REVIEW ON: MEDICINAL PLANTS FOR TREATMENT OF RHEUMATOID ARTHRITIS

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ABSTRACT

Rheumatoid arthritis (RA) is a chronic inflammatory disorder and many tissues and organs, out principally attacks flexible synovial joints. The process is produce an inflammatory response of the synovial cells. The aim in this review is to collate all available data on experiments reporting the anti-arthritic effect of plants and natural products in the last two decades. A bibliographic investigation was carried out by analyzing. The terms and word Anti-arthritic bone disease medicinal plants to identify. although conventional treatment of Rheumatoid Arthritis RA commonly alleviate the symptoms high incidence of adverse reaction leads to research tendency towards complementary and alterviate medicine. As various medicinal plants are traditionally use for the management of symptomatologies associated with Rheumatoid Arthritis (RA).

KEYWORDS: Rheumatoid arthritis, herbal drugs, therapeutic potential, alternative medicine.

1.1 INTRODUCTION

Rheumatoid Arthritis is a chronic autoimmune disease that is associated with progressive disability systemic complication early death, and socioeconomic costs.[1] Although the exact pathogenesis of disease has yet not been elucidated. arthritis generally inflammation of joints is a one of the oldest known diseases occurring almost in all age groups, In India more than 20% of total population is suffering from arthritis. the process produce an inflammatory response of the capsule around the joints, secondary swelling of the synovial cells. The aim in this review is to collate all available data on experiments reporting the anti-arthritic effect of plant and natural product in the last two decades.[2] It can occasionally involve other internal organs, such as the nerves, eyes, lungs or heart. The earliest symptoms of RA can be non
specific including feeling unwell or tried soreness in or around joints, low- grand fever, and weight loss/poor appetite. As time goes on RA can involve more and more joints on both sides of the body often in a ‘’symmetrical’’ pattern. Although various drugs. It has been used to control RA, there are numerous reports regarding the side effects of these drugs. A range of newer drugs called TNF blockers have been linked to a condition called leukocytoclastic vasculitisor LCV. TNF blockers. Medicinal Plants are a source of great economic value all over the word. Nature has bestowed on us a very rich botanical wealth and a large number of diverse types of plants grow in different parts of the country. There is considerable evidence that plant extracts have the potential to be developed into agents that can be used as preventative or treatment therapies for oral diseases. In this review, we have selected some of the main advances achieved in the identification of plants with anti arthritic activity.

The Most commonly involved joints that are affected by Rheumatoid Arthritis include: Arthritis also affects small joints of the hands and feet, wrists elbows, shoulders, knees and ankles. There are several factors which may contribute to development of RA. Some people who develop RA have history, largest genetic risk factor described for RA, estimated to contribute approximately 30%of the genetic risk for the disease. RA affects women more often than men hormonal changes are also related to be an increased risk of Ra. The risk increases with age it commonly develops between ages 40 to 60, anyone can get RA at any age. Most commonly RA affects the old age. There are many environmental factors contributing to RA, but smoking is most convincingly relates to RA. The recent review is an attempt to in touch the plants valuable for rheumatoid arthritis.

1.2 Treatments For Rheumatoid: Arthritis the general approach of treating RA is to prevent long term damage to the joints and reduce inflammation. Pain management is also important in the treatment of RA. The Keystone is a medication therapy for RA in disease modifying anti rheumatic drugs and newer class of medication called biologics.

![Fig. Treatments for Rheumatoid.](image-url)
1.3 **Physiology**: There is usually a trigger such as an infection or environment factor, which activates the genes. When the body is exposed to this trigger the immune system responds inappropriately. Instead of protecting the joints the immune system begins to produce substances that attack the joints. This leads to the development of rheumatoid arthritis.[7] The normal joint lining is very thin and it has very few blood vessels in it but in the rheumatoid arthritis joints lining is very thick and crowded with the white blood cells. The white blood cells secrete substance like interleukin-1 and tumor necrosis factor alpha that produce pain, joint swelling and joint damage. Cytokines like IL-1, IL-1 stimulate synovial fibroblasts and chondrocytes in the nearby articular cartilage to secrete enzymes the degrade proteoglycan and collagen, leading to tissue destruction. In rheumatoid cartilages are eroded the synovial membrane invades the space between the joints and whole joint is swollen and become painful on movement.

1.4 **Causes**: Arthritis involves the breakdown of cartilage. Cartilage normally protects a joint allowing it to move smoothly. The process produce an inflammatory response of the synovial secondary to hyperplasia of synovial fluid and the development of panes in the synovial.

2. **Signs and symptoms**: Tender, Warm, swollen, joints Morning stiffness that may last for hours firm bumps of tissue under the skin on arms fatigue, fever and weight loss. As the disease progresses, symptoms often spread to the wrists knee, ankles elbows, hips and shoulders. In most cases, symptoms occur in the same joints on both sides of your body. Rheumatoid arthritis signs and symptoms may vary in severity and may even come and go.[8] Periods of increased disease activity called flares alterate with periods of relative remission when the swelling and pain fade or disappear. Over time, rheumatoid arthritis can cause joints to deform and shift out of place. Firm lumps, called rheumatoid nodules, which grow beneath the skin in place such as elbow and hands. Fig given below.

![Fig. Sign and Symptoms.](image-url)
3. Effect of Medicinal Plants on anti- rheumatoid arthritis: Inflammatory and arthritic conditions are among those treated using traditional remedies, with considerable success. Chronic inflammatory diseases including rheumatoid arthritis are still one of the main health problems of the world population. Although several modern drugs are used to treat these types of disorder their prolonged use may cause severe adverse side effect on chronic administration the most common being gastrointestinal bleeding and peptic ulcers. There is a need to develop new anti inflammatory agents with minimum side effect.\[9\] It is worthwhile to note that most of the present day analgesic drugs also exert a wide range of side effects.

Name, chemical constituents and uses of herbal drugs used for treatment of Rheumatoid Arthritis (RA)

Myrobalan

Terminalia chebula Retz (Combretaceae): Terminalia chebula Retz is called the ‘King of Medicine’ in Tibet and is always listed at the top of the list of ‘Ayurvedic Materia Medica’ because of its extraordinary power of healing. T. chebula has been extensively used in Ayurveda, Unani and Homoeopathic medicine and has become a cynosure of modern medicine. The health benefits may be credited to the presence of the various phytochemicals like polyphenols, terpenes, anthocyanins, flavonoids, alkaloids and glycosides.\[10\] The hydroalcoholic extract of T. chebula produce significant inhibition of joint swelling.

Chemical constituents: It contains arjunglucoside, trans-cinnamic acid, triethyl ester of chebulic acid, arjunic acid, arjungenin, daucosterol (Fig. 3).

Uses: The whole used this plant in the treatment of asthma, sore throat, vomiting, hiccup, diarrhea, dysentery, bleeding piles, ulcers, and gout, heart and bladder diseases. 8antioxidant, antimicrobial, antidiabetic, hepatoprotective, anti-inflammatory, antimutagenic, antiproliferative, radio protective, cardio protective, antiarthritic, anticaries, gastrointestinal motility and wound healing activity.

Black Pepper

Piper Nigrum linn (Piperaceae).

It is the fruit of the black pepper plant from the Piperaceae family and is used as both a spice and a medicine. The chemical piperine, which is present in black pepper, causes the spiciness. It is native to Kerala, the southern state of India.
Chemical constituents: It consists of piperene, an amine alkaloid, which gives strong spicy pungent character to the pepper. It also contains numerous monoterpenes hydrocarbons such as sabinene, Pinene, terpene, limonene, mercene, camphene, caryophylline, alphaphellandrene, alphapinene, beta-pinene, beta-bisbolene, beta-farnesene, linalool, terpene-4-ol, thujone (Fig. 4).

![Chemical Structure of Piperidine and Piperone](image)

Uses: antiinflammatory, carminative, anti-flatulent, potassium, calcium, zinc, manganese, iron, and magnesium. Peppers are an excellent source of many vital B-complex groups of vitamins such as Pyridoxine, riboflavin.

Ginger
Zingiber officinale (Zingiberaceae)
The rhizomes of ginger are used as spice in food and beverages and in traditional medicine as carminative, antipyrexia of waist pain rheumatism and bronchitis.\(^{[10]}\) It is used for the treatment of gastrointestinal disorders.

Chemical constituents
It contains sesquiterpenes and phenolic compounds shogaols, gingerols bisabolene, zingiberine, zingiberone sesquiphellandrene. It also contains curcumene, 6dehydrogingerdione, galanolactone, gingesulphonicacid, zingerone, geraniol, neral, gingerglycolipids, curcumin, alpha farnesene (Fig. 5)\(^{13}\).
Uses: It has anti-emetic, chemo-protective, anti-viral, antiinflammatory, anti-nauseant, and anti-ulcerogenic, migraine. Ginger improves the absorption and assimilation of essential nutrients in the body.

**Tinospora gulancha**

Tinospora cordifolia linn (Menispermaceae)  
Tinospora cordifolia commonly named as “Guduchi” in Sanskrit belonging to family Menispermaceae is a genetically diverse, deciduous climbing shrub with greenish yellow typical flowers, found at higher altitude.\(^{[10]}\)

**Chemical constituents**

It consist of tinocardifolin, columbin, colombine, picroretin and tinocardifolioside, tinosponone, tinocardioside, cordioside (Fig.6) \(^{15}\).

![Chemical structures of Tinospora cordifolia](image)

**Uses:** Tinospora cordifolia is used in the Indian Ayurvedic system of medicine for the treatment of jaundice, diabetes, and rheumatoid arthritis, and immunostimulant, antineoplastic, antioxidant, hepatoprotective, hypolipidemic, and immunologic properties.

**Deodar cedar**

*Cedrus deodara* (Pinaceae)

*Cedrus deodara* (Roxb.), belonging to the family Pinaceae (Hindi-Marathi Deodar; Sanskrit-Devadaru; English-Cedar) is graceful, ornamental evergreen tree growing extensively on the slopes of the Himalayas. C. Deodar forests are common from Kashmir, especially krishnaganga, kishtwar and Jhelum, to Garhwal. 17 The wood of C. deodara has been used since ancient days in Ayurvedic medical practice for the treatment of inflammations and rheumatoid arthritis.\(^{[11]}\)
Chemical constituent

The principle constituents of the oil are sesquiterpenes i.e., α-himachalene (12.5%) and β-himachalene (43%) associated with them are sesquiterpene alcohols himachalol, allohimachalol, himadarol, isocentdarol and centdarol. Some compounds isolated from the pineneedles of cedrus deodara are 9-hydroxy-dodecanoic acid, ethyl laurate, ethyl stearate, 3-beta-hydroxyoleanolic acid methyl ester, beta-sitosterol, shikimic acid, methyl coniferin, ferulic acid, beta-glucoside. Cedeodarin (6-methyltaxifolin), dihydromyricetin, cedrin (6-methyldihydromyrecetin) and cedrinoside are also isolated from cedar wood. (Fig.7).

Uses

Deodar cedar is carminative, diaphoretic, diuretic and expectorant. A decoction of the wood is used in the treatment of fevers, flatulence, pulmonary and urinary disorders, rheumatism, piles, kidney stones, insomnia, diabetes etc. It is used as an antidote to snake bites.

Indian Bay Leaf

Cinnamomum tamala(Lauraceae)

Cinnamomum tamala is found in himalayan region is a promising medicinal plant species. It is used in traditional indian system of medicine.

Chemical constituents

Cinnamomum tamala consist of geraniol, beta-pinene, camphene, beta-caryophyllene, Cinnamaldehyde, limonene, p-cymene, alpha-pinene, eugenol (Fig. 8) 21, 22.
Uses: Essential oils of Cinnamomum tamala are used as carminative, anti-flatulent, diuretic for anorexia, bladder disorder, coryza, nausea, headache, insomnia, nervous tension, muscles and joints complications, arthritis, inflamed joints, muscular pains, rheumatism, sprains benefits the digestion.

Aginbuti
Ammania baccifera Linn (Lythraceae)
An erect or sub erect herb, 15-20 cm high, sometimes more. Leaves oblong or narrow-elliptic, usually opposite, cauline ones opposite or alternate, 2.5-6.2 cm long.

Chemical constituents
It contains hentriacontine, dotriacontanol, betulinic-acid, lupeol, ellagic acid, quercetin, and lawsone. The plant is also reported to contain tetralone derivatives i.e. (−)

![](image)

(4R)-Hydroxy-1-tetralone, (−)-(4S)-acetoxy-1-tetralone, (−)-(4S)-hydroxy-1-tetralone-4-O-β-D-glucoside, β-sitosterol and β-sitosterol-β-D-glucoside, ellagic acid (Fig. 9) 26-28.

Uses: It has anti-arthritis, anti-inflammatory potential, an appetizer, and stomachic and is useful in treating biliousness; the leaves are beneficial for removing phlegm from the lungs and trachea. Hypothermic, hypertensive, antiurolithiasis, antibacterial and CNS depressant activities.
**Indian Mallow**

*Abutilon indicum* (Malvaceae)

It is a perennial shrub, softly tomentose and up to 3 m in height. The plant is found in India, Sri Lanka, topical regions of America.

**Chemical constituents**

It consist of stigmasterol, riboflavin, adenine, scoparone, scopoletin, and p-coumaric acid, Scoparone, scopoletin, sitosterol, syringaldehyde, thymine, vanillic acid etc (Fig. 10).

**Uses**

It is used in treatment of lung ailments, cold and fever, tuberculosis, bronchitis, urinary tract infection, gout, tooth ache, anti-arthritic. It is sweet, cooling, digestive, laxative, expectorant, diuretic, astringent, analgesic, antiinflammatory. It is useful in gout, tuberculosis, ulcers, bleeding disorders, and worms.

**Teak**

*Tectona grandis* linn (Verbanaceae)

The plant *Tectona grandis* is probably the most widely cultivated high value hardwood (HVH) in the world and is native to India and Myanmar and South-East Asian countries. It is now one of the most important species of tropical plantation forestry. The whole plant is medicinally important and many reports claim to cure several diseases according to Indian traditional system of medicines.[11]

**Chemical constituents**

Several phytochemicals like alkaloids, glycosides, steroids, saponins, steroids, flavonoids, proteins and carbohydrates have been reported in *Tectona grandis*. Secondary metabolites such as tectoquinone, 5-hydroxylapachol, tectol, betulinic acid, betulinic aldehyde, squalene, are found in plants.
Uses
It has antibacterial, anti-oxidant, anti-asthmatic, analgesic, anti-fungal, anti tumor, anti inflammatory and anti metastatic, anti pyretic, anti-ulcer activity.

Shallaki

Boswellia serrate (Burseraceae)
Resin of Boswellia species has been used as incense in religious and cultural ceremonies and in medicines since time immemorial. Boswellia serrata (Salai/ Saale guggul), is a moderate to large sized branching tree of family Burseraceae (Genus Boswellia), grows in dry mountainous regions of India, Northern Africa and Middle East.

Chemical constituents
It contains essential oil, gum and resin. Resin portion mainly composed of pentacyclic triterpene acid of which boswellic-acid is the active moiety. Essential oil fraction of n-hexane extract of Salai guggul contains esters (62.1%), alcohol (15.4%), monoterpenes (9.9%) and diterpenes (7.1%) (28). It’s leaves contains P-Cymene-Limonene, Terpinolene, Bornyl acetate, αPinene, α-Thujone, α-Phellandrene (Fig.12)33.

Uses
The gum resin from Boswellia serrata, i.e. frankincense, has been used as medicine for the treatment of inflammatory diseases. Rheumatoid arthritis, osteoarthritis, cervical spondylosis, ankylosing spondylitis

Chanka pied
Phyllanthus niruri (Euphorbiaceae)
The herb P.niruri is a widespread tropical plant found in coastal areas. It grows along the bunds and ridges in cultivated fields. The plant grows to a height of 15-60 cm.13
Chemical constituents: Ascorbic Acid, Astragaline, Brevifolin, Butyrolactone, dibenzyl, Butyrolactone, trans-2-(3-4-dimethoxy benzyl)-3-(3-4-methylenedioxy-benzyl), Catechin, (+)Catechin, epi: (-) Cholesterol, 24-isopropyl, Corilagin, Cymene, Deca-trans-2-cis-4-dienamide, Dotriacontanoic Acid, Ellagic (Fig.13)34.

Uses: Asthma, anemia, astringent, conjunctivitis, bronchitis, cough, dropsy, diarrhoea, diabetes, dysentery, eye disorders, galactagogue, gonorrhea, genitourinary disorders, jaundice, hepatitis, menorrhagia, leucorrhea, ringworm, oligogalactia, stomachic, scabies, tuberculosis, thirst, urogenital tract infections.

Morning Glory
Argyreia (Convolvulaceae)
The Elephant Creeper is a very large climber whose length is over 8-10 meters. It bears stout stems that are covered with white woolly hairs. The round fruit 2cm. in diameter, with a short sharp point.

Chemical constituents: The leaves contain flavonoids, quercetin and kaempferol root contain tetradecanyl palmitate, 5, 8-oxidotetracosan.
Uses: It has antibacterial, anti-convulsant, anti-inflammatory, anti-viral, anti-fungal, hepatoprotective, Hypoglycemic, immune-modulatory, central nervous system activity, aphrodisiac activity. Promotes the flow of urine, relieves gonorrhoea, strangury or painful urination and chronic ulcers. Rheumatis and nervous disorder.[14]

**Clearing Nut Tree**

*Strychonos potatorum* linn (Loganiaceae)

*Strychonos potatorum* is a medium-sized, glabrous tree of height 1213 m. Stem is fluted and covered with black, thick, square to rectangular scales. Bark is 1.32 cm thick, black or brownish-black, corky, with very deep and narrow vertical, thin ridges, which easily break off. Branches are swollen at nodes. Leaves are about 57.5 cm long, nearly sessile, subcoriaceous, ovate or elliptic, acute, glabrous and shining, spuriously three or five nerved, with lateral nerves springing from the lower part of the mid rib, nearly reaching the tip36.

**Chemical constituents**

It consists of alkaloids, flavonoids, phenols, tannins, saponins. Alkaloids mainly diaboline, four triterpene i.e. isomotiol itosterol, stigmasterol and compesterol norharmane, akuammidine, nor-C-fluroiocuraine, ochrolifuanine, bis-nordihydrotoxiferine, 11-methoxyhenningsamine, 11-methoxy-12 hydroxydiabolin and 11methoxydiabolin. Alkaloids-diaboline 9 and its acetate10, brucine, loganin, mannose, sucrose, arachidonic, lignoceric, linoleic, oleic, palmitic and stearic acids; steroids and triterpines6, βsitosterol, stigmasterol, oleanolic acid and its 3β-acetate, saponins containing oleanic acid11 (Fig.15)37.

Uses: It is used for treating several diseases like microbial infections, diarrhea and diabetes, It has anti-microbial, analgesic, anti-inflammatory, anti-nociceptive, antiarthritic, anti-ulcerogenic, hepato-protective.[15]

**CONCLUSION**

The use of herbal medicine is widespread among patients as herbal plants represent a rich or prime source of highly effective conventional drugs for the treatment of arthritis. Although numbers of synthetic drugs are being used as standard treatment for rheumatoid arthritis but they have adverse effect that can compromise the therapeutic treatment. Unfortunately, there is still no effective known medicinal treatment that cures rheumatoid arthritis as the modern medicine can only treat the symptoms of this disease that means to relieve pain and inflammation of joints. With herbal medicines there is reduced risk of side effects and is cost
effective. The use of herbal drugs in treatment of rheumatoid arthritis is an alternative and even effective method of treatment of chronic conditions with lesser or no side effects. From the above review it should be evident that there are many medicinal plants that exert anti-arthritic activity. This review makes an attempt to give scientific account of use of valuable medicinal plants in rheumatoid arthritis.

REFERENCES