation (Cheong et al., 1998). Therefore, hyssop essential oil contains several components that may treat the different symptoms of hay fever, which may explain its popularity as a hay fever treatment in aromatherapy.

This is not an exhaustive list of the oils that may be useful for hay fever, as other anti-allergic, anti-inflammatory, decongestant and expectorant oils could provide relief. However, the oils described above have evidence to suggest that they have a specific targeted effect upon the underlying mechanisms of hay fever. Hopefully, in future years, controlled clinical trials on human volunteers will be carried out to provide further meaningful evidence for their effectiveness.

### **References**

- Burrows, A., Eccles, R. and Jones, A.S. (1983) The Effects of Camphor, Eucalyptus and Menthol Vapour on Nasal Resistance to Airflow and Nasal Sensation. *Acta Oto-laryngologica*, 96 (1-2), pp. 157-161.
- Chandrashekhar, V.M. et al. (2011) Anti-allergic activity of German chamomile (*Matricaria recutita* L.) in mast cell mediated allergy model. *Journal of Ethnopharmacology*, 137 (1), pp. 336-340.

Charles, D.J. (2013) *Hyssop*. In: *Antioxidant Properties of Herbs, Spices and Other Sources*. New York: Springer.

Cheong et al. (1998) Studies of Structure Activity Relationship of Flavonoids for the Anti-Allergic Actions *Archives in Pharmacal Research*, 21 (4), pp. 478-480.

Eccles, R. (2003) Menthol: Effects on Nasal Sensation of Airflow and the Drive to Breathe. *Current Allergy and Asthma Reports*, 3 (3), pp. 210-214.

Greiner, A.N.et al. (2012) Allergic rhinitis. *The Lancet*, 378 (9809), pp. 2112-2122

Inoue et al. (2001) Effects of Peppermint (*Menta piperta* L.) Extracts on Experimental Allergic Rhinitis in Rats. *Biological and Pharmaceutical Bulletin*, 24 (1), pp. 92-95.

Inoue et al. (2002) Antiallergic Effect of Flavonoid Glycosides Obtained from *Mentha piperita* L. *Biological and Pharmaceutical Bulletin*, 25 (2), pp. 256—259.

Kim, H. and Cho, S. (1999) Lavender Oil Inhibits Immediate-type Allergic Reaction in Mice and Rats. *Journal of Pharmacy and Pharmacology*, 51 (2), pp. 221-226.

Kobayashi, Y., Takahashi, R. and Ogino, F. (2005) Antipruritic effect of the single oral administration of German chamomile flower extract and its combined effect with antiallergic agents in ddY mice. *Journal of Ethnopharmacology*, 101 (1-3), pp. 308-312.

Osakabe, N.et al. (2004) Anti-inflammatory and Anti-Allergic Effect of Rosmarinic Acid (RA); Inhibition of Seasonal Allergic Rhinoconjunctivitis (SAR) and its Mechanism. *Biofactors*, 21 (1-4), pp. 127-131.

Price, S. and Price, L. (2011) *Aromatherapy for Health Professionals*. 4<sup>th</sup> Ed. Churchill Livingstone.