

AN OVERVIEW OF TRADITIONAL HERBAL MEDICINES WITH ANTI-ARTHRITIC EFFECTS

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ABSTRACT

Traditional medicinal plants are practiced worldwide for treatment of arthritis especially in developing countries where resources are meagre. This review presents the plants profiles inhabiting throughout the world regarding their traditional usage by various tribes/ethnic groups for treatment of arthritis Osteoarthritis (OA) of the knee and hip is a debilitating disease affecting more women than men and the risk of developing OA increases precipitously with aging. Rheumatoid arthritis (RA), the most common form of inflammatory joint diseases, is a disease of unknown etiology and affects 1% of the population worldwide, and unlike OA, generally involves many joints because of the systemic nature of the disease. Non-steroidal anti-inflammatory drugs (NSAIDs) are the first drugs of choice for the symptomatic treatment of both OA and RA. Because of the risks associated with the use of NSAIDs and other

limitations, the use of alternative therapies, such as acupuncture and medicinal herbs, is on the rise and according to reports 60–90% of dissatisfied arthritis patients are likely to seek the option of complementary and alternative medicine (CAM). This paper reviews the efficacy of some of the common herbs that have a history of human use and their anti-inflammatory or anti-arthritic properties have been evaluated in animal models of inflammatory arthritis, in studies employing well defined and widely accepted in vitro models that use human chondrocytes/cartilage explants or in clinical trials.

KEYWORDS: Polyherbal, Traditional Uses, Inflammation, Osteoarthritis, Rheumatoid Arthritis.

INTRODUCTION

Rheumatoid arthritis is a chronic, systemic, inflammatory autoimmune disorder causing symmetrical polyarthritis of large and small joints, typically presenting between the ages of 30 and 50 years, that is associated with progressive disability, systemic complications, early death, and socioeconomic costs. The cause of rheumatoid arthritis is unknown, and the prognosis is guarded. Rheumatoid arthritis is characterized by synovial inflammation and hyperplasia ("swelling"), autoantibody production (rheumatoid factor and anti-citrullinated protein antibody [ACPA]), cartilage and bone destruction ("deformity"), and systemic features, including cardiovascular, pulmonary, psychological, and skeletal disorders.^[1,2] It is a major cause of disability. It existed in early Native American populations several thousand years ago but might not have appeared in Europe until the 17th century. Early theories on the pathogenesis of rheumatoid arthritis focused on autoantibodies and immune complexes. T-cell mediated antigen-specific responses, T-cell-independent cytokine networks, and aggressive tumour-like behaviour of rheumatoid synovium have also been implicated. More recently, the contribution of autoantibodies has returned to the forefront. Based on the pathogenic mechanisms, specific therapeutic interventions can be designed to suppress synovial inflammation and joint destruction in rheumatoid arthritis.^[3-5]

The aim of the treatment for arthritis is to eliminate the symptoms of the disease, slow disease progression, relief of analgesia, reduction of inflammation, protection of articular structure, maintenance of function etc.^[6,7] Major advances have been made in the treatment of arthritis over the couple of decades in past. The drugs used conventionally (allopathic) for the treatment are non-steroidal anti-inflammatory drugs (NSAIDs) (ex- aspirin, ibuprofen, naproxen etc.), corticosteroids and disease modifying anti-rheumatic drugs (DMARDs) (ex- methotrexate, sulphasalazine etc.).^[8-10]

Types of Arthritis

1. Osteoarthritis (OA)

Osteoarthritis is the most prevalent form of arthritis, often referred to as "wear and tear" arthritis. It occurs when the cartilage that cushions the ends of bones deteriorates over time, leading to pain, stiffness, and swelling in the affected joints. OA commonly affects weight-bearing joints such as the knees, hips, and spine. Risk factors include age, obesity, joint injuries, and genetics. Treatment focuses on pain relief and improving joint function through medications, physical therapy, and lifestyle changes like weight management and exercise.

2. Rheumatoid Arthritis (RA)

Rheumatoid arthritis is an autoimmune disorder where the immune system mistakenly attacks the synovial membranes, leading to inflammation and damage in the joints. This condition can affect multiple joints symmetrically and may also cause systemic symptoms such as fatigue and fever. RA is more common in women and can lead to joint deformities if not treated effectively. Treatment typically involves disease-modifying antirheumatic drugs (DMARDs), anti-inflammatory medications, and lifestyle modifications to manage symptoms and prevent joint damage.

3. Psoriatic Arthritis (PsA)

Psoriatic arthritis is associated with psoriasis, a skin condition characterized by red patches of skin covered with thick, silvery scales. PsA can cause joint pain, stiffness, and swelling, along with skin symptoms. It may also affect the nails and lead to eye inflammation. Treatment options include nonsteroidal anti-inflammatory drugs (NSAIDs), DMARDs, and biologics to reduce inflammation and prevent joint damage.

4. Gout

Gout is a type of inflammatory arthritis caused by the accumulation of uric acid crystals in the joints, often affecting the big toe. Symptoms include sudden and severe pain, swelling, and redness. Gout attacks can be triggered by certain foods, alcohol consumption, and dehydration. Treatment focuses on managing pain during attacks and lowering uric acid levels through dietary changes and medications.

5. Ankylosing Spondylitis (AS)

Ankylosing spondylitis is a chronic inflammatory arthritis that primarily affects the spine, leading to pain and stiffness in the back. Over time, it can cause the vertebrae to fuse, resulting in a rigid spine. AS is more common in men and can also affect other joints and organs. Treatment includes physical therapy, NSAIDs, and biologics to reduce inflammation and improve mobility.

Symptoms of Arthritis

Common symptoms of arthritis include

- **Joint Pain:** Varies in intensity and can be constant or intermittent.
- **Swelling:** Joints may appear swollen and feel warm to the touch.
- **Stiffness:** Often worse in the morning or after periods of inactivity.

- **Reduced Range of Motion:** Difficulty moving the affected joints.

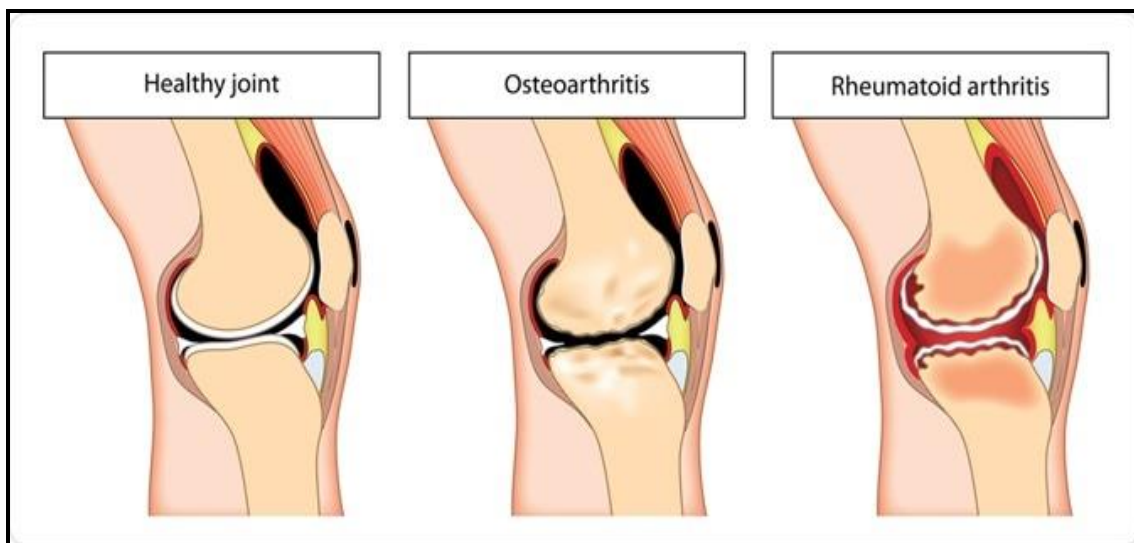


Figure 1: a. healthy joint, b. osteoarthritis, c. rheumatoid arthritis.

Various Treatment Strategies for Rheumatoid Arthritis

- **Allopathy**

It is a conventional treatment in which drugs are used to cure acute and life-threatening illness or infections. It is scientifically proved system of medicine and most widely followed one. But it is associated with many untoward effects which limits its usage for some chronic conditions. In spite of these drawbacks it still occupies the first place as far as treatment is concerned. NSAIDs are particularly helpful during the first few weeks in which a patient has symptoms, because the drugs provide partial relief of pain and stiffness. NSAIDs should be used together with DMARDs. NSAIDs exert their actions by inhibiting enzymatic activity of the COX enzymes. Aspirin, ibuprofen, or naproxen are non-steroidal anti-inflammatory drugs (NSAIDs) that can relieve arthritis pain.^[11]

Homeopathy

Homeopathy is effective in reducing the symptoms of joint inflammation in RA. There was a significant improvement in subjective pain, articular index, stiffness and grip strength in those patients receiving homoeopathic remedies. Eg: Arnica, Nux vomica, Arsenicum album, Opium, Bryonia alba, Pulsatilla Calcareo carbonica, Rhododendron, Causticum, Rhus toxicodendron, Ignatia ruta, Lachesis, Sepia, Lycopodium sulphur, Morgan, Sycoctic co, Natrum muriaticum, Thuja are homeopathic Remedies of wide action in rheumatoid arthritis.^[12]

Ayurveda

Ayurveda is very systemic and considered to be the best Indian system of Medicine, having more approachable ways of treatment. According to Ayurveda, RA is caused due to an imbalanced Vata Dosha (Airy Bioelement) that leads to the accumulation of Ama (toxin) in the body. The classical ayurvedic formulation treatment includes several pharmacological forms of internal herbal medicines [Arishtams (Alcoholic preparations), Bhasmas (Ash), Choornas (Powder), Grithams (Medicated Ghee), Gulikas (Tablet) Lehyams (Herbal Jam), Kashayams (Water Extract) and Thailams (Oil)] which eliminates the toxins and retaining back to the balance to Vata Dosha (Airy Bioelement) in the body.^[13,14]

Unani

As per Unani conventional and literal explanations, arthritis is defined as the pain which occurs in different joints of the body especially in the joints of arms and legs etc.^[15,16] and the description of disease is based on the four-humor doctrine of Unani Medicine. The pathological changes in the joints are caused mainly by derangement of temperament of humors, which leads to accumulation of morbid materials into the joint spaces.^[17-20]

Siddha Formulation

Interestingly, the Siddha system of treatment is being increasingly recognized as an alternate approach to arthritic treatment. Herbal mixtures have long been used in traditional medicine because of the synergism that takes place among the phytochemicals on the herbs utilized.

A significant increase is observed in the activities of glycohydrolases in RA. Furthermore recently a strong association was found between RA and -d-glucuronidase and N-acetyl-dglucosaminidase activities that were reported to be the foremost glycosidases of stimulated chondrocyte supernatants and RA sera.^[21,22]

Historical Perspective

Herbal medicine is the root of various traditional medicine systems around the world. Botanicals are a chemical source that directly provides ~25% of currently used crude drugs, with another 25% derived from chemically altered natural products.^[23] Various traditional medicine systems around the world, including ancient Chinese medicinal system, Indian medicinal system (composed of two major branches—Unani and Ayurveda) and Amazonian ethnomedicine, rely heavily on herbs for health preservation and healing. Herbal medicines have been described in traditional texts and used as antimicrobial, anti-inflammatory and

antiviral medicine for the cure of allergies, RA, infections, wound healing and fever²⁴. Arthritis (both OA and RA) is one of the foremost diseases for which patient seeks the CAM option.^[25,26] Because there is little evidence about the long-term effects of currently available traditional medicines and its associated adverse effects, the American College of Rheumatology recommends the careful use of dietary supplements and herbal medicines during early stages of treatment or disease development to limit the degree of joint destruction. It is no surprise, then, that the use of alternative medicine, such as botanicals and nutritional supplements, has become popular with arthritis patients and is on the rise. An increasing number of people in the United States, as many as 42% use complementary or alternative medicine approaches to help meet their personal health problems.

Utilization of Medicinal Plants In The Treatment of Arthritis

Various medicinal plants have been employed in the treatment of arthritis. Due to their enhanced activity with lower adverse effects, these may be recommended against allopathic medications

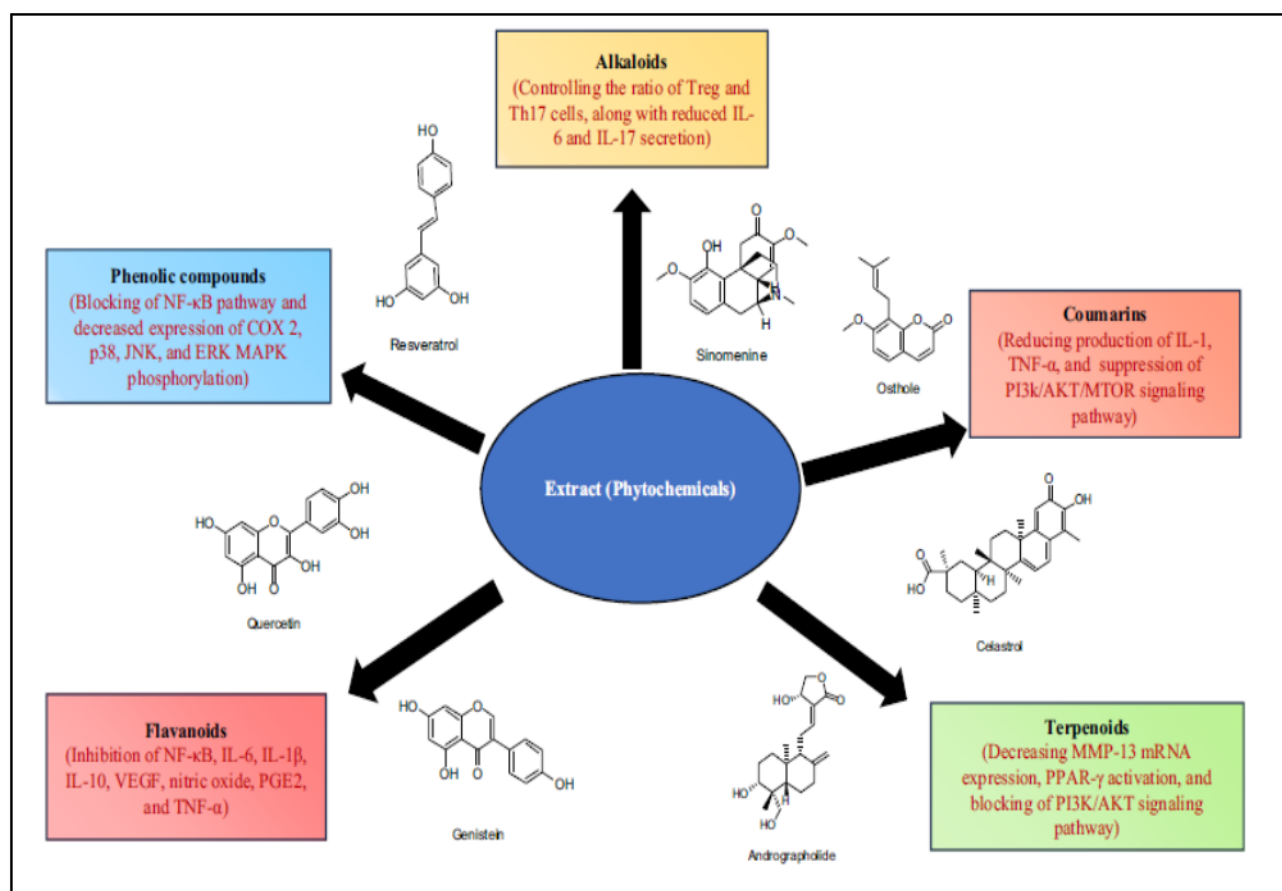


Fig: 2. Screening of various anti-inflammatory pathways involved in Arthritis.

1. *Sophora flavescens* (Fabaceae)

Sophora flavescens is also known as Kushen (Chinese), and has been an important species in Chinese medicine since the Qin and Han dynasties. The root of *Sophora flavescens* has a long history in the traditional medicine of many countries, including China, Japan, Korea, India and some countries in Europe. In traditional Chinese medicine (TCM), *Sophora flavescens* has been used extensively, mainly in combination with other medicinal plants in prescriptions to treat fever, dysentery, hematochezia, jaundice, oliguria, vulvar swelling, asthma, eczema, inflammatory disorders, ulcers and diseases associated with skin burns.^[27]

Dried roots of *Sophora flavescens* (*Sophora radix*) is an oriental traditional medicine. The roots of *Sophora flavescens* have long been used in Chinese medicine for the treatment of fever, inflammatory disorders, ulcers and skin burns. *Sophora flavescens* contains flavonoids and alkaloids. The main chemical components in Kushen include alkaloids, flavonoids, alkylxanthones, quinones, triterpene glycosides, fatty acids, and essential oils.^[28,29,30]

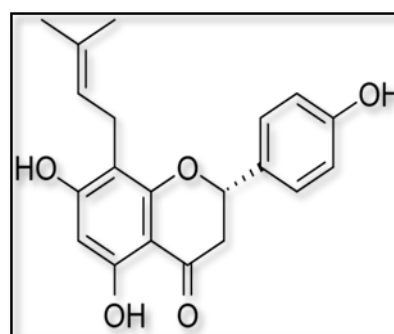


Fig. 3: *Sophora flavescens* (Fabaceae) Fig. 4: Prenylated Flavonoids.

2. *Commiphora caudata* (Burseraceae)

Commiphora caudata (Wight & Arn.) Engl. is a small deciduous tree which is widely distributed in South India and Sri Lanka. Its local names are kilimaram, idingil, kizhuvam. Commonly known for its antibacterial, antifungal, analgesic, and anti-inflammatory activities.^[31,32]

It is commonly known as “hill mango”. In phytochemical analysis, the leaves of the plant showed the presence of flavonoids, glycosides, steroids, tannins, terpenoids, sugars, lignans, etc. The bark of *C. caudata* revealed the presence of alkaloids, coumarins, tannins, glycosides, phytosterols, flavonoids, phenols, and saponins. Its bark and leaves have been

used in folk medicine for treating low back pain, sciatica, fever, arthritis and urinary retention.^[33,34]



Fig. 5: Commiphora caudate.

3. *Cinnamomum zeylanicum* (Lauraceae)

It is also called Ceylon cinnamon or ‘true cinnamon’ and is indigenous to Sri Lanka and southern parts of India. The leaf and bark of *C. zeylanicum* are used as spices and for the production of volatile oils. These major bioactive are different from the volatile oils of other parts of *C. zeylanicum*, such as leaf, flowers, buds, fruits, root bark, and stem bark. The major compounds were found to be eugenol, cinnamaldehyde, cinnamyl acetate, copane, and camphor, along with other minor constituents. In Ayurvedic medicine, the bark is described as having stimulant, antifatulent, antiemetic and anti-diarrhoeal properties.^[35,37]



Fig. 6: *Cinnamomum zeylanicum*.

4. *Boswellia serrata* (Burseraceae)

Boswellia serrata is an oleo gum-resin (Salai) and is a plant exudate of the genus *Boswellia*. It is a moderate to large sized branching tree that grows in dry mountainous regions of India, Northern Africa and the Middle East. Also called Salai/Salai guggul. The oleo gum-resins contain 30- 60% resin, 5-10% essential oils, which are soluble in the organic solvents, and the rest is made up of polysaccharides (~ 65% arabinose, galactose, xylose) which are soluble in

water. s. The resin is generally harvested all through the summer and autumn after the tree has been wounded in March or April. In Malayalam and Tamil parangi, saambraani; in English Indian frankincense or Indian olibanum. Animal studies and clinical trials support the potential of *B. serrata* gum resin extract (BSE) for treatment of inflammatory bowel disease, rheumatoid arthritis, osteoarthritis and asthma. widely recognized for the treatment of inflammatory conditions, as well as in some cancerous diseases, wound healing and its antimicrobial activity.^[37-39]



Fig. 7: *Boswellia serrata*.

5. *Xanthium strumarium* L. (Asteraceae)

It is an annual herb, commonly grown in waste places, roadsides and along river banks in warmer parts. It is commonly called chotagokhru due to the shape of its fruit, which looks like a cow's toe. In many parts of India, it is known as adhasisi, as this weed is used for the treatment of the common disease hemiparesis. pharmacological and phytochemical studies of *X. strumarium*, and more than 170 chemical compounds have been isolated and identified from this plant, including sesquiterpene lactones, phenols, glycoside, alkaloids, fatty acid and others. According to Ayurveda, the plant has cooling, laxative, fattening, anthelmintic, alexiteric, tonic, digestive, antipyretic activities and improves appetite, voice, complexion and memory.^[40]



Fig. 8: *Xanthium strumarium*.

CONCLUSION

Arthritis affects people globally and men are 3 times more prone to it than woman. The onset is generally between 40 - 60 years of age although it can occur at any age. There are many children under the age of 16 with the juvenile form of the disease. Other than genetic dispositions, exact external cause is not known but cigaret smoking and environmental pollutants are important precipitating factors. So far, there is no cure for it, but understanding about the inflammatory process helps to manage it effectively The good news is that the prognosis today, if diagnosed and treated early, is significantly better than it was 20-30 years ago and many people have a much better quality of life in spite of having arthritis. Herbal drugs and its isolated constituents can play vital role in the management of arthritis. Traditionally, various medicinal plants are used to cure patients with arthritis. Therefore, this review article helps to assemble medicinal plants having potential anti-arthritic activity. Plant parts like roots, rhizomes, leaves, gum resin, and whole plants are also used which possess anti-arthritic activity. The present review focused on the development and studies on traditional herbal medicines as anti- arthritic agents. This review concluded that herbal medicines have many advantages and they are very promising area of anti-arthritis drug development.

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Conflict Of Interest

The authors declare no conflict of Interest.

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