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# Honey-based inhaler for asthma

Asthma is a chronic inflammatory airway disease reported among children and young adults. The Global Initiative for Asthma Program (2004) reports that about 300 million people worldwide had asthma with 250,000 annual deaths attributed to the the disease.

As countries become more urbanized, it is estimated that the number of people with asthma will increase to 400 million. Chronic obstructive pulmonary disease (COPD) is currently ranked as the third leading cause of death in the United States (Juvelekian & Stoller, 2012).

Countries with high prevalence of clinical asthma are Australia (21.5%), Sweden (20.2%), United Kingdom (18.2%), Netherlands (15.3%) and Brazil (13.0%) (To et al.,2012). In Malaysia, Roslan et al., (2011) found a higher prevalence of childhood asthma at 24%.

Drug therapy, short acting β-agonist, inhaled corticosteroids, and long acting β-agonist, have become the most common treatment for asthma management. Such drugs are proven to alleviate an asthmatic attack by relaxing the airway's smooth muscle. However, asthma attacks and exacerbations can still occur as the treatment does not alter the underlying pathology.

Unfortunately, prolonged usage of drug therapy can cause local and systemic side effects which include oral candidiasis, dysphonia, growth failure, accelerated loss of bone mass, elevated intraocular pressure and mild tachyphylaxis. Natural products are preferred to conventional drug therapy as alternative new treatments with fewer side effects.

Honey has been widely used as a remedy in treating ailments such as cough, fever, infections and inflammation. It has been reported that honey possesses biological properties such as antioxidant, anti-immunomodulatory, and anti-bacterial effects. Honey is usually taken orally.

Traditional use of honey by oral consumption has been practised decades ago and various comments and feedbacks raised about its effectiveness in treating asthma related symptoms.





Innovative treatment strategies are needed to ensure the effective use of honey in treating asthma and chronic lung diseases beneficial to the target group of patients.

Scientific evidence to support the traditional claims are critically needed for commercial purposes, especially the mechanisms of actions in eliminating and preventing the occurrence of asthma symptoms.

Dr. Badrul Hisham Yahaya, a senior lecturer and the Head of Regenerative Medicine Cluster, Advanced Medical and Dental Institute at Universiti Sains Malaysia, has taken an innovative strategy to produce a honey-based inhaler as an alternative treatment for patients with asthma. To achieve his aim, he collaborated with Prof. Dr Siti Amrah Sulaiman (USM School of Medical Sciences) and Dr Azlina Ahmad (USM School of Dental Sciences) and secured a grant from the Ministry of Science, Technology and Innovation (MOSTI).

The study aimed to investigate the effect of aerosolised honey on histopathological changes of the airway in the rabbit, as a model of ovalbumin (OVA)-induced chronic lung disease, which mimics the human condition of asthma.

The traditional use of honey by oral consumption is less effective in treating asthma as it routes the honey towards the digestive system, thereby delaying its efficacy in treating patients with an acute asthma attack.

Our study provides insight into the effect of aerosolised (inhalation)-honey on the histopathological changes of the airway tissues to reduce asthma-related features such as goblet cell hyperplasia, mucus overproduction, airway remodelling and inflammatory cell responses.

The study found that the inhalation of honey has been proven effective in reducing the inflammatory cell response and goblet cell hyperplasia as well as in restoring the airway structure, which is a good indicator for eliminating asthma conditions.

Our study also showed the potential role of honey as both a rescue and preventive agent in the treating and managing asthmatic disease. The effectiveness of inhalation of honey was not only tested at the cellular level but also on gene expression levels of various genes associated with inflammation, tissue regeneration and repair and stem cells markers.

Our group is now developing a method to produce honey in the form of powder (nanoparticles size) for later use in productions of honey-based inhaler. By using the protocols, our group has also tested the model with aerosolised-virgin coconut oil (VCO) and the results showed that both aerosolised (inhalation) of honey and VCO are effective in eliminating asthma-related symptoms.

**References**

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