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PHARMACOLOGICAL ASPECT OF HERBAL PLANTS: AN UPDATE

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ABSTRACT:

In the health system the herbal medicine played a vital role to treat various acute and chronic condition without and minimum toxic effect. Most of the medicinal Plants are reservoir of the therapeutic properties and are used as a boon for the various dieases. Ylang-Ylang, Hyssop, and Vetiver are well known medicinal and aromatic herb. Their essential oil exhibit many allopathic, antibacterial, antifungal properties and these agents are active against many plant pathogens. These herbal plants are also used as flavouring agent and also utilised as spices. Overall, this review emphasizes on the potential of many herbal plants to be used as new therapeutic agent and also provides sufficient baseline information for future works and commercial exploitation.

Keywords: Hyssop, Ylang-ylang, Vetiver, Pharmacological, Herbal

Introduction

In the present scenario the use of traditional medicine and medicinal plants to maintain the good health is the priority. During the past decade, traditional system of medicine have become a topic of global important. There are numerous medicinal herbs possessing potency to produce it's pharmacological effect. There are numerous researchers working in the past and present to evaluate the various theraputic aspects of herbs [1-6]. The present study, tries to highlight the pharmacological and introductory aspects of three aromatic herbs.

HYSSOP

Hyssop (*Hyssopus officinalis* L.) is the flowering top of the evergreen perennial shrub that belongs to the peppermint family, Lamiaceae. Hyssop is native to southern Europe and the temperate zones of Asia. It grows wild in countries bordering the Mediterranean Sea [7-8]. It is cultivated in Europe, especially in southern France, mainly for its essential oil. In India, it is found in the Himalayas from Kashmir to Kumaon at altitudes of 2435–3335 m. The plant grows to a height of 60 cm and flowers in autumn. Whorls of bluish-purple flowers are produced on long narrow spikes [9].

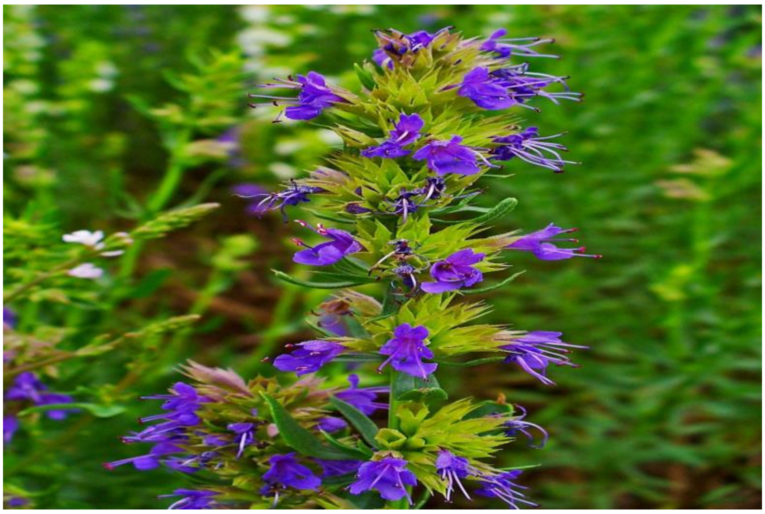

Figure 1 Hyssop plant

Hyssop oil is colourless or greenish yellow with an aromatic, camphoraceous odour and a slightly bitter taste. The major component of the volatile oil is ketone 1-pinocamphone. The content of essential oil is rather low (0.3–0.9 %); it is mostly composed of cineol, α-pinene and a variety of bicyclic monoterpene derivatives (*L*-pinocamphene, isopinocamphone, pinocarvone). Hyssop contains large amounts of bitter and antioxidative tannins, phenols with a diterpenoid skeleton (carnosol, carnosolic acid), depsides of caffeic acid and several triterpenoid acids (mainly ursolic and oleanolic acid) [10- 11].

Therapeutic Uses

Khare [12] mentions the following medicinal properties for hyssop: stimulant, carminative, sedative, antispasmodic, diuretic; it has also been ascribed stomachic and emmenogogue effects. It is used in the treatment of bronchitis, asthma, coughs and colds. Alongwith that it induces heavy sweating in fevers and can increase blood pressure. The antimicrobial activity of the essential oil of hyssop has been investigated and the activity was attributed to the linalool and 1,8-ciniole components of the essential oil [13]. Hyssop is used externally for bruises, concussion and cuts. Leaf juice preparation is used for the treatment of roundworms. A tea made from the herb is believed to be effective in the treatment of nervous disorders and toothache.

Hyssop is used as a condiment and the leaves and flowering tops of hyssop are employed in flavourings for salads and soups in European cuisines. Utilised as bitters and tonics, and in the preparation of liquor and perfumes. Hyssop is used as a condiment and also in medicines. The leaves and flowering tops of hyssop are employed in flavouring for salads and soups. It is also used in the preparation of liquor and perfumes. It is also used as a pot herb. Hyssop is considered a stimulant, carminative, expectorant and is used in colds, coughs, congestion and lung complaints. It is also effective in pulmonary, digestive, uterine and urinary troubles alongwith asthma and coughs. Leaves are stimulating, stomachic, carminative and effective against roundworm [14-16].

YLANG-YLANG

Canangaodorata Hook. F. & Thomson, which is commonly called ylang-ylang, is a fast growing tree and can found natively in tropical Asia such as Philippines, Malaysia, Indonesia, and some other islands of Indian Ocean, mainly the Comoro, Nossi Be, and Madagascar islands. This plant has been well-known for its fragrant flower and has been introduced to China, India, Africa, and America [17].

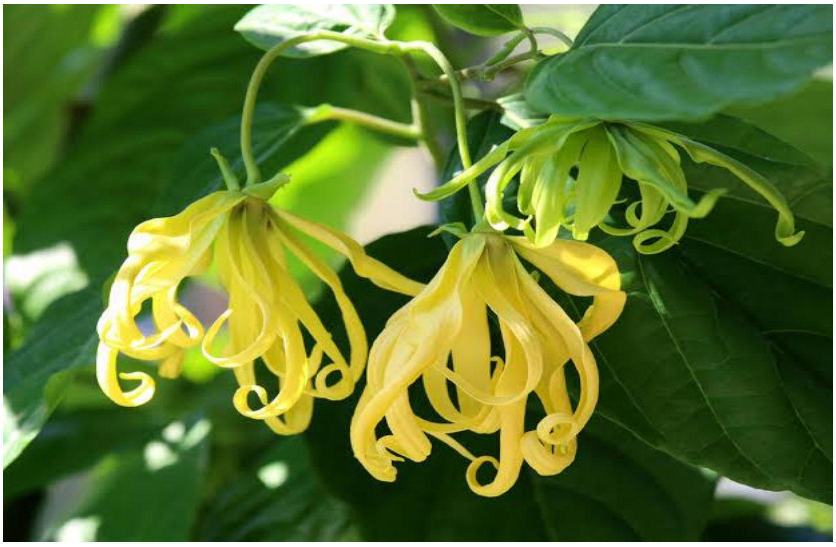

Figure 2 Ylang-Ylang plants at flowering stage

Ylang-ylang essential oils have already been widely utilized in the food industry as well as in the perfume industry and aromatherapy. Primarily, the ylang-ylang essential oil is derived from the flower of the *C. odorata* plant via water or steam distillation. Ylang-ylang oil has been described to possess medium to strong initial aroma with fresh, floral, slightly fruity fragrant yet delicate. Furthermore, the flower is also described to produce intensely sweet scent which is similar to jasmine.

Therapeutic Values [18-24]

Antimicrobial Activity

In the last decade, the emergence of multidrug resistance pathogens and strains with reduced susceptibility due to indiscriminate use of antibiotics has become a global concern as the clinical efficacy of many existing antibiotics has been compromised. As a consequence, the therapy of the infections inflicted by the multidrug resistant pathogen is complicated and has led to substantial increased hospitalizations and greater risk for morbidity and mortality. This issue has necessitated the scientist to screen for novel antimicrobial substances from various medicinal plant sources including the essential oils or the extracts from aromatic plants which have been reported to possess phytochemicals with antimicrobial activities. The antimicrobial properties of the essential oils and extracts of *C. odorata* have been tested against various Gram-positive and Gram-negative pathogens as well as pathogenic fungi. Recently, the stem bark extracts of *C. odorata* obtained from Indonesia were shown to exhibit potent antimicrobial activities using the agar well disc diffusion assay.

Antioxidant Properties

The generation of free-radical intermediates through oxidative stress has been known to cause disturbances in metabolic processes. They are known to be responsible for cellular injuries and disease formation due to the destruction of unsaturated lipids, proteins, and DNA. The implications of oxidative damage have been linked to many human diseases such as cancer, cardiovascular diseases, inflammatory processes, cataracts, and even the normal ageing process

Insect-Repellent Properties

Dengue disease, which is a tropical and subtropical mosquito-borne viral illness, has become a public health concern worldwide. According to World Health Organization, statistics showed that approximately 2.5 billion people live in countries that are endemic for dengue and estimated that 50–100 million infections occur annually. There was dramatic increase in the number of reported cases of dengue disease in Malaysia, particularly in 2013 where incidences of dengue fever (143.27 per 100,000 population) were doubled as compared to 2012 (72.2 per 100,000 population) . However, the prevention of dengue fever is only restricted to managing the vector *Aedesaegypti* due to absence of effective prophylactics or vaccine against the infection. Insect repellent is known to be one of the most effective ways to reduce the transmission of vector-borne diseases especially from mosquito. With the fact that no effective vaccine against dengue is available, protection from mosquito bites could be only achieved by preventing physical contact with mosquitoes using repellents. Studies have indicated that the essential oil of *Canangaodorata* prepared in soybean oil possessed certain degree of repellent activity against the adult mosquito of *A. aegypti, A. dirus,* and *C. quinquefasciatus* with the ED_{50} of 0.045, 2.149, and <0.003 mg/cm^2. The essential oil of *Canangaodorata* also demonstrated a moderate time of protection against *A. aegypti*, *A. dirus,* and *C. quinquefasciatus* at a duration of 8.4, 24.0, and 60.0 minutes, respectively

Antimelanogenesis

Melanin production or melanogenesis determines the skin color of animals and humans. Although melanogenesis is a major protective mechanism against UV-induced skin injury, the excessive production of melanin due to extensive UV exposure can lead to dermatological disorders. There has been increasing interest towards the findings of alternative herbal for treatment of hyperpigmentation because of the increased reports of potential mutagenicity and cases of ochronosis due the use of tyrosinase inhibitor such as hydroquinone, which is one of the most widely prescribed compounds found in nowadays cosmetic products and depigmenting agents. Methanolic extract of the flower buds of *C. odorata* was found to exhibit inhibitory effect against melanogenesis.

Anti-Inflammatory Properties

Inflammatory diseases such as rheumatism, arthritis, and pelvic inflammatory disease continue to be one of the major health concerns worldwide. Traditional remedies have been known to be one of the most common ways to treat inflammatory diseases. For instance, the folkloric practice of treating joint pain with Willow (*Salix alba*) bark has led to the discovery of aspirin as the most commonly used pain reliever for 100 years. Despite that, many steroidal and nonsteroidal anti-inflammatory drugs (NSAIDs) have been introduced to treat various inflammatory disorders. However, adverse side effects including renal problems, gastrointestinal irritation, and even myocardial infarction and strokes have been reported due to the prolonged use of steroidal and NSAIDs.

Sedative, Relaxing, and Harmonizing Effects

Essential oil of *C. odorata* indeed possess sedative, relaxing, and also harmonization effects on human. It is also proved its usefulness in aromatherapy and medicine such as reduction of blood pressure or relief of depression and stress in human.

Effects on Mood and Cognitive Performance

Studies have shown that the mood and cognitive performance of a healthy individual can be modulated by aromas of essential oils. A study revealed that ylang-ylang aroma acted significantly different on the cognitive performance of the healthy volunteers as compared to the control group and the peppermint aroma. Ylang-ylang aroma produced a reduced alertness mood and increased calmness of the healthy volunteers.

VETIVER

Chrysopogonzizanioides (L.) Roberty (formerly known as *Vetiveriazizanioides* (Linn.) Nash), commonly known as vetiver is a perennial bunchy herbaceous species of the Poaceae family that develops at altitudes up to 2000 m in almost every soil type, although well-drained sand is considered the most appropriate subsoil for its growth.

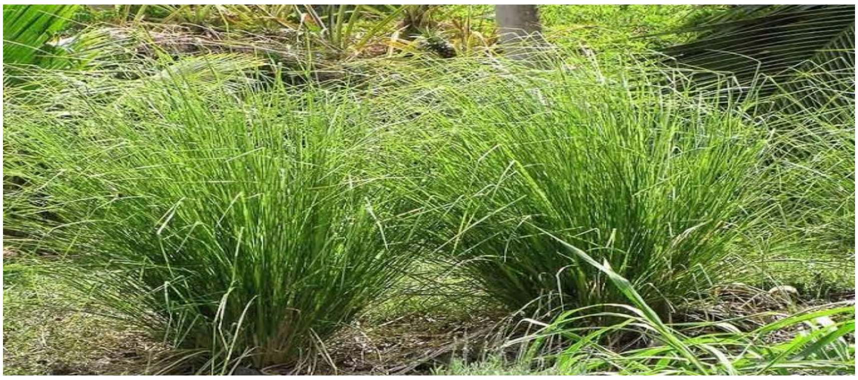

Figure 3: Perennial bunchy herbaceous species of Vetiver

The stems being stiff, vetiver tufted grass can attain up to 2 m height [25]. Native to India, vetiver was disseminated around the world some 100 years ago and is since widely cultivated in tropical regions for many different purposes (current major producers include Haiti, India, Indonesia, and Reunion Island).

Antimicrobial Agent/Cosmetic Preservative

Several studies have reported that vetiver oil possesses antibacterial and antifungal activities against various pathogenic strains. These activities have been assessed using different *in vitro* methods, such as the cup bore method, the disk diffusion method and more rarely, the broth dilution method. Their results were expressed either in %*v*/*v*, µL/mL or µg/mL, and were sometimes divergent. Moreover, activities of vetiver extracts were also reported against several drug-resistant bacterial pathogeneses.

Vetiver essential oil, key ingredient for the perfume/personal care industry, might be threatened by obsolescence similar to many others flagship cosmetic ingredients due to constant and rapid changes in personal tastes.

Based on literature survey, vetiver EO appeared as beneficial in skin care but not all cosmetic allegations were scientifically certified. The results were often contradictory, thus a series of bioassays was undertaken to clarify this situation. No convincing cosmetic activity could be raised. Some antimicrobial assays have then been performed, as essential oils might be sources of interesting antibacterial/antifungal molecules . The antibacterial activities reported were in relative accordance with those from the literature: vetiver EO is mainly active on Gram-positive strains, especially on *Staphylococcus aureus* strains, either susceptible or resistant to methicillin [26-30].

Recently, evaluating the ability of several EOs to remove *Staphylococcus aureus*, a food-borne pathogen, from food-processing facilities, Researchers observed a significant reduction of the number of viable biofilm cells induced by almost all of the EOs tested, but none of them could inhibit completely the formation of those biofilms. Essential oil-based treatments consisting in combinations of various EOs alone (in rotation) or together with other biocides might be conceived to prevent the appearance of resistant bacterial strains in the food industry. Besides, one should also note that the original antifungal activity already known against *C. albicans*, actually extends to *C. glabrata*. To our knowledge, no previous mention of such an activity of vetiver oil against *C. glabrata* could be identified in the literature. Vetiver EO might constitute a potential source of novel anti-*Candida* compounds and lead to the development of alternative antifungal agent. from previously published ones, it can be concluded that vetiver essential oil should be considered as a potential alternative for synthetic biocides against emerging antibiotic-resistant microorganisms, presenting less harmful side effects and lower treatment costs. None of the compounds characterized in the vetiver EOs analyzed has previously been identified as displaying any antibacterial or antifungal activity. Hence, the antimicrobial results obtained for vetiver EOs may tentatively be attributed to the joint action of their major components, but synergetic/antagonist effects of some less abundant constituents cannot be ruled out. A subsequent bio-guided fractionation of these essential oils should be considered to further identify specifically active compounds.

Conclusion:

In the present scenario the herbs are being widely utilized in the treatment of various ailments. The aromatic herbs have got the duel benifit in this matter. They can be utilised as the cosmeceutical as well as pharmaceutical ingredient. The present work justifiy the pharmacological prespective of the aromatic plants which were earlier being utilized in the only for flavouring purpose. The economical aspect of these herbs too needs to be verified in the future to explore its pharmacoeconomical values.

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