MEDICINAL PLANTS AND RHEUMATOID ARTHRITIS - A REVIEW

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Abstract:
Rheumatoid arthritis is an progressive and autoimmune disease, it is characterized by inflammation of the lining of joints. There are more than 100 rheumatic diseases characterized by inflammation and loss of function of one or more connecting structure of the body. The exact cause of arthritis is unknown and yet there is no cure. It is possible to use the herbs and plants in various forms in order to relieve the pain and inflammation in the joints. Also many medicinal plants that have shown anti rheumatoid arthritis properties (3). This review consists of the detail on rheumatoid arthritis and the treatment of arthritis from medicinal plants.

Keywords: Autoimmune disease, Herbs, Joints, Medicinal plants, Rheumatoid arthritis, Systemic inflammation.

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INTRODUCTION:
Rheumatoid arthritis (RA) is a chronic inflammatory disease characterized by joint swelling, joint tenderness, and destruction of synovial joints, leading to severe disability and premature mortality. Rheumatoid arthritis is a systemic (body-wide) disease, involving other body organs, whereas osteoarthritis is limited to the joints (5). It affects 1% of the population in India (4). The other important symptom in the disease is early morning stiffness in the joints. The early morning stiffness in the joints usually lasts for more than one hour. Rheumatoid arthritis varies greatly from person to person, so it’s hard to identify typical stages of the disease. Joint involvement is usually symmetrical, affecting both sides of the body equally. Gender appears to play a major role in a person's susceptibility to rheumatoid arthritis. Women are about three times more likely than men to develop rheumatoid arthritis. Some people have this
disease for only a few months or a year or two. Then it goes away without causing damage (5), (7) (9) (4).

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**Epidemiology:**

RA was estimated to be the 40th leading cause of non-fatal burden in the world in 1990, accounting for 0.7% of total Years lived with Disability (YLD)(13). Worldwide, the annual incidence of RA is approximately 3 cases per 10,000 population, and the prevalence rate is approximately 1%, increasing with age and peaking between the ages of 35 and 50 years(10). First-degree relatives of individuals with RA are at 2- to 3-fold higher risk for the disease. Anyone can get this disease, though it occurs more often in women (8). Rheumatoid arthritis often starts in middle age and is most common in older people. But children and young adults can also get it. RA affects 21 million people worldwide. The disease most often begins between the fourth and sixth decades of life. However, RA can start at any age (4)(1).

**Causes:**

The exact cause of rheumatoid arthritis is unknown. It occurs as an immune system attacks his or her own body tissues.

However, while a number of possible causative agents have been investigated, none has been convincingly demonstrated to cause RA(18).

Gender, heredity, and genes largely determine a person’s risk of developing rheumatoid arthritis.

**Gender:**

Gender appears to play a major role in a person’s susceptibility to rheumatoid arthritis. Women are about three times more likely than men to develop rheumatoid arthritis.

**Heredity:**

Rheumatoid arthritis is not an inherited disease. Genes do not cause rheumatoid arthritis; they merely affect the risk of its development.

**Specific genes:**

People with specific variants of human leukocyte antigen (HLA) genes are more likely to develop rheumatoid arthritis than people with other gene variants.

Initiating factors — Many individuals who carry HLA genes never develop the condition. Indeed, when one identical twin has rheumatoid arthritis, the chance that the other will develop disease is only about 1 in 3. This suggests that additional factors must be necessary for a person to develop RA.
Infection:

Researchers suspect that infection with bacteria or viruses may be one of the factors that initiate rheumatoid arthritis. However, at this time, there is no definite evidence linking infection to rheumatoid arthritis.

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Cigarette smoking:

Cigarette smoking may increase the risk of developing rheumatoid arthritis. There is also some evidence that cigarette smoking increases the likelihood that rheumatoid arthritis will be severe when it occurs.

Stress:

Patients often report episodes of stress or trauma preceding the onset of their rheumatoid arthritis. Stressful “life events” (eg, divorce, accidents, grief, etc.) are more common in people with RA in the six months before their diagnosis compared with the general population(6),(2),(5).

SYMPTOMS:

RA usually affects joints on both sides of the body equally. Wrists, fingers, knees, feet, and ankles are the most commonly affected. Inflammation at the joints, pain and loss of strength, movement limitation around joints of hands, feet, elbow, knees and neck, Feeling generally unwell and fatigue, Stiffness in the morning and after sitting still for a long time, Warmth around a joint(7)(12).

Hands: The joints of the hands are often the very first joints affected by rheumatoid arthritis. These joints are tender when squeezed, and the hand's grip strength is often reduced. Wrist: The wrist is the most commonly affected joint of the arm in people with rheumatoid arthritis. In the early stages of rheumatoid arthritis, it may become difficult to bend the wrist backward.

Elbow : Rheumatoid arthritis may cause inflammation of the elbow. Swelling of this joint may compress nerves that travel through the arm and may cause numbness or tingling in the fingers.

Shoulder: The shoulder may be inflamed in the later stages of rheumatoid arthritis, causing pain and limited motion.

Foot: The joints of the feet are often affected in the early stages of rheumatoid arthritis, especially the joints at the base of the toes.

Ankle: Rheumatoid arthritis may cause inflammation of the ankle.
Knee: Rheumatoid arthritis may cause swelling of the knee, difficulty bending the knee, excessive looseness of the ligaments that surround and support the knee, and damage of the ends of the bones that meet at the knee.

Hips: The hips may become inflamed in the later stages of rheumatoid arthritis. Pain in the hips may make it difficult to walk (6)(5).

*Pathophysiology:*

The pathogenesis of RA is not completely understood. An external trigger (eg, cigarette smoking, infection, or trauma) that triggers an autoimmune reaction, leading to synovial hypertrophy and chronic joint inflammation along with the potential for extra-articular manifestations, is theorized to occur in genetically susceptible individuals (10).

Synovial cell hyperplasia and endothelial cell activation are early events in the pathologic process that progresses to uncontrolled inflammation and consequent cartilage and bone destruction. Genetic factors and immune system abnormalities contribute to disease propagation. CD4 T cells, mononuclear phagocytes, fibroblasts, osteoclasts, and neutrophils play major cellular roles in the pathophysiology of RA, whereas B cells produce auto antibodies (ie, RFs)(10).

Ultimately, inflammation and exuberant proliferation of the synovium (ie, pannus) leads to destruction of various tissues, including cartilage (see the image below), bone, tendons, ligaments, and blood vessels.

*Complications:*

Learn more about RA complications and what you can do to prevent or treat them.

Heart Disease and Rheumatoid Arthritis:

Learn about the increased risk of heart attack with RA and what steps you can take to help your heart.

When Juvenile Rheumatoid Arthritis Affects the Eyes:

Learn what happens when JRA affects a child’s eyes and what to do to prevent serious problems.

Rheumatoid Arthritis Skin Problems:
Rheumatoid arthritis (RA) is primarily a disease of the joints. But the disease and many of the medications used to treat it can also affect the skin, causing problems as diverse as sun sensitivity, rash, and firm lumps of tissue called nodules (11).

**DIAGNOSIS:**

There is no test that can determine for sure whether you have RA. Most patients with RA will have some abnormal test results, although for some patients, all tests will be normal.

*Potentially useful laboratory studies in suspected RA include the following (11):*

- **Erythrocyte sedimentation rate:**
  
  An erythrocyte sedimentation rate (ESR or sed rate) measures how fast red blood cells (erythrocytes) fall to the bottom of a fine glass tube that is filled with the patient's blood. The higher the sed rate the greater the inflammation. However, the sed rate can be high in many conditions ranging from infection to inflammation to tumors. The test is used, then, not for diagnosis, but to help determine how active the condition is (11)(2).

- **Complete blood count:**
  
  Complete blood count (CBC) with differential and platelet count, tests of liver and kidney function, serum uric acid, and a urinalysis — The CBC is often abnormal in RA, with anemia and thrombocytosis consistent with chronic inflammation(2). Liver and kidney testing abnormalities indicate a disorder other than RA; if caused by comorbid conditions, they may affect therapeutic choices or drug dosing. Hyperuricemia may prompt additional efforts, including arthrocentesis and crystal search, to exclude gout; polyarticular gout can infrequently be mistaken for RA(11).

- **Antinuclear antibody (ANA) testing:**
  
  A negative ANA helps exclude SLE and other systemic rheumatic diseases; the ANA may be positive in up to one-third of patients with RA. In patients with a positive ANA, anti-double stranded DNA and anti-Smith antibody testing should also be performed; these antibodies have high specificity for SLE(11).

- **Rheumatoid factor assay:**
  
  Find out who should have a rheumatoid factor test and what it means if you have a positive result(2).
➢ Anti-cyclic citrullinated peptide and anti-mutated citrullinated vimentin assays (12).

Joint aspiration and analysis of synovial fluid may be considered, including the following:

- Gram stain
- Cell count
- Culture
- Assessment of overall appearance (10)(11).

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Treatment and management:

PATIENT EDUCATION

Patient-led self management education programmes are increasing in popularity but evidence for their effectiveness is limited (9). Programmes such as The Expert Patient endorsed by the Department of Health aim to instill core self management skills: problem solving, decision making, resource utilization, formation of a patient-professional partnership and taking action(13). Evaluation of these programmes should be undertaken in Scotland if they are to be made available more widely (9).

MULTIDISCIPLINARY TEAM

A shared care approach between primary and secondary care physicians and the multidisciplinary team facilitates optimal monitoring of the efficacy and toxicity of drug therapy and the prompt identification of the complications of RA and its treatments(9)(13).

EARLY TREATMENT

There is evidence that delays in initiating treatment with DMARDs are associated with more radiological damage and poorer functional status. All patients with suspected inflammatory joint disease should be referred to a specialist as soon as possible to confirm the diagnosis and evaluate disease activity(9).

Analgesics:

Analgesics in early RA should only be used as an adjunct to non-steroidal anti-inflammatory drugs (NSAIDs) and DMARD therapy(2). There is evidence that both paracetamol and codeine are effective in reducing pain in RA(9).

NON-STERoidal ANTI-INFLAMMATORY DRUGS:

NSAIDs provide some relief of pain and stiffness in RA (but do not influence radiographic progression) by inhibiting cyclo-oxygenase (COX). There are at least two COX
isoforms and non-selective NSAIDs inhibit both COX-1 and COX-2 in differing ratios. Selective COX-2 inhibitors or coxibs were designed to avoid gastro duodenal ulceration which arises due to inhibition of COX-1 by NSAIDS(9)(16).

**OCCUPATIONAL THERAPY:**

In everyday practice, the benefit of skilled occupational therapy (OT) intervention on quality of life for patients with RA is clear. Unfortunately, relatively few studies have been carried out and evidence from RCTs is absent (2).

There are treatments for RA in conventional medicine, but some people also try complementary and alternative medicine (19).

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**PHYSIOTHERAPY:**

The role of the physiotherapist in assessing and treating patients with RA is well established in clinical practice (2). Physiotherapy management has been shown to be effective in improving self efficacy, knowledge and morning stiffness (9).

**DIETETICS:**

Nutritional advice plays an important part in the management of a patient with RA. Enquiries about diet are amongst those most commonly received from patients (2)(9).

**Herbal Medicines:**

Since 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(3).

Unfortunately chemical identification of the anti-inflammatory components are usually given much more attention than therapeutic use of the herbs. This is because the plants are viewed as sources of potentially valuable drugs rather than having inherent value in themselves(17).

It is possible to use the herbs and plants in various forms in order to relieve the pain and inflammation in the joints, many medicinal plants that have shown anti rheumatoid arthritis properties(3).

The plants posses the anti-rheumatoid arthritis properties are:

**Aloe barbadensis:**

Biological Name: *Aloe barbadensis*  
Common Name: Curacao aloe, Lily of the desert  
Family: Liliaceae
Aloe vera has been one of the most important plants used in folk medicine. Anthraquinone, anthracene, cinnamic acid and anthranilic acid are found in the Aloe vera plants that are responsible for its activity. The anti arthritis property of aloe vera is due to the anthraquinone compound (3).

Ashwagandha:

Biological Name: *Withania somnifera* Linn.

Common Name: Winter cherry, withania root

Family: Solanaceae

The roots of this plant used as an aphrodisiac, liver tonic, anti-inflammatory agent, and more recently to treat asthma, ulcers, insomnia, and senile dementia. Clinical trials and animal research support the use of Ashwagandha for anxiety, neurological disorders, inflammation, and Parkinson's disease. Incorporation of Ashwagandha in the diet may prevent or decrease the growth of tumors in human. Oral administration of *Withenia somnifera* Linn., root powder showed the anti arthritic effect in adjuvant induced arthritic rats(3).

Abuta:

Biological Name: *Cissampelos pareira* Linn.

Common name: Velvet Leaf, Barbasco

Family: Menispermaceae

The ethanolic extract of the roots are useful for relieving diarrhoea, pain and arthritis (3).

Black pepper:

Biological Name: *Piper nigrum* Linn.

Common Name: Pepper

Family: Piperaceae

Pipper contains an alkaloid piperine, volatile oil, pungent resins, piperidine and starch. It is used as a aromatic, stimulant, stomachic and carminative. Piperine isolated from black pepper. Piperine administered orally at a dose of 20 and 100 mg/kg/day for eight days cause decrease in the arthritic symptoms in carrageenan-induced acute paw arthritis(3).

Ginger:

Biological Name: *Zingiber officinale*

Common Name: Ginger root

Family: Zingiberaceae
Ginger is consists of volatile oil, starch, fat, fibre, inorganic material, residual moisture. Ginger oil contains monoterpine, hydrocarbons, sesquiterpene hydrocarbons, oxygenated mono and sesquiterpines. Ginger is used as stomachic, an aromatic, a carminative, stimulant, flavouring agent. It is used to treat nausea, vomiting, diarrhea. It is also used as antioxidant, anti-inflammatory, antiseptic, anticarcinogenic, antifungal, anti-microbial. Main constituents are sesquiterpenoids, with (-) zingiberene. Sesquiterpene Lactones (SLs) are natural products responsible for its anti-inflammatory activity(3).

**Green tea :**

Biological Name: *Camellia sinensis* Linn.
Common Name: Green tea extract, Chinese tea
Family: Theaceae

The active constituents of Camellia sinensis Linn., are polyphenols (catechins and flavonols). Other constituents are caffeine and essential oils. The most important catechin in Green Tea is (-) epigallocatechin that is a potent antioxidant. The reduced collagen induced arthritis incidence and severity was reflected in a marked inhibition of the inflammatory mediators COX-2, IFNγ, and TNFα in arthritic joints of green tea-fed mice(3).

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**Schleichera oleosa (Lour.)**

Family :Sapindaceae

Local Names- Kusum Baru Pagada

Localities- Sikurihati Hathikot

A piece of garlic and ginger is soaked in seed oil (100 gms) of the plant for 7 days. This oil is used to massage on the body of patient suffering from rheumatism and gout till cure(15).

**Deodar cedar :**

Biological Name: *Cedrus deodara*
Common name: Marathi Deodar, Devadaru, Cedar
Family: Pinaceae

*Cedrus deodara* has been used for the treatment of inflammation and rheumatoid arthritis. *Cedrus deodara* effectively inhibited the polyarthritis phase as measured by the paw swellings on the injected limbs on complete adjuvant induced arthritis in rats(3).

**Indian sarsaparilla :**

Biological Name: *Hemidusmus indicus* Linn.

Common name: Anantamul, Pseudosarsa

Plant family: Asclepiadaceae.
It contains coumarin, essential oil, starch, tannic acid, triterpenoid saponin. It is used in the treatment of rheumatoid arthritis, nephritic complaints, chronic skin disease, chronic ulcer, blood purifier. On oral treatment for 8 days with ethanolic extract of Hemidusmus indicus Linn., reducing the paw volume & paw thickness more than Diclofenac sodium(3).

**Myrobalan:**

Biological Name: *Terminalia chebula* Retz.
Common Name: Haritaki
Family: Combretaceae

It contains phytochemical constituents such as tannic acid, chebulinic acid, gallic acid, resins, anthraquinone and sinnosides. It is used in chronic ulcer, leucorrhoea, fungal infections of skin. Hydro-alcoholic extract of *Terminalia chebula* Retz., shows the anti-arthritic activity in formaldehyde or complete Freund's adjuvant induced arthritis. The anti-arthritic activity of *Terminalia chebula* Retz., is due to its modulatory effect on pro-inflammatory cytokine expression in the synovium(3).

**Morinda tinctoria** Roxb:

Family : Rubiaceae

Local Names- Chayalee Chaily
Localities- Ramatirtha Sundivilla

Stem bark is pasted with water and applied locally on the paining part of the joints of domestic animals as well as human beings(15).

**Crotalaria prostrata** Rottler :

Family : Fabaceae

Local Name- Jhumka
Localities- Sundivilla Ramatirtha

Plants are pasted and applied externally on rheumatic pains for 30 days(15).

**Mango:**

Biological Name: *Mangifera indica* Linn.
Common name: Anbah, manga
Plant family: Anacardiaceae
The methanolic extract of *Mangifera indica* posses the anti inflammatory activity show in the arthritic parameter like arthritic index, paw edema and rheumatoid factor(3).

**Milkweed :**
Biological Name: *Calotropis Procera* Linn.
Common name: Giant Swallow Wort
Family: Asclepiadaceae

Roots of *Calotropis Procera* Linn., at doses of 180 mg/kg (methanol extract) and 200 mg/kg (other extracts), show anti-inflammatory activity(3).

**Tinospora gulancha :**
Biological Name: *Tinospora cordifolia* Linn.
Common name: Guduchi
Family: Menispermaceae

The bitter principle present shows antiperiodic, antispasmodic, anti-inflammatory and antipyretic properties. It is used in the treatment of rheumatoid arthritis(3).

**Aginbuti :**
Biological Name: *Ammania baccifera* Linn.
Common name: Acrid weed, Monarch red stem, Tooth cup,
Family: Lythraceae

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The aerial parts of *Ammania baccifera* Linn., posses’ significant anti-inflammatory and anti arthritic activity in rats(3).

**Black adusa :**
Biological Name: *Justicia gendarussa* Linn.
Common name: Gandarusa, Warer willow
Family: Acanthaceae

The ethanolic extract of *Justicia gendarussa* Linn., plant leaves showed significant anti-arthritic activity similar to that of aspirin against Freund’s adjuvant-induced and collagen-induced arthritic rat models(3).

**Conclusion:**

This review has been presented in a very interactive manner showing the detail study of the rheumatoid arthritis and its managements. Also From above review it is concluded that there are many plants that have anti rheumatoid arthritis properties.

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