

A review on selected herbal plants used in treatment of Rheumatoid arthritis

Pratibha Shivaji Gavarkar * and Rajashree Sunil Chavan

Department of Pharmaceutical Chemistry, Seth Govind Raghunath Sable College of Pharmacy, Saswad, Tal-Purandar, Dist-Pune 412301, Maharashtra, India.

World Journal of Advanced Research and Reviews, 2024, 23(02), 626–632

Publication history: Received on 29 June 2024; revised on 06 August 2024; accepted on 08 August 2024

Article DOI: <https://doi.org/10.30574/wjarr.2024.23.2.2401>

Abstract

The immune system ailment rheumatoid joint pain (RA) principally influences the joints and is persistent (durable). At the point when the body's safe reaction, which frequently supports shielding the body against ailment and contamination, focuses on its own tissues, RA results. Joint uneasiness, edema, strength, and decrease in capability are side effects of the condition. There is a lengthy tradition of using herbal remedies and their formulations to cure illnesses in people. It has long been believed that herbal extracts can provide novel, practical medications. Approximately 62% of pharmaceuticals that are sold commercially have natural product origins, according to Cragg's research. Remorsefully, flow clinical information for the most part tends to the illness' side effects that is, joint agony and irritation and there is still no demonstrated successful prescription to treat rheumatoid joint inflammation. The aggravation and irritation in the joints can be diminished by involving spices and plants in various ways. Anti-rheumatoid arthritis properties have been demonstrated for a variety of therapeutic herbs. Subsequently, rheumatoid joint inflammation is treated with plants and plant items that offer striking advantages. The restorative plants with hostile to rheumatoid joint pain activity are the primary subject of this audit.

Keywords: Rheumatoid arthritis; Autoimmune disorders; Joints; Systemic inflammation; Herbal plants.

1. Introduction

Systemic rheumatoid arthritis includes rheumatoid nodules, vasculitis, inflammatory conditions of the eyes, and cardiopulmonary disease as symptoms. It is not inherited when it comes to rheumatoid arthritis. It is thought by researchers that certain individuals are predisposed to the illness due to certain genes. A person with these genes does not always develop rheumatoid arthritis. Typically, a "trigger," such as an infection or an outside factor, activates the genes. When the body is subjected to this trigger, the immune system responds inappropriately. Rather than protecting the joint, the immune system begins to produce substances that attack it. This is the one that may lead to the symptoms of rheumatoid arthritis. It's an autoimmune disease, which means that the immune system mistakenly targets healthy tissues. Compared to normal joints, which have relatively thin linings and few blood vessels, the lining of rheumatoid arthritis joints is thicker and packed with white blood cells. White blood cells secrete chemicals that lead to discomfort, swelling, and destruction of joints. According to recent research, there are distinct cytokines like IL-17 and IL-182. These cytokines trigger the release of enzymes by the chondrocytes and synovial fibroblasts surrounding the articular cartilage, which breaks down collagen and proteoglycans. This tissue degradation results in RANK ligand (RANKL) and plays a part in the pathophysiology of chronic arthritis. When several cytokines and inflammatory mediators are produced, synovial tissue proliferates and spreads, a condition known as pannus occurs. Fibrosis, which comes after ankylosis and causes a loss of joint motion, is the next step. [1]

It's known as an autoimmune illness. This means that your immune system, which is your body's natural defense mechanism, is confused and starts attacking healthy tissues. Rheumatoid arthritis primarily causes joint inflammation

* Corresponding author Pratibha S Gavarkar

to do this. Approximately 400,000 adults over 16 in the UK have rheumatoid arthritis. That can impact people of any age. Since it can rapidly progress, prompt diagnosis and strict treatment are essential. The earlier you start treatment, the more likely it will be successful. Understanding the normal functioning of a joint is useful in understanding the etiology of rheumatoid arthritis. [2] The precise course of RA's progression is unknown. In the absence of curative measures, the illness often gets worse over time and goes through phases. However, RA disease development has been effectively slowed down by a number of novel medications. You can better control your RA and take care of your health if your treatment reduces the disease's progression.

Rheumatoid arthritis can also present with the following other features:

- It destroys the tissue covering the ends of the bones of a joint, affecting the lining of the joints.
- When RA manifests in one hand or knee, it frequently does so symmetrically, affecting the opposite hand or knee as well. Wrists, and hands, elbows as well as arms, feet, spinal column, knees, and jaw joints may be affected.
- Fatigue, sporadic fevers, and appetite loss are possible side effects of RA.
- In addition to affecting the joints, RA can lead to health issues with the lungs, heart, blood while nerves, vision, and skin.

Rheumatoid arthritis thickens the synovial membrane and erodes cartilage. When a joint moves, the membrane of the synovial sac encroaches on the surrounding tissue, resulting in swelling and pain. Joint discomfort, swelling, morning stiffness, weariness, weight loss, insomnia, and a vague feeling of flu-like symptoms are a few of the symptoms. Rheumatoid arthritis is diagnosed by examining for aberrant levels of immunoglobulin G (IgG) in the blood, commonly known as rheumatoid factor. In reaction to antigen, they create an antigen-antibody complex that damages and irritates the synovial membrane. According to the American College of Rheumatologists, the diagnosis cannot be confirmed unless at least four of the following seven requirements are satisfied. [3]

1.1. Risk Factors

The following factors could make you more susceptible to rheumatoid arthritis:

- **Sex:** women are considerably more prone to rheumatoid arthritis than males.
- **Life:** RA often develops in middle life, while it can affect anyone at any age.
- **Family history:** If a member of your family already has rheumatoid arthritis, you may be at higher risk of getting it as well.
- **Smoking:** Smoking increases the risk of developing rheumatoid arthritis, particularly if the condition runs in the family.
- **Being overweight:** It seems that being overweight increases the chance of getting rheumatoid arthritis. [4]

1.2. Complications

Rheumatoid arthritis increases your risk of developing:

- **Dry mouth and eyes:** Sjogren's syndrome, a condition that reduces moisture in the mouth and eyes, is far so common in those with rheumatoid arthritis.
- **Infections:** Rheumatoid arthritis and most of the drugs used to treat RA can weaken the immune system, which raises the risk of infections. Vaccinate yourself against diseases like COVID-19, pneumonia, and influenza to protect yourself.
- **Heart issue:** Arthritis can raise your risk of heart-related problems such as swelling of the sac that surrounds your heart and hardened and clogged arteries. [5]

2. Stages of Rheumatoid Arthritis

As rheumatoid arthritis worsens, the body changes. You can see and feel certain changes, but others are invisible to you. Depending on the patient's stage of rheumatoid arthritis, different therapy goals apply.

2.1. Stage 1

Rheumatoid arthritis in its early stages is known as stage 1. Many people have stiffness, edema, or discomfort in their joints. The first stage is characterized by joint inflammation. In the joint, the tissue swells. For instance, a person with

stage 1 rheumatoid arthritis in their hands may have pain and stiffness in their knuckles and finger joints. Moving can usually make these feelings go away. [6] The synovium, the tissue lining the joint, becomes inflamed as the tissue in the joint swells; the bones are unaffected. Due to the absence of obvious symptoms, people with rheumatoid arthritis may not be aware of their condition right first, and clinicians may find it difficult to diagnose it at this time.

2.2. Stage 2

Moderate-stage RA is stage 2. At this point, the inflammation of the synovium damages the bone and cartilage in the joint. The tissue that covers a bone's end at a joint location is called cartilage. The first place affected by RA damage is the bone adjacent to the joint's end of cartilage. People who have damaged cartilage may feel pain and become less mobile. The joint's range of motion could be restricted. For instance, stiffness and trouble bending the fingers may be signs of RA in the hands. Blood tests may not reveal any evidence of RA antibodies at this point, even in the presence of severe symptoms. Because a tiny percentage of RA patients are and may continue to be zero-negative, the RA the antibodies may be negative. The most typical course of events is the presence of RA antibodies years before symptoms appear. We refer to this as zero-negative RA. [7]

2.3. Stage 3

Experts consider RA serious once it reaches stage 3. The injury now includes the cartilage, and the breakdown of the bone continues. The bones rub against each other because the cushion between them deteriorates. More discomfort and edema could be present. Some persons might lose greater mobility and develop muscular weakness. There's a chance that the bones will erode or undergo formational modifications. Examples include thicker knuckles and twisted fingers, which may be permanent. Compressing tendon at the wrist, along with signs of tendon rupture or carpal tunnel syndrome, are possible additional symptoms.[8] Although there is a significant chance of extensor tendon rupture on the fingers as a result of synovitis at the wrist, doctors can avoid this from happening if they catch it early.

2.4. Stage 4

In stage four, the joint is no longer inflamed. In this stage of the disease, joints become non-functional because to RA. End-stage RA patients may still experience stiffness, limited mobility, edema, and pain. The muscles may not be using as much force. Joint injury and bone fusion (ankylosis) are possible outcomes. Depending on the course and location of their end-stage RA, a person may lose hand function or have trouble flexing their hips or bending their knees. It might take years for someone to move through all four stages, and some people never do. For example, ankylosis, or fused bones, affects just 0.8% of RA patients. For a while, some patients experience no RA activity. This could indicate that RA is in remission in certain situations. Any joint in the body can be impacted by rheumatoid arthritis, however it typically manifests in the hands and feet's tiny joints initially. Usually, the same side of the body experiences the same effects at the same moment, but this isn't always the case. [9]

3. Medicinal Plants Used to Treat Rheumatoid Arthritis:

The selected medicinal herbal plants given below possess antirheumatoid properties:

3.1. Manjistha



Figure 1 *Rubia cordifolia*

- Biological Name: *Rubia cordifolia*
- Kingdom: Plantae
- Class: Dicotyledonae
- Subclass: Sympetalous
- Order: Rubiales

- Family: Rubiaceae
- Genus: *Rubia*
- Species: *cordifolia*

Rubia cordifolia Linn roots bearing number of activities like anti-inflammatory, immunomodulatory, antiepileptic and anti-cancer activities. [10]

This extremely precious herb is utilized in the Ayurvedic medical system for-

- Skin conditions and splenic disorders are treated by ingesting powdered dried roots and fruits.
- Major burns, ulcers, and bone fractures are treated with it.
- It is thought to be a tonic, an antitussive, and helpful for persistently low fevers.
- The roots are taken internally to cure a variety of conditions, such as dysentery, rheumatism, bronchitis, internal and external hemorrhage, kidney, bladder, and gallstones, and irregular uterine bleeding. Blood problems are treated using this herb.
- The roots have vulnerary, styptic, astringent, diuretic, antiphlogistic, alterative, and anodyne properties.

3.2. Haritaki



Figure 2 *Terminalia chebula*

- Biological Name: *Terminalia chebula*
- Class: Magnoliopsida
- Request: Myrtales
- Family: Capabilities
- Variety: Terminalia
- Species: *Terminalia chebula*

Size: *T. chebula* (haritaki) is a medium-sized deciduous tree with spreading branches that can reach a height of 25 to 30 meters. Usually cylindrical, the bowl is no longer than a few meters (<10 m). The leaf is bright green, arranged in a spiral on the stem, and reaches 12–15 cm in length and 5–6 cm in breadth. During the winter, the leaf becomes deciduous. Reddish-brown, velvety, glossy hairs cover the buds, young leaves, and branches. Blooms: The blooms are monoecious, small panicles or terminal spikes with short stalks that are dark white to yellow in color and have an overpowering, unpleasant smell. Fruit: oval drupe with dry pericarp, 2-4 cm long and 2-2.5 cm diameter; green when unripe, brown when ripe. Fruit matures between November and March, depending on the region; it falls early after ripening. Seed: bony, tough, and slightly inclined. Dark brown in colour, the bark of the petiole has two large glands at the top. Haritaki is a laxative, rejuvenator, astringent, purgative, and dry. Its fruit paste works well to clean wounds and ulcers, reduce edema, and speed up the healing process. The paste relieves conjunctivitis by nourishing the eyelids. Gargling with the decoction of haritaki relieves sore throats, mouth ulcers, and stomatitis. It works well as an astringent for bleeding gums, loose gums, and gum ulcers. The herb is utilized to make "Triphala," a remedy for bleeding gums, pyorrhea, and hair washing. Frequent ingestion of haritaki powder, fried in ghee, increases vitality and prolongs life.

3.3. Black catechu

- Biological Name: *Acacia catechu*
- Division: Angiospermae
- Class: Dicotyledons
- Subclass: Polypetalous
- Series: Calyciflora
- Order: Fables

- Family: Fabaceae
- Genus: Acacia
- Species: catechu



Figure 3 *Acacia catechu*

Acacia is a generic classification of trees and plants in the family Mimosoid of the pea family Fabaceae, for the most part alluded to as the wattles or acacias. It is made up of a number of plant genera that are native to Africa and Australasia. The Greek word "thorn," which was once used to characterize the behaviours of many of the genus's extinct species, is where the New Latin name for the genus originates. Trees, deciduous, gregarious, up to 15 m high; bark rough, dull greyish-brown to dim brown, peeling in long, thin, rectangular strips; burst caramel crimson; brown, glabrous branchlets. Bipinnate, alternating, and stipulate leaves; stipular spines matching, 3–10 mm long, straight or snared, occasionally absent on blossoming branchlets; stipular spines considerably infra axillary; rachis: 8–19.5 cm, thin, pulvinate, fleecy, scored above, with an organ near the rachis's base on the upper side; pinnae: 10–20 sets, 3.6–8 cm long, inverse, wool, thin, with an in between the terminal 6 sets on the lower side; pamphlets: 30–50, inverse, paripinnate, sessile, stipels absent; lamina: 2.5–8 x 0.5–1.5 mm, straight elongated, base inconsistently shorten, summit round, inhumane, or mucronate, edge whole, pubescent, chartaceous; midrib is subcentral at the base, while lateral nerves are hidden. Blossoms light yellow, sessile, in lengthy singular or in gatherings of 2-4 axillary spikes; bracts cauducous; calyx cupular-campanulate, 1-1.5 x 1.3-1.5 mm, teeth three-sided or deltoid; lobes are oblong, ovate to linear-lanceolate, and the corolla is 2.5-3 mm long; stamens many, 4.5-5 mm long; ovary stipitate, 0.8-1.2 mm long, elliptical ellipsoid; style 4-5 mm long; disgrace terminal. A case of natural products Seeds: 3–10, orbicular or praise, smoothed; 5–10 x 1-1.6 cm, level, straight, unlobed or sinuate along edges, slender walled, hooked at zenith, brown, confined at base into a stipe, dehiscent. This plant's extract helps with high blood pressure, diarrhoea, colitis, gastrointestinal issues, bronchial asthma, cough, leucorrhoea, and leprosy. It is also used to cure sore throats and diarrhoea. It is used as a mouthwash to treat oral, dental, and gum infections as well as sore throats and gingivitis.

3.4. Aloe vera



Figure 4 *Aloe barbadense*

- **Biological Name:** *Aloe barbadense*
- **Common Name:** Curacao aloe, Lily of the desert
- **Family:** Liliaceae

Europe and many Indian locations, especially the northwest Himalayan region, are home to *Aloe barbadense* cultivation. One of the most significant plants in traditional medicine is *Aloe vera*. The anthraquinone, anthracene, cinnamic corrosive, and anthranilic corrosive are the dynamic fixes found in *Aloe vera* plants. *Aloe vera* is used to cure a variety of skin ailments, such as bug bites, dermatitis, poison ivy, and minor cuts. Alongside being a vein cleaner, calming in nature a diuretic uterus tonic, spermatogenic, diuretic, laxative, and fever minimizer, it likewise has antibacterial and antifungal characteristics. The anthraquinone particle in aloe vera is answerable for its enemy of joint pain properties.

Aloe vera has powerful anti-inflammatory and immune-boosting properties. In Sprague Dawley rodents with adjuvant-actuated joint pain, effective organization of aloe vera extricate lessens irritation and joint pain.

3.5. Shallaki



Figure 5 *Boswellia serrata* Linn.

- **Biological Name:** *Boswellia serrata* Linn.
- **Common Name:** Boswellia/Indian Frankincense
- **Family:** Burseraceae

Boswellia serrata Linn. is a moderate-to-huge spreading tree found in India, Northern Africa, and the Centre East. It is possible that it can be located in India's Madhya Pradesh, Gujarat, and Bihar states. Gummy-oleo resins can be seen when the strips of *Boswellia* bark are peeled away. The tar piece of it contains β -*Boswellia* corrosive, which has been demonstrated to have militating, against atherosclerotic, and hostile to ligament properties. Additionally, this sticky oleo resin extract has been utilized as an astringent, stimulant, expectorant, sedative, antiseptic, and analgesic. It is likewise known to reestablish the respectability of the vessel that has been harmed or spasmed in the joints. Terpenoids, sugars, and unstable oil are the essential elements of *Boswellia*. By repressing cytokines that are favorable to fiery and middle people that start the cycle, *Boswellia serrata* remove has innate calming properties where it is predominant to progressing irritation. Although *Boswellia serrata* Linn. reduces the digestion of carbohydrates, non-steroidal anti-inflammatory medications may exacerbate joint conditions that cause arthritic pain.

4. Bhumyaamalaki



Figure 6 *Phyllanthus amarus*

- **Biological Name:** *Phyllanthus amarus*
- **Species:** P. amaro's
- **Rank:** Species
- **Order:** Malpighiales
- **Family:** Phyllanthocin
- **Genus:** Phyllanthus
- **Kingdom:** Plantae

Phyllanthus loves Schum. and Thonn. a minuscule plant with restorative qualities utilized everywhere, is an individual from the Euphorbiaceous family. P. loves is a huge plant in the Indian Ayurvedic clinical framework. It is used to treat stomach, spleen, liver, kidney, and genitourinary system problems. It has antibacterial, stomachic, diuretic, harsh, and astringent properties. For gonorrhoea, menorrhagia, and other genital sicknesses, the whole plant is used. It assists with ophthalmopathy, scabies, ulcers, wounds, loose bowels, diarrhoea, gastropathy, and irregular fevers. The glabrous annual *Phyllanthus amarus* can reach a height of 60 to 75 centimeters. The stems are often precise extended at the base,

and the root is solid and woody. Huge quantities of sub-sessile, distichous, specify, paripinnate, and little handouts make up the leaves. The elliptical handouts have an adjusted base, a hazy nerve. The root is thick, curved, and woody. [11]

5. Conclusion

Rheumatoid arthritis is a painful, debilitating, and protracted illness that can lead to both long-term disability and joint damage. Preventing major injury and losing essential bodily functions requires early detection and intervention. Treating physicians should think about following treat-to-target (T2T) recommendations, which involve establishing the goals first, then implementing the procedures to achieve and assess them. Furthermore, seeking professional assistance early on will help ensure better outcomes from treatment. Advances in subatomic medicine have given us a better understanding of disease components, which can help in the development of more potent drugs. Both new and improved versions of existing therapy techniques have been created. The use of gene array analysis is helping to identify the patients who will respond better to particular treatments. In order to find the best treatment for a certain patient, this customization will enable faster treatment and reduce the chance that the disease will worsen during the trial phase. Additionally, gene array analysis is being utilized to identify people who may be more susceptible to more severe forms of Rheumatoid arthritis. It is anticipated that RA management techniques would witness significant advancements.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

- [1] Abdullah ST, Ali A, Hamid H, Ali M, Ansari SH, Alam MS. Pharmazie. 2003; 58(3): 216-17.
- [2] Joosten LA, Oppers B, Bersselaar VL, Coenen-de Roo CJ, Kolls JK. et al. IL-1-independent role of IL-17 in synovial inflammation and joint destruction during collagen-induced arthritis. J Immunol. 2001; 167(2): 1004-13.
- [3] Gracie JA, Forsey RJ, Chan WL, Gilmour A, Leung BP, Greer MR. et al. A proinflammatory role for IL-18 in rheumatoid arthritis. J Clin Invest. 1999; 104(10): 1393-401.
- [4] Van den Berg WB, Bresnihan B. Pathogenesis of joint damage in rheumatoid arthritis: evidence of a dominant role for interleukin-1. Baillieres Best Pract Res Clin Rheumatol. 1999; 13(4):577-97.
- [5] Badyal DK, Lata H, Dadhich AP. Animal models of hypertension and effect of drugs. Indian Journal of Pharmacology. 2003; 35: 349-362.
- [6] Sukh Dev. A selection of Prime Ayurvedic plant drugs Ancient-Modern Concordance. New Delhi: Anamaya publishers; 2006.
- [7] Sharma PV, Dravyaguna V. Chaukhambha Bharti Academy. Varanasi: 2(3), 1969, 928.
- [8] Xu K, Wang PL, Wang L, Liu CM, Xu SX, Cheng YT, Wang YH, Li Q, Lei HM. Quinone derivatives from Genus Rubia plants and their bioactivities. Chemistry & Biodiversity. 2014; 11: 341-363.
- [9] Zhao SM, Kuang B, Fan JT, Yan H, Xu WY, Tan NH. Antitumor cyclic hexapeptides from Rubia plants: history, chemistry, and mechanism (2005–2011), CHIMIA. International Journal of Chemistry. 2011; 65(12): 952–956.
- [10] Somade PM. et al. Antinociceptive Investigations of Rubiadin in Chronic pain induced by Freund's adjuvant in mice. Research J. Pharm. and Tech. 2023; 16(1): 31-34.
- [11] Chinese Pharmacopoeia Commission: Chinese Pharmacopoeia. Part I, Beijing: 2010, 218–219.