



**INTERNATIONAL JOURNAL OF
PHARMACEUTICAL SCIENCES**
[ISSN: 0975-4725; CODEN(USA):IJPS00]
Journal Homepage: <https://www.ijpsjournal.com>



Review Article

Review Of Anti-Inflammatory Herbal Drugs And Their Impact On Health

Shahrukh Sayyad^{1*}, Priyanka Shelke², Gajanan Sanap³

¹Student Department of Pharmacy, LBYP College of Pharmacy, Pathri, India

²Assistant Professor Department of Pharmacy, LBYP College of Pharmacy, Pathri, India

³Principle Department of Pharmacy, LBYP College of Pharmacy, Pathri, India

ARTICLE INFO

Received: 07 Jan 2024

Accepted: 11 Jan 2024

Published: 15 Jan 2024

Keywords:

Anti-inflammatory, Herbal remedies, Phytoconstituents, Inflammation.

DOI:

10.5281/zenodo.10499753

ABSTRACT

Skin health is a vital aspect of overall well-being, and the search for natural remedies has led to a burgeoning interest in the anti-inflammatory properties of herbal plants. This review aims to explore and consolidate scientific knowledge on the potential of various herbal plants in mitigating skin inflammation and enhancing overall skin health. Through a meticulous analysis of bioactive compounds, mechanisms of action, and clinical evidence, this article synthesizes information to provide a comprehensive understanding of the anti-inflammatory effects of herbal plants on the skin. As individuals increasingly seek alternative and sustainable solutions for skincare, this review offers valuable insights into harnessing the therapeutic potential of nature to promote skin health.

INTRODUCTION

Inflammation serves as the innate response of the mammalian body to various threats, such as parasites, pathogenic microorganisms, toxic substances, and physical tissue damage. The intricate processes involved in the inflammatory response include crucial elements such as the functions of neutrophils, metabolic products of arachidonic acid, and the involvement of reactive oxygen species (ROS). Rheumatoid arthritis (RA), a systemic autoimmune disorder characterized by synovial joint inflammation and concurrent

cartilage and bone destruction, emphasizes the need for potent non-steroidal anti-inflammatory drugs (NSAIDs) with minimal gastrointestinal (GI) side effects. There are primarily two types of inflammation, which are as follows:

Acute inflammation: is characterized by heightened vascular permeability, capillary infiltration, and the migration of leukocytes.

Chronic inflammation is linked to the infiltration of mononuclear immune cells, macrophages, monocytes, neutrophils, along with fibroblast activation, proliferation (angiogenesis), and

*Corresponding Author: Shahrukh Sayyad

Address: Student Department of Pharmacy, LBYP College of Pharmacy, Pathri, India

Email ✉: Shahrukhsayyad2002@gmail.com

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



fibrosis. The pursuit of NSAIDs with reduced or no GI side effects is a significant area of interest. Commonly prescribed analgesics, like aspirin, have limitations due to potential severe gastric disorders. The introduction of cyclooxygenase-2 (COX-2) inhibitors has addressed some GI side effects. However, due to challenges associated with current NSAIDs and steroidal anti-inflammatory agents, ongoing exploration, particularly from natural sources, seeks alternative agents. Herbal medicines emerge as a promising avenue in this quest, offering potential therapeutic agents for inflammation and RA. These herbal remedies not only aim to prevent structural damage in arthritic joints resulting from tissue and bone breakdown but also strive to be safe, relatively inexpensive, well-tolerated, and convenient for a broad range of patients.[1-2]

I. Herbal remedies for inflammatory disorders

Every contemporary medication traces its roots back to traditional herbal origins. The progression of these herbal sources has led to the development of conventional medicine, incorporating both synthetic drugs and isolated natural compounds. Herbal medicines enjoy widespread popularity among the public, and advancements in their formulation have given rise to a new generation of phytomedicines that exhibit increased potency compared to their predecessors. Throughout history, a multitude of herbs and their derived compounds have been employed in the treatment of inflammation and associated conditions, such as rheumatism. This paper focuses on the chemical profiles of certain herbal medicines utilized for addressing inflammatory disorders and provides insights into recent advancements in various herbal species with robust anti-inflammatory properties. [3]

The plant species investigated for their anti-inflammatory activity, along with their chemical constituents, are outlined below :

1. Aloe:

Common Names:

Aloe vera is known by various common names, including burn plant, lily of the desert, and elephant's gall.



Botanical Name:

Aloe vera

Plant Family:

Asphodelaceae

Plant Form:

Aloe vera is a succulent plant, characterized by its thick, fleshy leaves.

Chemical Constituents:

Aloe vera contains bioactive compounds such as aloin, barbaloin, vitamins, minerals, and amino acids.

Habitat:

Originating from arid regions, Aloe vera thrives in warm climates with minimal water requirements and is well-suited for cultivation in sandy or well-draining soils.

Cultivation:

Cultivating Aloe vera requires well-drained soil, protection from frost, and periodic watering. The plant is known for its adaptability to various climates.

Traditional Uses:

Aloe vera has a rich history in traditional medicine. The gel extracted from the inner leaf is topically applied to treat burns, cuts, and skin irritations, owing to its soothing and healing effects.

Therapeutic Uses:

In addition to its traditional uses, Aloe vera exhibits diverse therapeutic applications. It is valued for its anti-inflammatory properties, making it beneficial for conditions like eczema and psoriasis. The gel accelerates wound healing and is effective in relieving sunburn. Aloe vera is also recognized for its role in acne treatment, providing natural moisturization, and promoting digestive health when consumed as juice. Its application extends to addressing joint and muscle pain, supporting oral health, and offering antioxidant effects. Some studies suggest potential benefits in managing blood sugar levels, making Aloe vera a multifaceted plant in promoting overall well-being.

Cultivation Process:

Due to its global popularity, Aloe vera is cultivated for both commercial and medicinal purposes. Its incorporation into skincare products, dietary supplements, and traditional remedies highlights its versatility and continued significance in various wellness practices.

Aloe vera exhibits anti-inflammatory effects through several mechanisms:

I. Polysaccharides and Glycoproteins:

Aloe vera contains compounds that inhibit the release of pro-inflammatory mediators, such as cytokines and histamine.

II. Immunomodulation:

Polysaccharides, particularly acemannan, modulate the immune response, preventing excessive inflammation.

III. Antioxidant Activity:

Aloe vera's antioxidants, including vitamins C and E, neutralize free radicals, reducing oxidative stress and inflammation.

IV. Enzyme Inhibition:

Aloe vera enzymes, like bradykinase, break down pro-inflammatory compounds like bradykinin.

V. Wound Healing:

Gibberellins and auxins stimulate tissue repair, contributing to anti-inflammatory effects.

VI. Leukotriene Reduction:

Aloe vera inhibits the formation of leukotrienes, derived from arachidonic acid, mitigating inflammation.

VII. NF-kappaB Inhibition:

Aloe vera may inhibit NF-kappaB, a transcription factor involved in the expression of pro-inflammatory genes.

VIII. Collagen Synthesis:

Aloe vera stimulates collagen synthesis, aiding tissue repair and reducing inflammation. [4]

These actions make Aloe vera a versatile natural remedy for addressing inflammation, commonly applied topically or consumed orally for systemic benefits. As with any natural remedy, consulting a healthcare professional is advised, especially for chronic or severe inflammation.

b. Calendula:

Common Names:

Calendula is commonly known as pot marigold, garden marigold, and Mary's gold.

Synonyms:

Calendula officinalis

Botanical Name:

Calendula officinalis

Plant Family:

Asteraceae

Plant Form:

Calendula is an herbaceous plant with bright, daisy-like flowers.

Chemical Constituents:

Calendula contains various compounds, including flavonoids, saponins, carotenoids, and essential oils.

Habitat:

Native to Southern Europe, Calendula is cultivated worldwide and prefers well-drained soils in sunny locations.



Cultivation:

Cultivating Calendula requires well-drained soil and full sunlight. It is a hardy plant that is easy to grow and often used in gardens for its ornamental and medicinal qualities.



Traditional Uses:

Calendula has a rich history in traditional medicine. The flowers are known for their anti-inflammatory, antifungal, and antibacterial properties. Calendula-infused oils and salves are applied topically for wound healing, skin irritations, and inflammatory conditions.

Therapeutic Uses:

Beyond traditional applications, Calendula is utilized for various therapeutic purposes. It is known to soothe skin conditions such as eczema and dermatitis. The anti-inflammatory and antimicrobial properties make Calendula beneficial in promoting wound healing and alleviating skin discomfort. Calendula-infused products are often employed for their gentle and nurturing effects on sensitive skin.

Cultivation Process:

Cultivating Calendula involves providing well-drained soil and ample sunlight. The plant's adaptability makes it suitable for gardens and containers. Harvesting the vibrant orange or yellow flowers is typically done when in full bloom. Calendula's versatility extends to its use in herbal teas, tinctures, and as a colourful addition to salads, showcasing its culinary and medicinal significance.

Note:

Before using Calendula for therapeutic purposes, it's advisable to consult with a healthcare professional, especially for individuals with allergies or specific health conditions.

Calendula possesses anti-inflammatory properties through various mechanisms of action:

I. Flavonoids and Triterpenoids:

Calendula contains flavonoids and triterpenoids with anti-inflammatory effects. These compounds help modulate the immune response and reduce inflammation.

II. Anti-Oxidative Activity:

Calendula is rich in antioxidants, including carotenoids and flavonoids. These antioxidants neutralize free radicals, reducing oxidative stress and inflammation.

III. Interference with Pro-Inflammatory Mediators:

Calendula inhibits the activity of pro-inflammatory mediators, such as cytokines and prostaglandins, helping to alleviate inflammation.

IV. Wound Healing and Tissue Repair:

Calendula promotes wound healing through its ability to stimulate cell proliferation and tissue regeneration, contributing to the resolution of inflammation associated with injuries.

V. Anti-Microbial Effects:

Calendula exhibits antimicrobial properties, preventing or treating infections that may contribute to inflammation.

VI. Collagen Synthesis:

Calendula may stimulate collagen production, enhancing tissue repair and reducing inflammation associated with damaged tissues.

VII. **Calming Effect on Irritated Skin:**

Topically applied calendula preparations, such as creams or ointments, have a soothing effect on irritated skin, helping to reduce inflammation and redness.

VIII. **Regulation of Immune Response:**

Calendula compounds influence the immune system, regulating immune response and preventing excessive inflammation.

These combined actions make calendula a valuable herb for addressing various inflammatory conditions, including skin irritations, minor wounds, and inflammatory skin disorders. Topical applications, such as creams or ointments containing calendula extract, are commonly used for skin-related inflammation. As with any herbal remedy, consulting with a healthcare professional is advisable, particularly for individuals with allergies or specific health conditions. [5]

c. Yarrow:

Common Names:

Yarrow is commonly known by various names, including milfoil, soldier's woundwort, and nosebleed plant.

Synonyms:

Achillea millefolium

Botanical Name:

Achillea millefolium

Plant Family:

Asteraceae

Plant Form:

Yarrow is a herbaceous perennial with finely divided, feathery leaves and flat-topped clusters of small, white or pink flowers.

Chemical Constituents:

Yarrow contains active compounds such as flavonoids, alkaloids, tannins, and volatile oils.



Habitat:

Native to Europe and Asia, yarrow is now widespread and can be found in various habitats, including meadows, fields, and roadsides.

Cultivation:

Cultivating yarrow is relatively straightforward. It prefers well-drained soil and can thrive in full sunlight. Yarrow is known for its resilience and ability to adapt to different soil conditions.

Traditional Uses:

Yarrow has a long history of use in traditional medicine. The aerial parts of the plant are known for their anti-inflammatory and antiseptic properties. Yarrow is used topically for wound healing, to staunch bleeding, and to alleviate skin conditions.

Therapeutic Uses:

Beyond traditional applications, yarrow is valued for its therapeutic uses. It is employed to support digestive health, reduce fever, and address respiratory issues. The plant's astringent properties contribute to its use in managing conditions such as diarrhoea and dysentery.

Cultivation Process:

Cultivating yarrow involves providing well-drained soil, ensuring ample sunlight, and appreciating its adaptability to different environments. Harvesting is typically done when the plant is in full bloom, and both leaves and flowers can be utilized in various preparations, including teas and tinctures. Yarrow's versatility

extends to its role in traditional rituals and its cultivation as an ornamental plant, showcasing its multifaceted significance.

Yarrow (*Achillea millefolium*) exhibits anti-inflammatory effects through various mechanisms:

I. Flavonoids and Azulenes:

Yarrow contains flavonoids and azulenes, such as chamazulene, which inhibit pro-inflammatory pathways and provide a soothing effect.

II. Inhibition of Mediators:

Yarrow interferes with pro-inflammatory mediators, including cytokines, prostaglandins, and leukotrienes.

III. Antioxidant and Anti-Microbial Properties:

Yarrow's antioxidant compounds neutralize free radicals, reducing oxidative stress, while its antimicrobial properties help prevent or address infections associated with inflammation.

IV. Regulation of Immune Response:

Yarrow modulates the immune response, preventing excessive inflammation and promoting balanced immune reactions.

V. Wound Healing and Vasodilation:

Yarrow supports wound healing, promotes tissue repair, and induces vasodilation for improved blood circulation, reducing inflammation. [6]

These actions make yarrow a versatile herb for addressing inflammation, commonly used in herbal teas, tinctures, and topicals.

d. St. John's Wort:

Common Names:

St. John's Wort is commonly known by names such as *Hypericum perforatum*, goatweed, and Klamath weed.

Synonyms:

Hypericum perforatum

Botanical Name:

Hypericum perforatum

Plant Family:

Hypericaceae

Plant Form:

St. John's Wort is a perennial herb with distinctive yellow flowers and glandular punctate leaves.

Chemical Constituents:

St. John's Wort contains various bioactive compounds, including hypericin, hyperforin, flavonoids, and essential oils.



Habitat:

Indigenous to Europe, St. John's Wort is now widespread and can be found in meadows, pastures, and along roadsides.

Cultivation:

Cultivating St. John's Wort requires well-drained soil and ample sunlight. The plant is known for its hardiness and ability to thrive in various soil conditions.

Traditional Uses:

St. John's Wort has a rich history in traditional medicine. The flowering tops are known for their potential antidepressant and mood-stabilizing effects. St. John's Wort is often used to address mild to moderate depression, anxiety, and nervous system disorders.

Therapeutic Uses:

Beyond traditional applications, St. John's Wort is recognized for its therapeutic uses. It is employed as a natural remedy for sleep disorders, nerve pain, and inflammatory conditions. The plant's anti-inflammatory and antiviral properties contribute to its use in supporting immune health.

Cultivation Process:

Cultivating St. John's Wort involves providing well-drained soil, ensuring ample sunlight, and appreciating its adaptability to different environments. Harvesting is typically done during the flowering period, and the aerial parts of the plant are utilized in various preparations, including teas, tinctures, and capsules. St. John's Wort's contributions to mental and emotional well-being make it a valuable herb in both traditional and modern herbal practices.

St. John's Wort (*Hypericum perforatum*) exhibits potential anti-inflammatory effects through various mechanisms:

I. Hyperforin and Hypericin:

Inhibits pro-inflammatory enzymes.

II. Neurotransmitter Modulation:

Influences neurotransmitters (serotonin and dopamine) to impact inflammatory processes.

III. Anti-Oxidative Activity:

Possesses antioxidant compounds, reducing oxidative stress and inflammation.

IV. Inhibition of Pro-Inflammatory Mediators:

May inhibit the production of cytokines like interleukin-6 and tumour necrosis factor-alpha (TNF- α).

V. Modulation of Immune Response:

Modulates the immune response, preventing excessive inflammation.

VI. Reduction of Inflammatory Pain:

Suggested to reduce inflammatory pain. [7]

e. Nettle:

Common Names:

Nettle is commonly known by names such as *Urtica dioica*, stinging nettle, and common nettle.

Synonyms:

Urtica dioica

Botanical Name:

Urtica dioica

Plant Family:

Urticaceae

Plant Form:

Nettle is a perennial herb with serrated leaves covered in tiny stinging hairs and inconspicuous greenish flowers.

Chemical Constituents:

Nettle contains various bioactive compounds, including flavonoids, chlorophyll, vitamins, minerals, and histamine.



Habitat:

Widely distributed across Europe, Asia, and North America, nettle thrives in moist, nutrient-rich soils along riverbanks, in woodlands, and meadows.

Cultivation:

Cultivating nettle requires well-drained soil and partial sunlight. Known for its resilience, nettle can adapt to various soil conditions.

Traditional Uses:

Nettle has a long history in traditional medicine. The leaves are known for their diuretic properties and have been used to address conditions such as arthritis, allergies, and inflammatory disorders. Nettle is also used as a food source, rich in nutrients.

Therapeutic Uses:

Beyond traditional applications, nettle is recognized for its therapeutic uses. It is employed as a natural remedy for hay fever, allergies, and as a tonic for overall health. Nettle's anti-inflammatory properties contribute to its use in supporting joint health and alleviating symptoms of allergic rhinitis.

Cultivation Process:

Cultivating nettle involves providing well-drained soil, partial sunlight, and appreciating its adaptability to different environments. Harvesting

is typically done before flowering, and the aerial parts of the plant are utilized in various preparations, including teas, tinctures, and as a nutritious addition to soups and dishes. Nettle's versatility as both a medicinal herb and a nutrient-rich food source underscores its significance in traditional and modern herbal practices.

Nettle's multifaceted approach to addressing inflammation makes it a subject of interest in both traditional and modern herbal medicine.

i. Anti-Inflammatory Compounds:

Nettle contains compounds like flavonoids, carotenoids, and polyphenols with anti-inflammatory properties, helping to mitigate inflammatory processes.

ii. Inhibition of Pro-Inflammatory Mediators:

Components in nettle may inhibit the production or activity of pro-inflammatory mediators, such as cytokines and prostaglandins.

iii. Modulation of Immune Response:

Nettle has been suggested to modulate the immune response, preventing excessive inflammation and promoting immune balance.

iv. Support for Joint Health:

Nettle has been explored for its potential to support joint health by reducing inflammation associated with conditions like osteoarthritis.

v. Clinical Studies:

Some clinical studies suggest that nettle supplementation may be beneficial in managing inflammatory conditions, although more research is needed for conclusive evidence. [8]

f. Liquorice:

Common Names:

Liquorice is commonly known by names such as *Glycyrrhiza glabra*, sweet root, and licorice.

Synonyms:

Glycyrrhiza glabra

Botanical Name:

Glycyrrhiza glabra

Plant Family:

Fabaceae

Plant Form:

Liquorice is a perennial herb with compound leaves and clusters of purple to pale blue flowers.

Chemical Constituents:

Liquorice contains various bioactive compounds, including glycyrrhizin, flavonoids, anethole, and coumarins.



Native to Europe and Asia, liquorice is cultivated in various regions and thrives in well-drained, sandy soils with full sunlight.

Cultivation:

Cultivating liquorice requires well-drained soil, and it prefers sunny conditions. The plant is known for its deep, extensive root system.

Traditional Uses:

Liquorice has a rich history in traditional medicine. The root is known for its demulcent and expectorant properties and has been used to address respiratory issues, digestive discomfort, and as a soothing agent for the throat.

Therapeutic Uses:

Beyond traditional applications, liquorice is recognized for its therapeutic uses. It is employed for its anti-inflammatory and immunomodulatory properties, contributing to its use in supporting adrenal health, reducing inflammation, and managing symptoms of conditions such as gastritis.

Cultivation Process:

Cultivating liquorice involves providing well-drained soil, full sunlight, and understanding its preference for deep, loose soil. Harvesting is

typically done when the roots have reached maturity, and they are used in various preparations, including teas, tinctures, and herbal formulations. Licorice's diverse applications in both respiratory and digestive health make it a valuable herb in traditional and modern herbal practices.

Licorice's diverse anti-inflammatory mechanisms make it valuable in traditional and herbal medicine.

i. Glycyrrhizin and Glycyrrhetic Acid

Compounds in licorice inhibit pro-inflammatory enzymes.

ii. Cytokine Modulation:

Glycyrrhizin influences cytokine production, reducing inflammation.

iii. Antioxidant Properties:

Licorice's antioxidants, including flavonoids, neutralize free radicals and reduce oxidative stress-related inflammation.

iv. Inhibition of Pro-Inflammatory Mediators:

Glycyrrhizin inhibits pro-inflammatory mediators like prostaglandins and leukotrienes.

v. Immunomodulation:

Licorice may modulate the immune system, preventing excessive inflammation.

vi. Mucosal Protection: Traditionally used for its soothing effect on mucous membranes, contributing to anti-inflammatory effects. [9]

g. Chamomile:

Common Names:

Chamomile is commonly known by names such as *Matricaria chamomilla*, German chamomile, and wild chamomile.

Synonyms:

Matricaria chamomilla

Botanical Name:

Matricaria chamomilla

Plant Family:

Asteraceae

Plant Form:

Chamomile is an herbaceous plant with feathery leaves and small, daisy-like flowers with white petals and a yellow centre.



Chemical Constituents:

Chamomile contains various bioactive compounds, including chamazulene, flavonoids, sesquiterpenes, and essential oils.

Habitat:

Native to Europe and Western Asia, chamomile is now cultivated worldwide and thrives in well-drained soils in sunny locations.

Cultivation:

Cultivating chamomile requires well-drained soil and full sunlight. It is known for its adaptability and is often grown as a medicinal herb and ornamental plant.

Traditional Uses:

Chamomile has a long history in traditional medicine. The flowers are known for their calming and soothing properties, often used to alleviate stress, anxiety, and promote sleep. Chamomile tea is a popular remedy for digestive discomfort and mild inflammatory conditions.

Therapeutic Uses:

Beyond traditional applications, chamomile is recognized for its therapeutic uses. It is employed for its anti-inflammatory and mild sedative effects, contributing to its use in supporting digestive health, reducing skin irritations, and promoting relaxation.

Cultivation Process:

Cultivating chamomile involves providing well-drained soil, full sunlight, and understanding its preference for sunny locations. Harvesting is typically done when the flowers are in full bloom, and they are used in various preparations, including teas, essential oils, and topical formulations. Chamomile's versatility extends to its role in aromatherapy and skincare, making it a cherished herb in both traditional and modern wellness practices.

Chamomile's anti-inflammatory effects make it a widely used herb, especially in traditional medicine.

i. Anti-Inflammatory Compounds

Chamomile contains compounds with anti-inflammatory properties, mitigating inflammatory processes.

ii. Inhibition of Pro-Inflammatory Mediators: Active components in chamomile inhibit pro-inflammatory mediators, such as cytokines, helping reduce inflammation.

iii. Antioxidant Activity:

Chamomile's antioxidants neutralize free radicals, reducing oxidative stress and inflammation.

iv. Modulation of Immune Response: Chamomile may modulate the immune response, preventing excessive inflammation and promoting immune balance.

iv. Relief for Inflammatory Conditions:

Chamomile is traditionally used to alleviate inflammatory conditions, providing relief for issues like skin irritations.

vi. Clinical Studies:

Some studies suggest chamomile's potential in managing inflammation, though further research is needed for conclusive evidence. [10]

h. Horse Chestnut:

Common Names:

Horse Chestnut is commonly known by names such as *Aesculus hippocastanum*, buckeye, and conker tree.

Synonyms:

Aesculus hippocastanum

Botanical Name:

Aesculus hippocastanum

Plant Family:

Sapindaceae

Plant Form:

Horse Chestnut is a deciduous tree with distinctive palmate leaves and erect clusters of white to red flowers that develop into spiky fruits containing seeds (conkers).

Chemical Constituents:

Horse Chestnut contains various bioactive compounds, including aescin, flavonoids, tannins, and coumarins.



Habitat:

Native to southeastern Europe, Horse Chestnut is cultivated in temperate regions worldwide and thrives in well-drained soils.

Cultivation:

Cultivating Horse Chestnut requires well-drained soil and partial to full sunlight. It is often grown as an ornamental tree in parks and gardens.

Traditional Uses:

Horse Chestnut has a history in traditional medicine. The seeds, bark, and leaves are known for their potential vascular-stabilizing and anti-inflammatory properties. Traditionally, Horse Chestnut has been used to support venous health, reduce swelling, and address conditions such as varicose veins.

Therapeutic Uses:

Beyond traditional applications, Horse Chestnut is recognized for its therapeutic uses. It is employed for its anti-inflammatory effects, contributing to its use in managing chronic venous insufficiency and related symptoms, such as leg swelling and discomfort.

Cultivation Process:

Cultivating Horse Chestnut involves providing well-drained soil, partial to full sunlight, and understanding its preference for temperate climates. Harvesting is typically focused on the seeds, which are processed for their aescin content. Extracts from Horse Chestnut seeds are used in various preparations, including ointments, creams, and supplements. Horse Chestnut's contributions to venous health underscore its significance in both traditional and modern herbal practices.

Horse chestnut's anti-inflammatory mechanisms make it valuable, especially for vascular and inflammatory issues.

i. Aescin Content:

Horse chestnut contains aescin, known for its anti-inflammatory properties, reducing inflammation.

ii. Vein Health Support:

Aescin supports vein health by reducing inflammation and strengthening blood vessel walls.

iii. Anti-Edema Effects:

Horse chestnut may reduce edema by addressing inflammatory processes and promoting fluid balance.

iv. Antioxidant Activity:

The herb exhibits antioxidant effects, neutralizing free radicals and mitigating oxidative stress-related inflammation.

v. Clinical Studies:

Some studies suggest horse chestnut's efficacy in managing inflammatory conditions, although further research is needed for conclusive evidence.

[11]

i. Comfrey:

Common Names:

Comfrey is commonly known by names such as *Symphytum officinale*, knitbone, and bruise wort.

Synonyms:

Symphytum officinale

Botanical Name:

Symphytum officinale

Plant Family:

Boraginaceae

Plant Form:

Comfrey is a perennial herb with large, hairy leaves and clusters of bell-shaped flowers ranging in color from white to various shades of purple.

Chemical Constituents:

Comfrey contains various bioactive compounds, including allantoin, rosmarinic acid, tannins, and mucilage.



Habitat:

Native to Europe and widely naturalized, Comfrey thrives in moist, nutrient-rich soils along riverbanks and in damp meadows.

Cultivation:

Cultivating Comfrey requires well-drained, moist soil and partial to full sunlight. Known for its rapid growth, Comfrey is often cultivated as a medicinal herb and green manure.

Traditional Uses:

Comfrey has a history in traditional medicine. The roots and leaves are known for their potential wound-healing properties. Comfrey has been used topically to address bruises, sprains, and wounds, earning it the nickname "knitbone."

Therapeutic Uses:

Beyond traditional applications, Comfrey is recognized for its therapeutic uses. It is employed for its anti-inflammatory effects and tissue-regenerating properties, contributing to its use in supporting the healing of minor injuries, such as cuts and abrasions.

Cultivation Process:

Cultivating Comfrey involves providing well-drained, nutrient-rich soil, and partial to full sunlight. Harvesting is typically focused on the leaves, which can be used fresh or dried for various preparations, including poultices, ointments, and herbal teas. Comfrey's versatility extends to its use in organic gardening, where it is valued as a nutrient accumulator and soil conditioner.

Comfrey's anti-inflammatory mechanisms make it noteworthy for healing and tissue repair.

i. Allantoin Content:

Comfrey contains allantoin, contributing to its anti-inflammatory properties by promoting tissue repair.

ii. Cell Proliferation:

Allantoin aids in cell proliferation, accelerating the healing process and reducing inflammation.

iii. Wound Healing:

Comfrey supports wound healing by minimizing inflammation and promoting tissue regeneration.

iv. Connective Tissue Support:

The herb may support connective tissue health, addressing inflammation associated with injuries.

v. Clinical Studies:

While some studies suggest comfrey's potential in reducing inflammation, further research is needed for conclusive evidence.

[12]

j. Witch Hazel:

Common Names:

Witch Hazel is commonly known by names such as *Hamamelis virginiana*, spotted alder, and winterbloom.

Synonyms:

Hamamelis virginiana

Botanical Name:

Hamamelis virginiana

Plant Family:

Hamamelidaceae

Plant Form:

Witch Hazel is a deciduous shrub or small tree with alternate, oval-shaped leaves and distinctive, fragrant yellow flowers.



Chemical Constituents:

Witch Hazel contains various bioactive compounds, including tannins, flavonoids, essential oils, and gallic acid.

Habitat:

Native to North America, Witch Hazel is found in woodlands and along stream banks. It is now cultivated in various regions with temperate climates.

Cultivation:

Cultivating Witch Hazel requires well-drained soil and partial to full sunlight. The plant is often grown for its ornamental value and medicinal properties.

Traditional Uses:

Witch Hazel has a history in traditional medicine. The bark and leaves are known for their astringent properties and have been used topically to soothe

skin irritations, reduce inflammation, and address conditions such as hemorrhoids.

Therapeutic Uses:

Beyond traditional applications, Witch Hazel is recognized for its therapeutic uses. It is employed for its anti-inflammatory and antioxidant effects, contributing to its use in skincare products, toners, and as a natural remedy for various skin conditions, including sunburn and insect bites.

Cultivation Process:

Cultivating Witch Hazel involves providing well-drained soil, partial to full sunlight, and understanding its preference for temperate climates. Harvesting is typically focused on the leaves and bark, which are used in various preparations, including distillates, ointments, and tinctures. Witch Hazel's contributions to skincare and its versatility make it a valuable plant in both traditional and modern herbal practices.

Witch hazel's anti-inflammatory mechanisms, especially in skincare, make it a popular remedy

i. Tannins:

Witch hazel's tannins reduce inflammation and swelling.

ii. Astringent Properties:

Contributes to anti-inflammatory actions by tightening tissues.

iii. Vasoconstriction:

May promote vasoconstriction, reducing blood flow and inflammation.

iv. Antioxidant Activity:

Neutralizes free radicals, mitigating oxidative stress-related inflammation.

v. Topical Soothing:

Commonly used topically for skin inflammation, providing relief and reducing redness.

vi. Clinical Studies:

Limited studies suggest witch hazel's potential for managing inflammatory skin

conditions, though further research is needed for conclusive evidence. [13]

CONCLUSION:-

Plants have been integral to healthcare practices since ancient times. Traditional plant-based medicines continue to hold significant importance, particularly in developing countries, and contribute to the exploration of potential new drug candidates. [14] A large portion of the global population is experiencing the impact of disorders related to inflammation. Current analgesic drugs, such as opiates and NSAIDs, are thought to be insufficient in certain cases due to their associated side effects, including gastrointestinal irritation, liver dysfunction, and various others. [15][16] Hence, there is a significant demand for therapeutic agents effective in treating chronic inflammatory diseases, leading to a growing interest in complementary and alternative medicines. Numerous herbal species, either traditionally or as folk medicines, have been utilized to address inflammatory conditions. Many of these plants have undergone scientific investigation, confirming their efficacy as beneficial anti-inflammatory agents. Successful efforts have been made to isolate individual chemical compounds responsible for their anti-inflammatory activity. Nevertheless, numerous herbal folk remedies for inflammation and rheumatism have not yet undergone thorough scientific investigations, including a careful assessment of their potential toxic effects. Therefore, it is imperative to systematically evaluate all such herbal medicines rooted in traditional use. This involves determining their pharmacological activities, isolating the specific drug entity responsible for the anti-inflammatory effect, and developing appropriate formulations that prove beneficial against inflammatory disorders. We declare that we have no conflict of interest.

REFERENCES



1. Cai X, Zhou H, Wong YF, Xie Y, Liu ZQ, Jiang ZH, Bian ZX, Xu HX and Liu L, Suppression of the onset and progression of collagen-induced arthritis in rats by QFGJS, a preparation from an anti-arthritic Chinese herbal formula, *J Ethnopharmacol*, 2007, 110 (1), 39-48.
2. Kaneria M, Naik S and Kohli R, Anti-inflammatory, antiarthritic and analgesic activity of a herbal formulation (DRF/AY/4012), *Indian J Exp Biol*, 2007, 45, 278-284.
3. Benedek B, Kopp B and Melzig MF, *Achillea millefolium* L.–Is the anti-inflammatory activity mediated by protease inhibition?, *J Ethnopharmacol*, 2007, 113 (2), 312-317.
4. Langmead, L., Makins, R. J., & Rampton, D. S. (2004). Anti-inflammatory effects of aloe vera gel in human colorectal mucosa in vitro. *Aliment Pharmacol Ther*, 19, 521–527. <https://doi.org/10.1111/j.1365-2036.2004.01874.x>
5. Preethi, K. C., Kuttan, G., & Kuttan, R. (2009). Anti-inflammatory activity of flower extract of *Calendula officinalis* Linn. and its possible mechanism of action. *Indian Journal of Experimental Biology*, 47(2), 113-120.
6. Tadić, V., Arsić, I., Zvezdanović, J., Zugić, A., Cvetković, D., & Pavkov, S. (2017). The estimation of traditionally used yarrow (*Achillea millefolium* L. Asteraceae) oil extracts with anti-inflammatory potential in topical application. *Journal of Ethnopharmacology*, 199, 138-148.
7. Tedeschi, E., Menegazzi, M., Margotto, D., Suzuki, H., Förstermann, U., & Kleinert, H. (2003). Anti-Inflammatory Actions of St. John's Wort: Inhibition of Human Inducible Nitric-Oxide Synthase Expression by Down-Regulating Signal Transducer and Activator of Transcription-1 α (STAT-1 α) Activation. *Journal of Pharmacology and Experimental Therapeutics*, 307(1), 254-261. DOI: <https://doi.org/10.1124/jpet.103.054460>
8. Namazi, N., Tarighat Esfanjani, A., Avari, M., & Heshmati, J. (2012). Effects of Hydroalcoholic Nettle Extract on Insulin Sensitivity and Some Inflammatory Indicators in Type 2 Diabetic Patients. *Avicenna Journal of Clinical Medicine*, 18(4), 10-14. URL: <http://sjh.umsha.ac.ir/article-1-207-en.html>
9. Račková, L., Jančinová, V., Petříková, M., Drábíková, K., Nosál, R., Štefek, M., Košťálová, D., Prónayová, N., & Kováčová, M. (2007). Mechanism of anti-inflammatory action of liquorice extract and glycyrrhizin. *Journal of Inflammation*, 4(15), 1234-1241. <https://doi.org/10.1080/14786410701371280>
10. Srivastava, J. K., Pandey, M., & Gupta, S. (2009). Chamomile, a novel and selective COX-2 inhibitor with anti-inflammatory activity. *Life Sciences*, 85(19-20), 663–669. Published online 2009 Sep 27. doi: 10.1016/j.lfs.2009.09.007
11. Matsuda, H., Li, Y., Murakami, T., Ninomiya, K., Yamahara, J., & Yoshikawa, M. (1997). Effects of Escins Ia, Ib, Ila, and Iib from Horse Chestnut, the Seeds of *Aesculus hippocastanum* L., on Acute Inflammation in Animals. *Biological and Pharmaceutical Bulletin*, 20(10), 1222–1226. Online ISSN: 1347-5215, Print ISSN: 0918-6158. doi: 10.1248/bpb.20.1222
12. Staiger, C. (2012). Comfrey: A Clinical Overview. Published on 23 February 2012. *Phytotherapy Research*, <https://doi.org/10.1002/ptr.4612>
13. Thring, T. S. A., Hili, P., & Naughton, D. P. (2011). Antioxidant and potential anti-inflammatory activity of extracts and formulations of white tea, rose, and witch hazel on primary human dermal fibroblast cells. *Journal of Inflammation*, 8(27),



Published on 13 October 2011. doi:
10.1186/1476-9255-8-27.

14. Orhan I, K'upeli E, Sener B and Yesilada E, Appraisal of anti-inflammatory potential of the clubmoss, *Lycopodium clavatum* L., *J Ethnopharmacol*, 2007, 109 (1), 146-150.
15. Dutt V, Dutt R, Kumar S and Dhar V, Evaluation of analgesic activity of *Solanum platanifolium* Sims. fruits, *Indian Drugs*, 2007, 44(5), 405-407.
16. Vasudevan M, Gunnam KK and Parle M, Antinociceptive and anti-inflammatory effects of *Thespesia populnea* bark extract, *J Ethnopharmacol*, 2007, 109 (2), 264-270

HOW TO CITE: Shahrukh Sayyad, Priyanka Shelke, Gajanan Sanap, Review of Anti-Inflammatory Herbal Drugs and Their Impact on Health, *Int. J. of Pharm. Sci.*, 2024, Vol 2, Issue 1, 165-179. <https://doi.org/10.5281/zenodo.10499753>

