



Review of aromatherapy essential oils and their mechanism of action against migraines

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Abstract

Ethnopharmacological relevance

Migraines have become a major threat to human health, as they significantly affect human health and quality of life due to a high prevalence rate, attack rate and pain intensity. Aromatherapy, with its comfortable and pleasant natural characteristics and rapid and efficient characteristics, is widely favored by patients in the folk. Chinese folk also have the application history and related records of aromatic plants in the treatment of migraine.

Aim of the study

This study was conducted to review the pathogenesis of migraine, the application of plant essential oils in the treatment of migraine, and further explore the material basis and mechanism of action of plant essential oils against migraine.

Materials and methods

Search the electronic literature of essential oils with anti-migraine effect in Google Scholar, PubMed and China National Knowledge Infrastructure, and further search the research situation of the monomer components of essential oils in migraine, inflammation, pain and other aspects.

Results

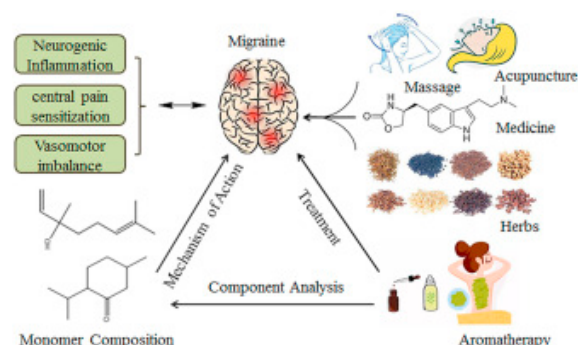
studies show that there are 10 types of plant essential oils that could relieve migraine symptoms, and that 16 monomers may play a role in migraine treatment by effectively inhibiting neurogenic inflammation.

hyperalgesia and balancing vasorelaxation.

Conclusion

Aromatic plant essential oils can relieve migraine effectively, these findings can be used as an important part of the development of anti-migraine drugs.

Graphical abstract



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Introduction

Migraine is a type of primary neurovascular dysfunction disease, that is characterized by unilateral or bilateral pulsatile pain, and is accompanied by photophobia, phonophobia, nausea, vomiting and other symptoms IHS. Studies have shown that several mental, environmental and genetics can influence or induce a migraine (Kunkler et al., 2018; Sirri et al., 2018). The increasingly high-intensity, stressful working and living environment in China has led to an increase in the prevalence rate of migraines, reaching 9.3% in 2012 (Sirri et al., 2018). Patients with migraine experience many social, physical and psychological problems, which seriously affect their quality of life. Currently, the treatment of migraine primarily includes drug therapy, acupuncture therapy, massage therapy and aromatherapy. The complex pathogenesis of a migraine leads to limitations in a patient's response to drugs, and specific side effects and contraindications have further limited the choice of available drugs to treat this condition (Markus et al., 2016; Negro and Martelletti (2019)) (Table 1). Therefore, patients with migraine have explored alternative treatments such as aromatherapy for alleviation of their symptoms. Aromatherapy is a comfortable and pleasant all-natural therapy that produces a fast and efficient effect against migraine symptoms. Its application has been evidenced in traditional Chinese medicine, as well as the records of aromatic plants in the treatment of migraine. Traditional Chinese Medicine Aromatherapy is a monograph that introduces the related efficacy of aromatic plants and their application in various diseases. it is also a university textbook that details the usage of aromatic plants in the treatment of migraine (Table 2). In this study, the data were selected using the following terms: “*essential oils*”, “*volatile oils*”, “*terpenes*” and “*migraine*” as well as the names of experimental models of migraine in animals such as “*nitroglycerin*”, “*reserpine*”, “*neurogenic inflammation*”, “*electrophotoluminescence*”, “*chemical stimulation*” and “*Mechanical stimulation*”. The search was conducted in the scientific databases including Google Scholar, PubMed and China National Knowledge Infrastructure (CNKI), and 10 types of plant essential oils were found

to be used in migraine treatment (Table 3). In this review the key substances and mechanisms involved in the action of plant essential oils against migraine are explored in order to provide a theoretical basis for aromatherapy in the treatment of migraine and to provide a reference for the development of novel anti-migraine essential oils and products.

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Section snippets

Understanding migraines and their relation to modern medicine

Migraine is the second largest cause of disability in the world according to the 2016 Global Burden of Disease study Global 2016. Based on the migraine characteristics, they are primarily divided into migraine without aura and migraine with aura. The diagnostic criteria for migraine without aura is unilateral pulsatile headache lasting 4–72h that may be aggravated by physical activity or head movement and accompanied by photophobia, phonophobia, nausea, vomiting and other symptoms. Migraine ...

5-Hydroxytryptamine (5-HT)

The neurotransmitter 5-HT is considered to be closely related to migraines as it affects the vasomotor functions. Currently, the receptor subtypes involved in migraine vasoconstriction are the 5-HT_{1B/D}, 5-HT_{2B}, and 5-HT₇ receptors, these receptors could cause migraines by regulating dural vasodilation (Pei et al., 2016; Sokolov et al., 2011). A study of the relationship between platelet aggregation and 5-HT release has found that increased vascular shear stress, reversible vasoconstriction, or ...

Study of the anti-migraine activity of essential oils

From a database search using the keywords “*essential oils*”, “*volatile oils*”, “*terpenes*” and “*migraine*” as well as the names of experimental models of migraine in animals such as “*nitroglycerin*”, “*reserpine*”, “*neurogenic inflammation*”, “*electrophotoluminescence*”, “*chemical stimulation*” and “*Mechanical stimulation*”, 9 types of single plant essential oils (extracted from one plant) that could relieve migraine headaches were found, including lavender, peppermint, *Angelicae Dahuricae Radix*, ...

Study of the possible mechanism of action of the monomer components of the essential oils against migraine

Currently, Only three essential oils of *Angelica dahurica*, *Chuanxiong Rhizoma* and garlic were used to study the mechanism of anti-migraine, and the main chemical components of all essential oils except for the mixed essential oils list the main chemical components. To accurately determine the material basis and mechanism

of action of the plant essential oils against migraine, the mechanism of action of the monomer components of these essential oils against migraine was searched. Overall, 16 ...

Conclusion

The increasing prevalence of migraines in humans results in severe impacts on the quality of life of the affected individuals and their families. Therefore, it is essential to identify anti-migraine products that meet the health needs of these patients. Aromatic plant essential oils have demonstrated pain-relieving effects on migraines, as they inhibit neurogenic inflammation and pain sensitization, and some of these oils also affect vasomotor activity. However, additional research is required ...

Declaration of competing interest

The authors declare that they have no conflict of interest. ...

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Research data for this article

 Data not available / No data was used for the research described in the article

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