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"Exploring Botanical Legacies: Pamburus missionis and the Historical Tapestry of Traditional Medicine"

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ABSTRACT: This comprehensive overview explores the historical use of plants in traditional medicines, emphasizing Ayurveda and Chinese medicine's rich traditions. Traditional medicine , deeply rooted in cultural beliefs , serves as a primary healthcare source for a significant global population, with plants playing a central role. Integrating botanical, cultural, and anthropological perspectives provides a nuanced understanding of traditional healing practices. The introduction of pamburus missionis Swingle, a medicinal plant known as wild orange , unfolds its historical significance in Indian traditional medicine . Details on habitat, adaption, and morphology lay the foundation for its cultural and botanical importance. Phytochemical examinations have unveiled the presence of alkaloids, glycosides, tannins, terpenoids, and various compounds in pamburus missionis, indicating potential applications in antimicrobials. Antiarthritic, and antioxidant activities. The leaves and stems of the plant serve as reservoirs for these bioactive compounds, highlighting their therapeutic potential . Investigations into the essential oil have exposed antibacterial properties and demonstrated apoptotic effects on skin cancer cells .The identification of β-Caryophyllene suggests possible antiinflammatory and antioxidant effects, providing avenues for potential therapeutic applications. Traditional uses involve the treatment of chronic rheumatism, paralysis, swelling, fractures, piles , and fistula. Pamburus missionis , with its encouraging pharmacological activities, emerges as a potential candidate for upcoming therapeutic interventions. Its acknowledged antiinflammatory properties emphasize its potential in addressing disorders related to inflammation .

KEY WORDS: Pamburus missionis, Swingle, Antiarthritic, antioxidant activities, β-Caryophyllene

OVERVIEW OF HISTORICAL USE OF PLANTS IN TRADITIONAL MEDICINES:

Traditional medicine, also referred to as indigenous or folk medicine , encapsulates the medical dimensions of traditional wisdom that evolved over generations within the cultural beliefs of diverse societies , particularly indigenous communities, predating the era of modern medicine . The World Health Organization (WHO) provides a definition , characterizing traditional medicine as the collective knowledge, skills, and practices rooted in the theories, beliefs, and experiences indigenous to different cultures. Weather or not these practices are scientifically explainable , they are employed for the preservation of health and the prevention , diagnosis , improvement , or treatment of both physical and mental illnesses.[1]This definition from WHO serves to distinguish traditional medicine from scientific medicine , highlighting the cultural and experiential foundations of traditional healing practices. Plants have been integral to addressing a wide array of health conditions in traditional medicine. From treating common ailments to managing more complex diseases, indigenous cultures have developed a holistic approach to healthcare that integrates plant-based remedies with cultural, spiritual, and environmental considerations. Traditional medicine serves as a primary source of healthcare for a significant portion of the population in several Asian[2]and African[3]countries, with up to 80% relying on these traditional practices for their primary health needs. It is acknowledged as a form of alternative medicine, representing a distinctive approach to

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healing that diverages from conventional scientific medicine. Various scientific disciplines are dedicated to the study of traditional medicine, encompassing fields such as herbalism, ethnomedicine, ethnobotany, and medical anthropology. These disciplines contribute to the comprehensive understanding of the cultural , botanical , and anthropological aspects inherent in traditional healing practices. Traditional Indian medicines, known as one of the world's oldest medical sciences , is embodied in the comprehensive system of ayurveda.[4][5]This ancient practice are often deemed pseudoscientific .[6][7][8]In the ancient traditions of ayurveda , the roots of medical knowledge are intricately woven into the fabric of divine transmission. The significant contributions of ancient Indian herbalists, including luminaries like Charaka and Sushruta, played a pivotal role in shaping Ayurveda.[9] Historical evidence for Ayurvedic texts, terminologies, and concepts becomes discernible from the middle of the first millennium BCE.[10] Ayurveda employs a comprehensive approach to diagnose illnesses, utilizing eight methods known as Nadi (pulse), Mootra (urine), Mala (stool), Jihva (tongue), Shabda (speech), Sparsha (touch), Druk (vision), and Aakruti (appearance).[11] The practitioners of Ayurveda rely on the observations made through the five senses to approach diagnosis.[12] For instance, the sense of hearing is employed to assess the condition of breathing and speech. Special emphasis is placed on the study of lethal points, known as marman marma, adding a significant dimension to the diagnostic process. This holistic approach underscores the integration of sensory observations and specific points of focus in Ayurvedic diagnosis.

Physicians checking pulse rate
Fig 2

Chinese medicine boasts its rich heritage, And emphasizes the importance of recognizing the diverse landscape of global healing practices. The initial Chinese herbal[13]book, the Shennong Bencao Jing[14], was compiled during the Han dynasty but has roots dating back to an even earlier period. This compilation was later expanded upon and evolved into the Yaoxing Lun (Treatise on the Nature of Medicinal Herbs) during the Tang dynasty.noteworthy traditional medicine systems, including traditional European medicine, traditional African medicine, Siddha medicine, and Unani[15][16][17][18] contribute to the rich tapestry of traditional healthcare around the world."

Approximately 40% of current pharmaceutical products, including notable drugs like aspirin, artemisinin, and childhood cancer treatments, derive inspiration from nature and traditional knowledge. Scientists responsible for these breakthrough discoveries often built upon traditional knowledge to develop these landmark drugs.[19] For instance, aspirin, rooted in willow bark, traces its origins to over 3,500 years ago when Sumerians and Egyptians utilized willow tree bark as a pain reliever and anti-inflammatory.[20] This integration of nature and traditional knowledge has significantly influenced modern medicine, tapping into the historical use of medicinal plants, herbs, roots, and bark across various civilizations to treat diseases.

This extensive exploration of traditional medicine, including Ayurveda and Chinese medicine, provides a robust foundation for understanding the significance of Pamburus missionis because it is also a traditional plant herb so the historical, cultural, and botanical perspectives presented contribute to a nuanced comprehension of the plant's role in traditional healing practices.

INTRODUCTION OF PAMBURUS MISSIONIS SWINGLE

Pamburus missionis is a medicinal plant used in traditional medicine .Pamburus missionis.S is a compact thorny shrub commonly known as wild orange.[21]The genus Pamburus, belonging to the Rutaceae family, is represented by its sole species, Pamburus missionis (Wight) Swingle. This particular species is also recognized under alternative names, including Limonia missionis or Atalantia missionis.[22]Pamburus missionis Swingle exhibits a wide distribution across southern India. Limited anatomical and chemical

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investigations have been conducted on the Pamburus genus.[23][24]

Pamburus missionis holds a significant place in the history of traditional medicine, especially within the Indian medicinal framework. Traditionally, its leaves have been employed to address various ailments such as fistula, joint swellings, rheumatism, fractures, and piles in the Indian medicinal tradition.[25] This historical utilization underscores the plant's perceived therapeutic efficacy and its integration into established healing practices. Moreover, the plant's aromatic attributes might have played a role in its involvement in traditional rituals or cultural ceremonies, further solidifying its historical relevance. The ongoing exploration of Pamburus missionis continues to unravel its botanical wonders, reinforcing its importance in both traditional and potentially modern medicinal contexts.

HABITAT , ADAPTION AND PLANT MORPHOLOGY :

The Rutaceae family includes approximately 150 genera and 1310 species, with 71 species uniquely identified in India. The plant pamburus missionis exhibits flowering and fruiting from March to September. Pamburus missionis is typically found in church premises in the plains and the evergreen trees of the Pamburus species reach a height of up to 12 meters, featuring straight spines either solitary or in pairs.[26] The bark is grey, longitudinally fissured, and lenticellate, with the inner bark displaying hues ranging from straw to pinkish. The blaze is yellowish, and initially, the branchlets are green, angular, and compressed, later becoming cylindric with a dull or fuscous hue. The leaves are simple, alternate, estipulate, with a stout, glabrous petiole measuring 8-15 mm in length. The lamina is elliptic or elliptic-oblong, with an oblique, acute or cuneate base, and a round or emarginate apex. The margin is either entire or crenulate and undulate, while the texture is glabrous and coriaceous. When the leaflets are crushed, they emit a lemon fragrance. The fruits are typically broad and long, displaying shades ranging from orange to yellowish.

During the flowering period, bisexual white flowers with a fragrant aroma appear in axillary racemes. The flowers have 4 or 5 deltoid, glandular sepals and 4 or 5 free, oblong-lanceolate, recurved, prominently nerved, glandular petals that are pure white. The stamens are 8 or 10 with free filaments and linear-oblong anthers. The ovary is situated on a short gynophore, superior, 4-5-celled, with 2 ovules in each cell. The style is stout, and the stigma is capitate or truncate, glandular.

The fruit of Pamburus missionis is a berry, globose in shape, and turns orange-colored when ripe. This plant is valued for its edible fruits and is recognized for its antibacterial properties. Additionally, it exhibits drought tolerance.[27]

Pamburus missionis .S plant Fig -3

Vernacular name of pamburus missionis .S :
Kuruntu, [Tamil]
Kadanaathi [Tamil]

Pamburus missionis is indigenous to India and Sri Lanka, with its presence in Indian states such as Andhra Pradesh (specifically Nellore, Kadapa, and Chittoor districts), Kerala (found in Kollam and Thiruvananthapuram districts), Maharashtra (distributed across all districts), and Tamil Nadu (including Salem, Tiruchirapalli, Kanchipuram, Coimbatore, The Nilgiris, Dharmapuri, Villupuram, and Cuddalore).[28]
Pamburus missionis has successfully acclimated to diverse environmental conditions.

PHYTOCHEMICAL COMPOUNDS AND THEIR PHARMACOLOGICAL ACTIVITES

The leaves of Pamburus missionis Swingle have been found to contain phytochemicals such as alkaloids, glycosides, tannins, terpenoids, and carbohydrates.[29]The stem bark of Pamburus missionis Swingle contains imperatorin and xanthotoxin.

In the root of Pamburus missionis, imperatorin, 7-hydroxy-8-(3′,7′-dimethylocta-2′,6′-dien)yl coumarin, and a novel natural product, 3-(3-methyl-1-oxo-2-butenyl) 1H indole were identified. Additionally, the fruit was found to

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contain xanthyletin, xanthotoxin, isopimpinellin, scopoletin, and luvangetin. [30]

Early investigational studies unveil the potential of P. missionis leaves and stems as promising reservoirs of bioactive compounds, including fatty acid esters, alcohols, hydrocarbons, aldehydes, alkenes, fatty acids, and amides.

These findings provide support for the traditional use of this plant in addressing various ailments.[31]

Pharmacological activities of pamburus missionis are vast; they include antimicrobial activity and antibacterial activity .

Pamburus missionis demonstrates significant antiarthritic activity,[32] and its antimicrobial potential was explored using the agar disc diffusion method with acetone extracts from both leaves and stems.[33]

Pamburus missionis demonstrates notable antioxidant potential, supported by historical use and initial investigations. Benzoic acid 2,3-dimethyl within this plant is identified as a potential contributor to this antioxidant activity. However, further research, particularly through simulation studies, is crucial to validate and understand the specific antioxidant properties of benzoic acid 2,3-dimethyl. These studies will elucidate the intricate molecular interactions underlying its antioxidant effects, advancing our understanding of Pamburus missionis' pharmacological activities.[34]

Initial investigations into the properties of Pamburus missionis Swingle have brought to light compelling evidence suggesting the presence of persistent anti-inflammatory effects. This early stage of study has unveiled promising aspects of the plant's potential in mitigating inflammatory responses within the human body. The observed anti-inflammatory effects imply a capacity to modulate and regulate the body's immune and inflammatory pathways, which could have significant implications for managing a spectrum of inflammatory conditions.[35]

The essential oil extracted from the leaves of Pamburus missionis Swingle has been the subject of scientific scrutiny, revealing notable antibacterial properties. In exploring the chemical composition of this essential oil, researchers have unveiled its potential as a natural antibacterial agent. The presence of specific bioactive compounds within the essential oil contributes to its efficacy in inhibiting the growth and proliferation of bacteria.[36]

In a prior investigation involving Pamburus missionis, the essential oil (EO) exhibited apoptotic effects on skin cancer cells. The predominant compound detected in the EO was β-caryophyllene, constituting 25.40% of the composition. Additionally, the EO contained other compounds such as 4(14),11-eudesmadiene (7.17%), aromadendrene oxide 2 (14.01%), and phytol (6.88%).[37]

THERAPEUTICS USES

The fruits of Pamburus missionis have been recognized for their valuable contribution to traditional medicinal practices, particularly in the treatment of chronic rheumatism and paralysis.

The fragrant oil extracted from these fruits holds a significant place in traditional medicine, where it is employed for its therapeutic effects on conditions characterized by persistent rheumatic discomfort and paralysis.[38] The traditional use of Pamburus missionis extends beyond its fruits, encompassing the leaves, which are esteemed for their medicinal properties in addressing various health issues. Traditionally, these leaves are employed for the treatment of conditions such as swellings, fractures, piles, and fistula.

The therapeutic application involves the preparation of a decoction from the leaves, which is administered internally. This decoction is specifically prescribed for addressing ailments related to phlegm and puerperal diseases, highlighting the versatile role of Pamburus missionis in traditional healing practices.[39] The historical and cultural significance of these traditional uses underscores the potential value of Pamburus missionis in the development of future therapeutic interventions, warranting further exploration and scientific investigation into its medicinal properties.

The recognition of anti-inflammatory properties within Pamburus missionis Swingle highlights its potential therapeutic applications, offering a promising avenue for the development of innovative pharmaceutical interventions or herbal remedies focused on addressing disorders associated with inflammation.

This discovery positions Pamburus missionis Swingle as a potential candidate for therapeutic interventions aimed at managing and alleviating conditions characterized by inflammatory responses. The implications of its anti-inflammatory properties extend to potential therapeutic strategies that could benefit individuals

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grappling with various inflammation-related disorders. This underscores the importance of further exploring the therapeutic uses of Pamburus missionis Swingle, emphasizing its role in potential treatment modalities and contributing to the ongoing discourse on herbal remedies for inflammatory conditions.

The essential oils extracted from the leaves of Pamburus missionis Swingle exhibit antibacterial properties, suggesting their potential therapeutic application in addressing bacterial infections."

The Essential oils exhibited notable apoptotic effects on skin cancer cells, signifying a potential role in cancer treatment. The major compound identified in the Essential oils, β-caryophyllene, comprising 25.40% of the composition, holds significance due to its known therapeutic properties. β-caryophyllene is recognized for its anti-inflammatory and antioxidant effects, suggesting that Pamburus missionis Essential oils may contribute to combating oxidative stress and inflammation.[40]

Ongoing research is actively exploring the therapeutic potential of Pamburus missionis Swingle.

CONCLUSION :

Pamburus missionis Swingle emerges as a valuable botanical resource with a rich history in traditional medicine and promising therapeutic potential. Further scientific investigations are warranted to unlock its full medicinal properties and contribute to the ongoing discourse on herbal remedies for various health conditions.

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