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**Pharmaceutical Sciences** **Review Article……!!!**

# ANTI-ARTHRITIC ACTIVITY WITH MEDICINAL PLANTS

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**KEYWORDS:**

Arthritic activity, Medicinal plants, Traditional uses, Rheumatoid arthritis, Membrane stabilization.

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**ABSTRACT**

Rheumatoid arthritis (RA) is a disorder characterized by acute and chronic systemic inflammation that primarily involves the joints, but may also affect many tissues and organs, including blood vessels, heart, skin, lungs and muscles. RA initially presents with fatigue, musculoskeletal pain, and stiffness and only after week to months does it progress to involve joints. Generally the small joints are affected first, particularly the small bones of the hands. Later joints are affected, becoming swollen, warm, and painful. The use of medicinal plants play an important role in the development of potent therapeutic agents. The medicinal plants along with their chemical constituents and pharmacological profile which focus on the dose administered, bio active extract involved in anti-arthritic mechanism.

**INTRODUCTION:**

The plant provide foodstuff, attire, shelter and medicine. Most of the gerbil benefits seem to have been developed through observation of wild animals and by trial and error methods. As time goes on, people stared to find and to utilize more herbs having medicinal power. They systematically brought together information on herbs and developed to well-defined berbal pharmacopoeias i.e. traditional medicinal system. Traditional use of medicine is identified as a way to learn about potential future medicines. Because of wide niplogical and medicnal values, high safety margins and lesser cost of herbal medicine, it has great demand and used as source of basic health care in both developed and developing countreies WHO nores that around 200 pharmaceutical medicines are derived from the plant, in modern medicinal system around 74% of which are used in ways that can directly correlated to their ancient medicinal uses. Arthritis is one of the most common chronic inflammatory disorders, foremost cause of disability in world wide. There are more than 100 different types of arthritis and related conditions. Out of which rheumatoid arthirits and osteoarthirits are the major ones. Most of the diseases of joints affect synovial joints. Symptoms of one type arthritis are unlike other type. Some people may show mild but some are with strong symptoms. Some of the common symptoms are: Pain, Edema of Joints, Rigidity, Tenderness, Redness, Warmth, Loss of Fledibiltiy, Limping, Bone Spurs, Discimfort when Standing of Walking, Fatigue (feeling tired).

Arthritis is an anto immune disorder characterized by pain, swelling and stiffness. Its prevalence depends upon age. It is an inflammation of synovial joint due to immunomediated response. Rheumatoid arthritis has $19^{th}$ century roots and a $20^{th}$ century pedigree. Although its name was introduced in the 1850s. rheumatoid arthritis is characterized buy persistent synovitis, systemic inflammation and autoantibodies (particularly to rheumatoid factor and cirullinated peptide.)

Conventional treatmetns for RA, including Non-steroidal anti-inflammatory Drugs( NSAID's), disease modifying anti-rheumatioid drugs (DMARA's) and corticosteroids aim to reduce the patients pain and joint inflammation, minimize loss of function and decrease the progession of joint damage. However, such treatment are rarely totally effective and some pharmacological therapies have the potential to cause side effects. All anti inflammatory drugs are not anti-arthritic because it dose not suppress T-cell and B-cell mediated response. Rheumatoid arthritis is associated with poor nutritional status in relation to various nutrients due to not only necaise pf increased requirements and reduction in their absorption but also due ot NSAID's, DMARD's and corticosteroids prescribed to allevciate symptoms of this disease.

**EPIDEMIOLOGY:**

RA affects about 1% of the world's population[1]. No population is immune but a women are affected two to three times as often as men. The peak age of onset is between 30 and 55. Annually, the incidence of RA is 30 per 100,000 pepole. Due to the fact that waome are affected more than men, the precalence of RA in women over the age of 65 is around 5%[5]. Risk factors for the development of RA include smoking, obesity, concurrent infections, advancing age, female gender, and genetic ingeritance, while oral contraceptives and some dietary constituents may be protective.

**CAUSATIVE FACTORS:**

RA is a common disorder that has plagued for centuries. Many possible causative agents have beeb identified, yet the etiology of diseaseis still unknown. Women are affected by RA predominately more often than men and a possible reason includes the effects of estrogen on the immune system via a T-suppressor cell pathway.

It is believed that a genetic component to RA may exist. Supporting evidence includes an increased in individuals carrying an epitope in the third hypervariable region of the HLA-DRB chains. Although there is still uncertainty in the etiology of RA,HLA genotyping may help predict relative risk, disease severity, and response to therapy.

Serum rtheumatoid factor, an immunoglobulin with anti-LgG Fc specificity, is another genetic component that can be found in patients with RA. Rheumatoid factor is highly characteristic of RA, but is not specific, so clinicians do not rely solely on this finding for diagnosis. Twin studies have also shown that there is a hereditary component involved with RA as monozygotic twins have a higher incidence of RA than dizygotic twins. The relationship has held true for first degree relatives: they have a 1.5 increased risk of developing RA than individuals in the general population. Another significant correlation is the link between RA and other diseases belived to have an autoimmune pathogenesis. There is overlap between alleles of RA, lupus erythematosis, inflammatory bowel diseases, multiple sclerosis, and ankylosing spondylitis.

Environmental factors, such as smoking, have also been implicated in causation. Some studies have suggested that cigarette smoking enhances the development of RA. Cigarette smoling is also associated wieh more severe disease, where smokers with at least a 25 or more packyear history are more likely to be seropositive, have bodules, or have more radiographically apparen erosions.

Infection is yet another environmental factor and may offer further explanation as to the possible etiology of RA. One of the prime suspects for a microbial trigger to RA is the Epstein baar cirus

(EBV). In 1975 an anribody in the sera of RA patients was shown to react with an Epstein barr nuclear antigen. Since that further findings have linked RA and EBV, one of which is that EVB is a polyclonal activator of B lymphocytes, including those that express rheumatoid factor. Other agents that have been suggested in the development of RA include mycoplasma. Proteus mirabilis, parvovirus, and retrovirus. Further studies may elucidate the exact role these microorganisms play in the etiolity of RA.

**PATHOGENESIS:**

Although must about the etiology of RA seems uncertain, it is believed tha RA is initiaed by ab arthritogenic microbial antigen acting on an immunogenetically susceptible host. The origin of the arthritogenic antigen is currently unknown, yet it is still able to cause disease by activating an immune response. Once the host is attacked, the first event to occur is the activation of CD4+ helper T-cells which then release local inflammatory mediators and cytokines. Soon thereafter, endothelial cells of synocial capillaries are triggered, eith the expression of intercellular adhesion molecule-1 (ICAM-1). This in trun leads to the migration and attachment of other inflammatory cells ot the affected joint. While CD4+ cells are being activated, B cells are also triggered, which results in antibody production in the affecred joints. In 80% of patients with RA, autoantibodies to the Fc portion of autologous IgG, also knoen as rheumatoid factors are formed. However, these factors are not diagnostic for RA because they may bot be identified in some patients but found in other disease states. The circulating immune complexes are mostly localized within the inflamed cartilage activating complement and enhance the synovial inflammatory reaction. The synovium in RA organizes into invasive tissue, that if left untreated, can degrade cartilage and bone and eventually lead to the destruction of the joint.

**CLINICAL MANIFESTATIONS:**

The clinical picture of RA varies with a majority of patients presenting initially with a slow and insidious disease. The symptoms that predominate during this preliminary phase are musculoskeketal pain, stiffness, and swelling of many joints. Sites of early arthritis are typically localized in the metocarpoohalangeal and proximal interphalangeal joints of the fingers, interphalangeal joints of the thumbs, the wrists, and merocarpophalangeal joints of the toes. Other joints that also may be affected initially include joints of the upper and lower limber, such as the elbows, shoulders, ankles, and kness. Uncommonly the upper spine may be involved, but the lumbosacral region and hips are usually spared. As noted above, morning stiffness is typical. In about 10% of indiciduals with RA the onset of disease is acute and presents with severe

symptoms and polyarticular incolvement developing within a few days. But the typical clinical picture presents with progressive joint involvement over a period of months to years, with initial minimal limirtation of motion that in time becomes more severe. The course of RA may be fast ot slow and fluctuates over a period of years, with the majority of the damage incurring in the first 4 or 5 years following disease onset. One-fifth of patients have periods when their symptoms partially or completely resolve!

Radiographic hallmarks of RA are joint effusions and juxta-articular osteopenia with erosinons and narrowing of the joint space with the loss of articular cartilage. With continued destruction of ligaments, tendons, and joint capsules, characteristic deformities are produced on imaging which include, radial deveataion of the wrist, ulnar deviation of the fingers, and flexion-hyperxtension abnormalities of the fingers. However, with time, extensive destruction occurs and the severity of erosions may reach a level beyond which further progression of the RA cannot be assessed radiographically.

**DIAGNOSIS:**

Laboratory tests to diagnose RA definitively do not exist, but genetic tests are available to test for susceptibility. These factors do not guarantee that patients will develop the disease, but the chances for the possibility of occurrence are much greater than in the general population. The majority of individuals who have RA are positive for both HLA-DR beta and rheumatoid factor. These genetic factors are clearly major determinants for RA, however clinicians cannot erly solely on these factors for diagnosis. Synovial fluid in the inflamed joint can also be analyzed for leukocytosis of neutrophils or lymohocytes, low glucose and complement levels, and protein levels approaching those in plasma. This test is nonspecific for RA, yet it may be used as a means to confirm the presence of inflammatory arthritis. Clinical features aid in the confirmatory deagnosis.

**CURRENT AND NEW THERAPIES:**

Appropriate treatment early in the course of RA is essential to maintain joint function. The longer active disease persists, the less likely the patient is to respond to therapy. Evidence has shown that early treatment can control synovitis and may slow, or even stop, radiographic progression of disease. The goals of treatment include controlling signs and symptoms of RA, restoring physical function to joints, and preventing joint damage. If joint damage already exists then the goals are to ameliorate or halt progressive disease. However, despite all the current therapies available it may not be possible to achieve complete remission

**PHARMACOLOGIC THERAPY:**

Drug therapy is a mainstay in teatmebt options. The goals of pharmacologic therapy are to induce remission and prevent further loss of joint tissues or function in daily activities. Physicians can manage their patients by manipulating the order in which they administer drugs, adjusting dosages, and offering different combinations. There are five main drug classes that are currently used for treatment and they include analgesics, nonsteroidal anti-inflammatory drugs (NSAIDS), glucocorticoids, disease-modifying antirheumatic drugs (DMARDS), and anticytokine therapies.

Analgesics provide pain relief from mild to moderate arthritis. Included in this class are acetaminophen, tramadol, capsaicin, and narcotics. Due to the fact these drugs do not exhibit any anti-inflammatory properties, they are usually combined with NSAIDs, glucocorticoids, DMARDS, and anticytokine therapies.

Nonsteroidal anti-inflammatory drugs have both analgesic and anti-inflammatory properties but do not change disease outcomes. The drugs in this class iculde ibuprofen, aspirin, naproxen, and indomethacin. They inhibit COX-1 and COX-2, which block prostaglandin synthesis. NSAIDs are useful for treating the symptoms of RA, but are unable to prevent the development of progressive disease. Although NDSIDs are essential to the treatment of RA, they can cause severe GI distress and ulcers. On the other hand, selective COX-2 inhibitors are also just as useful in the treatment of RA, but have a lower severity of these sadverse GI side effects. These drugs include vvelecoxib and valdecoxib and are similar to the NSAIDs except that they do not have the same corrosive effects on the GI lining. However, when administering theses drugs, the patients' medical history must be assessed to ascertain that cardiovascular disease is not significant. COX-2 inhibitors are associated with reduced PG12 production by vascular endothelium with little or no inhibition of potentially thrombotic platelet thromboxane A2 production. This, in turn, predisposes to endotahelial injury, which can increase ischemic cardiovascular events. Since there is still uncertainty about the safety of COX-2 inhibitors, administration of these drugs should be decided on a case by case basis.

The most commonly used glucocoticoids are prednisone or prednisolone. Glucocorticoids may be administered orally, intravenously, or by intraarticular injection. The actions of these drugs on joint pain are much greater than NSAIDs and analgesics but they come with many side effects including adrenal suppression, ulcers, and osteoporosis. When deciding on whether or not initiate therapy with glucocorticoids, other medical conditions which may possibly uncrease the risk of glucocorticoid drug toxicity should be assessed. These conditions include established

hypertension or diabetes, preexisting cataracts or glaucoma, and significant risk factors for osteoporosis. Furthermore, the physician should explain potential side effects, the importance of limiting the duration and dosage of glucocorticoids, directed use, the difficulty in ceasing use of steroids, as well as the danger of long-term use and abrupt cessation. All patients receiving long-term glucocorticoid therpy should wear a medical alert bracelet. Finally, all patients should be counseled on smoking cessation and/or cholesterol reduction in order to curtail cardiovascular risk factors.

DMARDs are disease-modifying antirheumatic drugs that encompass a large group of drugs that reduce the progression of joint erosion. These drugs have slow onsets and no analgesic activity. DMARDs include gold compounds, penicillanmine, hydroxychloroquine, cyclophosphamide, and methotrexate. The actions of these drugs are probably related to reduction of phagocytosis and immune responses.

The last class of drugs available to treat RA is anticytokine therapies. The action of these drugs is still unknown, but it is thought that they act by dexreasing the inflammatory response in affected joints. Examples of these drugs include anti-tumor necrosis factor alpha agents, etanercept, infliximab, and adalimumab and the interleukin-1 receptor antagonist, ankinra. There are, however, case reports stating that the anti-TNF-alpha agents may induce leukosytoclastic vasculitis and even neurologic manifestations, with resolution after the drus are removed. These drugs are newer treatments and in the future additional biological therapies will probably become available.

All of these drug therapies are useful in the treatment of RA and when administered in combination have a greater ability for relief. When choosing a treatment regimen for a patient one should take into consideration the severity of the disease, possible adverse effects of treatment, convenience to the patient, and patient preferences.

**TABLE-1. TRADITIONALLY USED ANTI-ARTHRITIC PLANTS**

| S.NO | BOTANICAL NAME | FAMILY |
|---|---|---|
| 1. | ***Abrus precatorius Linn*** | ***Papilionaceae*** |
| 2. | ***Acica catechu willd*** | ***Fabaceae*** |
| 3. | ***Acalypha indica Linn*** | ***Euphorbiaceae*** |
| 4. | ***Acanthus illicifolius Linn*** | ***Acanthaceae*** |
| 5. | ***Achillea millefolium Linn*** | ***Composite*** |
| 6. | ***Achyranthus aspera Linn*** | ***Amaranthaceae*** |
| 7. | ***Acampe wightiana Lindl*** | ***Orchidaceae*** |
| 8. | ***Aconitum ferox Wall*** | ***Ranunlaceae*** |

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| **9.** | ***Aconitum napellus Linn*** | ***Ranunlaceae*** |
| **10.** | ***Aconitum palmatum Don*** | ***Ranunlaceae*** |
| **11.** | ***Acorus calamus Linn*** | ***Aroideae*** |
| **12.** | ***Actaea racemosa Linn*** | ***Ranunculaceae*** |
| **13.** | ***Actaea apicara Linn*** | ***Ranunculaceae*** |
| **14.** | ***Adansonia digitata Linn*** | ***Malcaceae*** |
| **15.** | ***Adenthera pavonina Linn*** | ***Lejuminosae*** |
| **16.** | ***Adaroda vasika Nees*** | ***Acanthaceae*** |
| **17.** | ***Aegel marmolosa Corr*** | ***Ruraceae*** |
| **18.** | ***Aesculus indica Colebr*** | ***Sapindaceae*** |
| **19.** | ***Agave ameridcana Linn*** | ***Amaryllidaceae*** |
| **20.** | ***Aghati gtandiflora Desv*** | ***Leguminosae*** |
| **21.** | ***Agropyron repens Beauv*** | ***Graminae*** |
| **22.** | ***Ailanthus excels Roxb*** | ***Simaroubaceae*** |
| **23.** | ***Alangium lamarckii thwaites*** | ***Cornaceae*** |
| **24.** | ***Allium cepa Linn*** | ***Liliaceae*** |
| **25.** | ***Allium sativum Linn*** | ***Liliaceae*** |
| **26.** | ***Alocasia indica Schott*** | ***Aroideae*** |
| **27.** | ***Alpinia galangal Willd*** | ***Scitaminaceae*** |
| **28.** | ***Alstonia scholaris R.Br*** | ***Apocynaceae*** |
| **29.** | ***Althaea rosea Cav*** | ***Malvaceae*** |
| **30.** | ***Ammannia baccifera Linn*** | ***Lythraceae*** |
| **31.** | ***Amorphophallus campanulatus Roxb*** | ***Aracea*** |
| **32.** | ***Anacylus pyrethrum DC*** | ***Compositae*** |
| **33.** | ***Andropogon citrates DC*** | ***Gramineae*** |
| **34.** | ***Androphogon iwarancusa Roxb*** | ***Gramineae*** |
| **35.** | ***Andropogon martini DC*** | ***Gramineae*** |
| **36.** | ***Andropogon nardus Linn*** | ***Gramineae*** |
| **37.** | ***Anemone obtusiloba Don*** | ***Ranunculaceae*** |
| **38.** | ***Anisomeles malabarica Linn*** | ***Labiatae*** |
| **39.** | ***Aphanamixis polystachya Blatter*** | ***Meliaceae*** |
| **40.** | ***Apium graveolens Linn*** | ***Umbellifeae*** |
| **41.** | ***Aquilaria agallocha Roxb*** | ***Thymelaeaceae*** |
| **42.** | ***Arctium lappa Linn*** | ***Compositae*** |
| **43.** | ***Argyreia speciosa Sweet*** | ***Convulvulaceae*** |
| **44.** | ***Aristolichia bracteata Linn*** | ***Aristolochiaceae*** |
| **45.** | ***Aristolichia serpentaria Linn*** | ***Aristolochiaceae*** |
| **46.** | ***Artanema sesamoides Benth*** | ***Scrophulaineae*** |
| **47.** | ***Artemisa absinthium Linn*** | ***Compositae*** |

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| **48.** | ***Asparagus filicinus Ham*** | ***Liliaceae*** |
| **49.** | ***Asparagus officinalis Linn*** | ***Liliaceae*** |
| **50.** | ***Asparagus racemosus Willd*** | ***Liliaceae*** |
| **51.** | ***Asystasia coromandeliana Nees*** | ***Acanthaceae*** |
| **52.** | ***Asystacia gangertca T. Anders*** | ***Acanthaceae*** |
| **53.** | ***Atalantia monophylla DC*** | ***Rutaceae*** |
| **54.** | ***Atropa belladonna Linn*** | ***Solanaceae*** |
| **55.** | ***Atyosia barbata Baker*** | ***Leguminosae*** |
| **56.** | ***Azadirachta indica A. Juss*** | ***Meliaceae*** |
| **57.** | ***Azima tetracentha Lam*** | ***Salvadroraceae*** |
| **58.** | ***Bacopa monnieri Penell*** | ***Plantaginaceae*** |
| **59.** | ***Balsamodendron mukul Hook*** | ***Burseraceae*** |
| **60.** | ***Balsamodendron playfairii Hook*** | ***Burseraceae*** |
| **61.** | ***Barleria courtallica Nees*** | ***Acanthaceae*** |
| **62.** | ***Barleria cristata Linn*** | ***Acanthaceae*** |
| **63.** | ***Baliospermum montanum Muell*** | ***Euphorbiaceae*** |
| **64.** | ***Bassia butyracea Roxb*** | ***Sapotaceae*** |
| **65.** | ***Bassia latifolia Roxb*** | ***Sapotaceae*** |
| **66.** | ***Bassia longifolia Linn*** | ***Sapotaceae*** |
| **67.** | ***Bassia malabarica Bedd*** | ***Sapotaceae*** |
| **68.** | ***Barosma crenulata Hook*** | ***Rutaceae*** |
| **69.** | ***Bauhinia tomentosa Linn*** | ***Fabaceae*** |
| **70.** | ***Bauhinia tomentosa Linn*** | ***Fabaceae*** |
| **71.** | ***Berberis asiatica Roxb*** | ***Berberidaceae*** |
| **72.** | ***Berberis petiolaris Wall*** | ***Berberidaceae*** |
| **73.** | ***Berberis vulgaris Linn*** | ***Berberidaceae*** |
| **74.** | ***Bidens pilosa Linn*** | ***Compositae*** |
| **75.** | ***Blumea balsamifera DC*** | ***Compositae*** |
| **76.** | ***Blumea ripens DC*** | ***Asteraceae*** |
| **77.** | ***Bula alba Linn*** | ***Cupliferae*** |
| **78.** | ***Boerhaavia diffusa Linn*** | ***Nyctagineae*** |
| **79.** | ***Boucerosia aucheriana Dcne*** | ***Asclepiadaceae*** |
| **80.** | ***Borassus flabellifer Linn*** | ***Arecaceae*** |
| **81.** | ***Boswellia glabra Roxb*** | ***Burseraceae*** |
| **82.** | ***Boswellia serrata Triana*** | ***Burseraceae*** |
| **83.** | ***Brassica campestris Linn*** | ***Cruciferae*** |
| **84.** | ***Brassica integrifolia West*** | ***Cruciferae*** |
| **85.** | ***Brassica juncea Coss*** | ***Cruciferae*** |
| **86.** | ***Brassica nepus Linn*** | ***Cruciferae*** |

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| **87.** | ***Brassica nigra Linn & Koch*** | ***Cruciferae*** |
| **88.** | ***Brassica oleracea Linn*** | ***Cruciferae*** |
| **89.** | ***Bridelia retusa Spreng*** | ***Euphorbiaceae*** |
| **90.** | ***Bryonia epigoea Rottl*** | ***Cucurbitaceae*** |
| **91.** | ***Buxus sempervirens Linn*** | ***Euphorbiaceae*** |
| **92.** | ***Caccinia glauce Savi*** | ***Borageneae*** |
| **93.** | ***Cadaba indica Lamk*** | ***Capparidaceae*** |
| **94.** | ***Caesalpinia bonduc Roxb*** | ***Caesalpiniaceae*** |
| **95.** | ***Callicarpa macrophylla Vahl*** | ***Verbenaceae*** |
| **96.** | ***Calophyllum apelatum Wild*** | ***Guttiferae*** |
| **97.** | ***Calophyllum inophyllum Linn*** | ***Guttiferae*** |
| **98.** | ***Calotropis gigantean R. Br*** | ***Asclepiadaceae*** |
| **99.** | ***Calotropis procera R. Br*** | ***Asclepiadaceae*** |
| **100.** | ***Cammphora officinarum Bauh*** | ***Lauraceae*** |
| **101.** | ***Canangium odoratum Baill*** | ***Annonaceae*** |
| **102.** | ***Canarium bengalense Roxb*** | ***Burseraceae*** |
| **103.** | ***Canarium commune Linn*** | ***Burseraceae*** |
| **104.** | ***Canarium strictum Roxb*** | ***Burseraceae*** |
| **105.** | ***Cannabis sativa Linn*** | ***Urticaceae*** |
| **106.** | ***Canella alba Murry*** | ***Canellaceae*** |
| **107.** | ***Capparis aphylla Roth*** | ***Capparideae*** |
| **108.** | ***Capparis deciduas Edgew*** | ***Capparideae*** |
| **109.** | ***Capparis heyneane Wall*** | ***Capparideae*** |
| **110.** | ***Capparis spinosa Linn*** | ***Capparideae*** |
| **111.** | ***Capsicum annum Linn*** | ***Solanaceae*** |
| **112.** | ***Cardiospermum halicacabum Linn*** | ***Sapindaceae*** |
| **113.** | ***Carissa carandas Linn*** | ***Apocynaceae*** |
| **114.** | ***Carissa spinarum Linn*** | ***Apocynaceae*** |
| **115.** | ***Carthamus tinctorius Linn*** | ***Compositae*** |
| **116.** | ***Cassia fistula Linn*** | ***Caesalpiniceae*** |
| **117.** | ***Cassia sophera Linn*** | ***Caesalpiniceae*** |
| **118.** | ***Cassia tora Linn*** | ***Fabaceae*** |
| **119.** | ***Cadreia toona Roxb*** | ***Meliaceae*** |
| **120.** | ***Cedrus deodaara Lou Don*** | ***Coniderae*** |
| **121.** | ***Cedrus libani Barrel*** | ***Coniderae*** |
| **122.** | ***Celastrus paniculata Willd*** | ***Calastraceae*** |
| **123.** | ***Celosia argentia Linn*** | ***Amaranthaceae*** |
| **124.** | ***Centella asiatica Urban*** | ***Mackinlayaceae*** |
| **125.** | ***Cephaelis ipecacuanha A. Rich*** | ***Rubiaceae*** |

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| **126.** | ***Chenopodium album Linn*** | ***Chenopodiaceae*** |
| **127.** | ***Chloroxylon swietenia DC*** | ***Meliaceae*** |
| **128.** | ***Cicuta virosa Linn*** | ***Apiaceae*** |
| **129.** | ***Cimicifuga racemosa Ellicot*** | ***Ranunculaceae*** |
| **130.** | ***Cinchona calisaya Hook*** | ***Rubiaceae*** |
| **131.** | ***Cinnamomum camphora Nees*** | ***Lauraceae*** |
| **132.** | ***Cinnamomum cassia Blume*** | ***Lauraceae*** |
| **133.** | ***Cinnamomum tamala Fr. Nees*** | ***Lauraceae*** |
| **134.** | ***Cinnamomum macrocarpum Hook*** | ***Lauraceae*** |
| **135.** | ***Cinnamomum parhenoxylon DC*** | ***Lauraceae*** |
| **136.** | ***Cissus quadrangularis Linn*** | ***Vitaceae*** |
| **137.** | ***Cistus creticus Linn*** | ***Cistaceae*** |
| **138.** | ***Citrullus colocynthis Schrad*** | ***Cucurbitaceae*** |
| **139.** | ***Citrus aurantium Linn*** | ***Rutaceae*** |
| **140.** | ***Citrus bergamia Ris*** | ***Rutaceae*** |
| **141.** | ***Citrus limonum Sp. Risso*** | ***Rutaceae*** |
| **142.** | ***Cleome brachycarpa Linn*** | ***Capparidaceae*** |
| **143.** | ***Cleome gynandra Linn*** | ***Capparaceae*** |
| **144.** | ***Cleome rutidosperma DC*** | ***Cleomaceae*** |
| **145.** | ***Clerodendron colebrookianum Walp*** | ***Lamiaceae*** |
| **146.** | ***Clerodendron inerme Gaertn*** | ***Verbenaceae*** |
| **147.** | ***Clerodendron phlomides L.F*** | ***Verbenaceae*** |
| **148.** | ***Clerodendron serratum Spreng*** | ***Verbenaceae*** |
| **149.** | ***Clerodendron siphonanthus R.Br*** | ***Verbenaceae*** |
| **150.** | ***Clitoria ternatea Linn*** | ***Verbenaceae*** |
| **151.** | ***Cocculus cordifolius Miers*** | ***Menispermaceae*** |
| **152.** | ***Cocculus hirsutus Diels*** | ***Menispermaceae*** |
| **153.** | ***Cocculus villousus DC*** | ***Menispermaceae*** |
| **154.** | ***Cochlearia armoracia Linn*** | ***Cruciferae*** |
| **155.** | ***Colchicum autumnale Linn*** | ***Melanthaceae*** |
| **156.** | ***Colchicum luteum Basker*** | ***Liliaceae*** |
| **157.** | ***Coldenia procumbens Linn*** | ***Boragineae*** |
| **158.** | ***Coptis teeta Wall*** | ***Ranunculaceae*** |
| **159.** | ***Corallocarpus epigeous Rottl & Willd*** | ***Cucurbitaceae*** |
| **160.** | ***Coriandrum sativum Linn*** | ***Umbelliferae*** |
| **161.** | ***Costus speciosus Sm*** | ***Scitaminaceae*** |
| **162.** | ***Cotula anthemoides Linn*** | ***Compositae*** |
| **163.** | ***Crataeva nurvala Linn*** | ***Capparidaceae*** |
| **164.** | ***Crataeva religosa Hook & Forst*** | ***Capparidaceae*** |

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| **165.** | ***Crinum asiaticum Linn*** | ***Amaryllidaceae*** |
| **166.** | ***Crinum latifolium Linn*** | ***Amaryllidaceae*** |
| **167.** | ***Crocus sativus Linn*** | ***Irideae*** |
| **168.** | ***Crotalaria prostrate Rottler*** | ***Fabaceae*** |
| **169.** | ***Croton oblongifolus Rox*** | ***Euphorbiaceae*** |
| **170.** | ***Croton tiglium Linn*** | ***Euphorbiaceae*** |
| **171.** | ***Curcuma longa Linn*** | ***Scitaminaceae*** |
| **172.** | ***Cymbopogon citrates Stapl*** | ***Graminae*** |
| **173.** | ***Cymbopogon jwarancusa Schult*** | ***Graminae*** |
| **174.** | ***Cymbopogon schoenanthus Spreng*** | ***Graminae*** |
| **175.** | ***Cynodon dactylon Pers*** | ***Graminae*** |
| **176.** | ***Daemia extensa R. Br*** | ***Asclepiadeae*** |
| **177.** | ***Dalbergia lanceolaria Linn*** | ***Fabaceae*** |
| **178.** | ***Daphne mezereum Linn*** | ***Thymelaceae*** |
| **179.** | ***Datisca cannabina Linn*** | ***Datiscaceae*** |
| **180.** | ***Datura alba Nees*** | ***Solanaceae*** |
| **181.** | ***Datura metel Linn*** | ***Solanaceae*** |
| **182.** | ***Datura stramnium Linn*** | ***Solanaceae*** |
| **183.** | ***Delonix elata Gamble*** | ***Fabaceae*** |
| **184.** | ***Delphinium consolida Linn*** | ***Ranunculaceae*** |
| **185.** | ***Delphinium consolida Linn*** | ***Ranunculaceae*** |
| **186.** | ***Delphinium staphisagri Linn*** | ***Ranunculaceae*** |
| **187.** | ***Derris uliginosa Benth*** | ***Papilionaceae*** |
| **188.** | ***Dichrostachys cinera W. &A*** | ***Fabaceae*** |
| **189.** | ***Diospyros candollena Wight*** | ***Ebasnaceae*** |
| **190.** | ***Diospyros paniculata Dalz*** | ***Ebanaceae*** |
| **191.** | ***Dipterocarpus alatus Roxb*** | ***Dipterocarpaceae*** |
| **192.** | ***Dipterocarpus indicus Bedd*** | ***Dipterocarpaceae*** |
| **193.** | ***Dononaea viscose Linn*** | ***Sapimdaceae*** |
| **194.** | ***Dolichos falcatus Klein*** | ***Papilionaceae*** |
| **195.** | ***Dysoxylum malabaricum Bedd*** | ***Meliaceae*** |
| **196.** | ***Eclipta prostrate Linn*** | ***Asteraceae*** |
| **197.** | ***Elaecarpus obolongus Gaertn*** | ***Tiliaceae*** |
| **198.** | ***Elaeocarpus serratus Linn*** | ***Tiliaceae*** |
| **199.** | ***Elaeis guinessnsis Jacq*** | ***Palmae*** |
| **200.** | ***Elaeocarpus tuberaculatus Roxb*** | ***Tiliaceae*** |
| **201.** | ***Elephantopus scaber Linn*** | ***Asteraceae*** |
| **202.** | ***Emblica officinalis Gaertn*** | ***Euphorbiaceae*** |
| **203.** | ***Ephedra gerardiana Wall*** | ***Gnetaceae*** |

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| **204.** | ***Ephedra vulgaris Rich*** | ***Ephedraceae*** |
| **205.** | ***Erythrina stricta Roxb*** | ***Papilionaceae*** |
| **206.** | ***Eucalyptus globlus Labill*** | ***Myrtaceae*** |
| **207.** | ***Eugenia operculata Roxb*** | ***Myrtaceae*** |
| **208.** | ***Eupatorium perfoliatum Linn*** | ***Asteraceae*** |
| **209.** | ***Euphorbia antiquorum Linn*** | ***Euphorbiaceae*** |
| **210.** | ***Euphorbia helioscopia Linn*** | ***Euphorbiaceae*** |
| **211.** | ***Euphorbia beriifolia Linn*** | ***Euphorbiaceae*** |
| **212.** | ***Euphorbia nuculia Ham*** | ***Euphorbiaceae*** |
| **213.** | ***Euphorbia tirucalli Linn*** | ***Euphorbiaceae*** |
| **214.** | ***Euryale ferox Salisb&Roxb*** | ***Fabaceae*** |
| **215.** | ***Erythrina stricta Roxb*** | ***Fabaceae*** |
| **216.** | ***Excoecaria acerifolia Didrichs*** | ***Euphorbiaceae*** |
| **217.** | ***Fagopyrum eacuentum moench*** | ***Polygonaceae*** |
| **218.** | ***Farsetia aegyptiaca Turr*** | ***Cruciferae*** |
| **219.** | ***Farsetia hamiltonii Royle*** | ***Cruciferae*** |
| **220.** | ***Farseaia jacquemontii Hk.F. & T*** | ***Cruciferae*** |
| **221.** | ***Feaula asafetida Linn*** | ***Umbelliferae*** |
| **222.** | ***Ferula galbanifulua Bioss*** | ***Umbelliferae*** |
| **223.** | ***Ferula narthex Boiss*** | ***Umbelliferae*** |
| **224.** | ***Ficus bengalensis Linn*** | ***Urticaceae*** |
| **225.** | ***Ficus religosa Linn*** | ***Urticaceae*** |
| **226.** | ***Ficus retusa Linn*** | ***Urticaceae*** |
| **227.** | ***Flacourtia sepiara Roxb*** | ***Cyperzceae*** |
| **228.** | ***Fraxinus exvelsior Linn*** | ***Oleaceae*** |
| **229.** | ***Garcinia pictorial Roxb*** | ***Guttiferae*** |
| **230.** | ***Gaultheria fragrantissima Wall*** | ***Eriaceae*** |
| **231.** | ***Gelsemium nitidum Michaux*** | ***Loganiaceae*** |
| **232.** | ***Gendarussa vulgaris Nees*** | ***Acanthaceae*** |
| **233.** | ***Gentian lutea Linn*** | ***Gentianaceae*** |
| **234.** | ***Geodorum densiflorum Lam*** | ***Orchidaceae*** |
| **235.** | ***Geranium maculatum Linn*** | ***Geraniaceae*** |
| **236.** | ***Gmelina asiatica Linn*** | ***Verbenaceae*** |
| **237.** | ***Gossypium arboretum Linn*** | ***Malvaceae*** |
| **238.** | ***Gossypium barbadense Linn*** | ***Malvaceae*** |
| **239.** | ***Gossypium haceum Linn*** | ***Malvaceae*** |
| **240.** | ***Gosstpium indicam Linn*** | ***Malcaceae*** |
| **241.** | ***Grangia maderaspatana Poir*** | ***Compositae*** |
| **242.** | ***Grewia asiatica Linn*** | ***Tiliaceae*** |

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| **243.** | ***Grewia tenax Fiori*** | ***Tiliaceae*** |
| **244.** | ***Guaiacum offcinale Linn*** | ***Zygophyllaceae*** |
| **245.** | ***Guizjia abyysynica Cass*** | ***Compositae*** |
| **246.** | ***Gynandropsis gyuandra Marill*** | ***Capparidaceae*** |
| **247.** | ***Gynocardia odorata R.Br*** | ***Flacourtiaceae*** |
| **248.** | ***Hedeoma pulegioides Persoon*** | ***Labiatae*** |
| **249.** | ***Heliotropium indicum Linn*** | ***Boraginaceae*** |
| **250.** | ***Hemidesmus indicus R.Br*** | ***Asclepiadaxeae*** |
| **251.** | ***Herpestis monniera H.B.K*** | ***Scrophulaarineae*** |
| **252.** | ***Hibiscus tillaceus Linn*** | ***Malvaceae*** |
| **253.** | ***Hiptage benghalensis Linn*** | ***Malpighiaceae*** |
| **254.** | ***Hptage madabiota Gaertn*** | ***Malpighiaceae*** |
| **255.** | ***Holarrhena antidysenterica Wall*** | ***Apocynaceae*** |
| **256.** | ***Hedera helix Linn*** | ***Araliaceae*** |
| **257.** | ***Holoptelea integrifolia Planch*** | ***Urticaceae*** |
| **258.** | ***Humulus luppulus Linn*** | ***Cannanineae*** |
| **259.** | ***Hydnocapus wightiana Blume*** | ***Flacourtiaceae*** |
| **260.** | ***Hydrocotyle asiatica Linn*** | ***Umbelliferae*** |
| **262.** | ***Hyssopus officinalis Linn*** | ***Labiatae*** |
| **263.** | ***Illicium verum Hook*** | ***Magnoliaceae*** |
| **264.** | ***Indigofera oblongifolia Forsk*** | ***Papilionaceae*** |
| **265.** | ***Indigofera paucifolia Delile*** | ***Papilionaceae*** |
| **266.** | ***Indigofera trifoliate Linn*** | ***Papilionaceae*** |
| **267.** | ***Inula helenium Hook*** | ***Compositae*** |
| **268.** | ***Ipomoea eriocarpa Br*** | ***Convolvulaceae*** |
| **269.** | ***Ipomoea hispida Roem & Schult*** | ***Convolvulaceae*** |
| **270.** | ***Ipomoea pescaprae Purga*** | ***Convolvulaceae*** |
| **271.** | ***Ipomoea reniformos chois*** | ***Convolvulaceae*** |
| **272.** | ***Ipomoea turpethum Br*** | ***Convolvulaceae*** |
| **273.** | ***Jasmiunm grandiflorum Linn*** | ***Oleaceae*** |
| **274.** | ***Jatropha curcas Linn*** | ***Euphorbiaceae*** |
| **275.** | ***Jatropha glandulifera Roxb*** | ***Euphorbiaceae*** |
| **276.** | ***Juglans regia Linn*** | ***Juglandaceae*** |
| **277.** | ***Juneperus communis Linn*** | ***Coniferae*** |
| **278.** | ***Justica ecnolium Linn*** | ***Acanthaceae*** |
| **279.** | ***Justica gendaruusa Burm*** | ***Acanthaceae*** |
| **280.** | ***Justica procumbens Linn*** | ***Acanthaceae*** |
| **281.** | ***Koelpinia linearis Pallas*** | ***Asteraceae*** |
| **282.** | ***Lantana aculeate Linn*** | ***Verbenaceae*** |

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| **283.** | ***Launaea pinnatifida Cass*** | ***Compositae*** |
| **284.** | ***Lavandula stoechas Linn*** | ***Labiatae*** |
| **285.** | ***Lawsonia alba Linn*** | ***Lythraceae*** |
| **286.** | ***Leea indicum Merr*** | ***Vitaceae*** |
| **287.** | ***Leonotis nepetaefolia R.Br*** | ***Labiatae*** |
| **288.** | ***Leucas aspera Spreng*** | ***Labiatae*** |
| **289.** | ***Lipidium crassifolium Hung*** | ***Cruciferae*** |
| **290.** | ***Lipidium sativum Linn*** | ***Cruciferae*** |
| **291.** | ***Leucas linifolia Spreng*** | ***Labiatae*** |
| **292.** | ***Lium usitatisssimum Linn*** | ***Linaceae*** |
| **293.** | ***Litsea chinensis Lam*** | ***Lauraceae*** |
| **294.** | ***Litsea sebifera Pers*** | ***Lauraceae*** |
| **295.** | ***Lolium temulentum Linn*** | ***Graminae*** |
| **296.** | ***Lycopodium clavatum Linn*** | ***Lycopodiaceaae*** |
| **297.** | ***Lygodium flexuosum Linn*** | ***Polypodiaceae*** |
| **298.** | ***Machilis macrantha Ness*** | ***Lauraceae*** |
| **299.** | ***Marrubium vulgare Linn*** | ***Labiatae*** |
| **300.** | ***Matricaria chamomillla Linn*** | ***Compositae*** |
| **301.** | ***Melaleuca leucadendron Linn*** | ***Myrtaceae*** |
| **302.** | ***Melaleua minor Smith*** | ***Myrtaceae*** |
| **303.** | ***Melia azadirachra Linn*** | ***Meliaceae*** |
| **304.** | ***Melia azedaracha Linn*** | ***Meliaceae*** |
| **305.** | ***Menthe piperita Linn*** | ***Labiatea*** |
| **306.** | ***Menyanthes trifoliate Linn*** | ***Gentianaceae*** |
| **307.** | ***Merremia tridentate Hallier*** | ***Convulvulaceae*** |
| **308.** | ***Mwsua ferrea Linn*** | ***Guttiferae*** |
| **309.** | ***Michella champaca Linn*** | ***Magnoliaceae*** |
| **310.** | ***Mimosa pudica Linn*** | ***Fabaceae*** |
| **311.** | ***Mollugo cerviana Ser*** | ***Ficoidaceae*** |
| **312.** | ***Momordica chirantia Linn*** | ***Cucurbitaceae*** |
| **313.** | ***Momordica cochinchinensis Spreng*** | ***Cucurnitaceae*** |
| **314.** | ***Moniera cuneifolia Michx*** | ***Scrophulariaceae*** |
| **315.** | ***Monarda punctuate Linn*** | ***Labiatae*** |
| **316.** | ***Morinda cirtifolia Linn*** | ***Rubiaceae*** |
| **317.** | ***Mringa oleifera Lam*** | ***Moringaceae*** |
| **318.** | ***Mucuna gigantean DC*** | ***Papilionaceae*** |
| **319.** | ***Mukia maderaspatana Linn*** | ***Cucurbitaceae*** |
| **320.** | ***Murraya exotica Linn*** | ***Rutaceae*** |
| **321.** | ***Murray koenigii Linn*** | ***Rutaceae*** |

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| **322.** | ***Myristica fragrans Houtt*** | ***Myristaceae*** |
| **323.** | ***Myrisica malabarica Lamk*** | ***Myristaceae*** |
| **324.** | ***Myropyrum similacifolium Blume*** | ***Oleaceae*** |
| **325.** | ***Myrtus caryophyllus Linn*** | ***Myrtaceae*** |
| **326.** | ***Myrtus communis Linn*** | ***Myrtaceae*** |
| **327.** | ***Naregamia alata W.&A*** | ***Meliaceae*** |
| **328.** | ***Nicotiana tabacum Linn*** | ***Solanaceae*** |
| **329.** | ***Nychanthis arbor-tristis Linn*** | ***Oleaceae*** |
| **330.** | ***Ocimum gratissimum Linn*** | ***Labiatae*** |
| **331.** | ***Ocimum sanctum Linn*** | ***Lam.iaceae*** |
| **332.** | ***Odina wodier Roxb*** | ***Anacardiaceae*** |
| **333.** | ***Oldenlandia heynei Hk*** | ***Rubiaceae*** |
| **334.** | ***Okea cuspidare Wall*** | ***Oleaceae*** |
| **335.** | ***Onosoma bracteatum Wall*** | ***Boraginaceae*** |
| **336.** | ***Onosoma echoides Linn*** | ***Boraginaceae*** |
| **337.** | ***Origanum majorana Linn*** | ***Labiatea*** |
| **338.** | ***Origanum vulgare Linn*** | ***Labiatea*** |
| **339.** | ***Oroxylum indicum Vent*** | ***Bignoniaceae*** |
| **340.** | ***Osmunda regalis Linn*** | ***Osmundaceae*** |
| **341.** | ***Paederia feotida Linn*** | ***Rubiaceae*** |
| **342.** | ***Pandanus odoratissimus WIilld*** | ***Pandanaceae*** |
| **343.** | ***Pandanus tectorius Soland*** | ***Pandanaceae*** |
| **344.** | ***Panicum italicum Linn*** | ***Gramineae*** |
| **345.** | ***Papaver dubium Linn*** | ***Papaveraceae*** |
| **346.** | ***Papaver somniferum Linn*** | ***Papaveraceae*** |
| **347.** | ***Pavetta indica Linn*** | ***Rubiaceae*** |
| **348.** | ***Pavonia odorata Willd*** | ***Malvaceae*** |
| **349.** | ***Pedalium murex Linn*** | ***Pedaliaceae*** |
| **350.** | ***Peganum harmala Linn*** | ***Rutaceae*** |
| **351.** | ***Peucedanum graveolens Benth*** | ***Umbelliferae*** |
| **352.** | ***Pergularis daemia Linn*** | ***Apocynaceae*** |
| **353.** | ***Pergularis extensa N.E*** | ***Asclepiadaceae*** |
| **354.** | ***Phaseolus Roxb. Urghii Linn*** | ***Papilionaceae*** |
| **355.** | ***Physalis alkekenji Linn*** | ***Solanaceae*** |
| **356.** | ***Pinus australis Michaux*** | ***Coniferae*** |
| **357.** | ***Pinus balsamea Linn*** | ***Coniferae*** |
| **358.** | ***Pinus gerardiana Wall*** | ***Coniferae*** |
| **359.** | ***Pinus picea Du Roi*** | ***Coniferae*** |
| **360.** | ***Piper longum Linn*** | ***Piperaceae*** |

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| **361.** | ***Pisonia aculeate Linn*** | ***Nictaaginaceae*** |
| **362.** | ***Pittosporum floribyndum W.& A*** | ***Pittosporaceae*** |
| **363.** | ***Pittosporum napaulense Rehdre*** | ***Pittosporaceae*** |
| **364.** | ***Plantago ispagula Forsk*** | ***Plantaginaceae*** |
| **365.** | ***Plantago major Linn*** | ***Plantaginaceae*** |
| **366.** | ***Plantago ovate Forsk*** | ***Plantaginaceae*** |
| **367.** | ***Plumbago rosea Linn*** | ***Lumbaginaceae*** |
| **368.** | ***Plumbago zeylanica Linn*** | ***Plumbaginaceae*** |
| **369.** | ***Plumieria acuminate Poir*** | ***Apocynaceae*** |
| **370.** | ***Plumieria acutifolia Poir*** | ***Apocynaceae*** |
| **371.** | ***Podphyllum peltatum Linn*** | ***Berberidae*** |
| **372.** | ***Poinciana elata Linn*** | ***Papilionaceae*** |
| **373.** | ***Pongamia glabra Vent*** | ***Papilionaceae*** |
| **374.** | ***Polygala snega Linn*** | ***Polyganaceae*** |
| **375.** | ***Portulaca oleracea Linn*** | ***Portulacaceae*** |
| **376.** | ***Premna Hacea Roxb*** | ***Verbenaceae*** |
| **377.** | ***Premna integrifolia Linn*** | ***Verbenaceae*** |
| **378.** | ***Prinsepia utilis Royle*** | ***Rosaceae*** |
| **379.** | ***Prosopis spicigera Linn*** | ***Fabaceae*** |
| **380.** | ***Prunus persica sstokes bot*** | ***Rosaceae*** |
| **381.** | ***Prunus triflora Roxb*** | ***Rosaceae*** |
| **382.** | ***Pseudarthria viscid W. &A*** | ***Papilionaceae*** |
| **383.** | ***Psidium guyava Linn*** | ***Myrtaceae*** |
| **384.** | ***Psoralea corylifolia Linn*** | ***Papilionaceae*** |
| **385.** | ***Ptychotis ajowan DC*** | ***Umbelliferae*** |
| **386.** | ***Pyrethrum indicum DC*** | ***Fabaceae*** |
| **387.** | ***Pyrethrum indicym DC*** | ***Compositae*** |
| **388.** | ***Pyrus malus Linn*** | ***Rosaceae*** |
| **389.** | ***Randia dumetorum Lamk*** | ***Rubiaceae*** |
| **390.** | ***Ranunculus avensis Linn*** | ***Ranunculaceae*** |
| **391.** | ***Ranunculus muricatus Linn*** | ***Ranunculaceae*** |
| **392.** | ***Ranunculus trichophyllus Linn*** | ***Ranunculaceae*** |
| **393.** | ***Rhamnus catharticus Linn*** | ***Rhamnaceae*** |
| **394.** | ***Rhazya stricta Dcne*** | ***Apocynaceae*** |
| **395.** | ***Rhodendron campanulatum D.Don*** | ***Eriaceae*** |
| **396.** | ***Rhodendron javanicum Benn*** | ***Eriaceae*** |
| **397.** | ***Ribes nigrum Linn*** | ***Saxifragaceae*** |
| **398.** | ***Richinus Communis Linn*** | ***Ephorbiaceae*** |
| **399.** | ***Ruta graveolens Linn*** | ***Ruraceae*** |

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| **400.** | ***Rubia cordifolia Linn*** | ***Rubiaceae*** |
| **401.** | ***Rourea santaloides W. & A*** | ***Conoraceae*** |
| **402.** | ***Rosa alba Linn*** | ***Rosaceae*** |
| **403.** | ***Saccolabium appllosum Lindi*** | ***Orchidaceae*** |
| **404.** | ***Salacia oblonga Wall*** | ***Celastraceae*** |
| **405.** | ***Salacia reticulate Wight*** | ***Celastraceae*** |
| **406.** | ***Salacia reticulate Wight*** | ***Celastraceae*** |
| **407.** | ***Salix alba Linn*** | ***Salicaceae*** |
| **408.** | ***Salvadora oleoides Dcne*** | ***Salvaoraceae*** |
| **409.** | ***Salvadora persica Linn*** | ***Salvadoraceae*** |
| **410.** | ***Samadera indica Gaertn*** | ***Simaroubaceae*** |
| **411.** | ***Sambucus Canadensis Linn*** | ***Adoxaceae*** |
| **412.** | ***Sambucus nigra Linn*** | ***Adoxaceae*** |
| **413.** | ***Sansevieria urghiana Roxb and Schult*** | ***Hemodoraceae*** |
| **414.** | ***Santalum rubrum Linn*** | ***Sapindaceae*** |
| **415.** | ***Sarcocephalus missionis Wall*** | ***Rubiaceae*** |
| **416.** | ***Sassafras officinale Nees*** | ***Laurineae*** |
| **417.** | ***Ssussurea lappa Clarke*** | ***Compositae*** |
| **418.** | ***Schleichera trijuga Willd*** | ***Sapindaceae*** |
| **419.** | ***Schoenocaulon officinale A. Gray*** | ***Melanthaceae*** |
| **420.** | ***Scindapsus officinalis Schitt*** | ***Araceae*** |
| **421.** | ***Semecarpus anacardium Linn*** | ***Anacardiaceae*** |
| **422.** | ***Sesamum indicum Linn*** | ***Pepilionaceae*** |
| **423.** | ***Sesbania aegyptiaca Pers*** | ***Papilionaceae*** |
| **424.** | ***Sesbania grandiflora Pers*** | ***Papilionaceae*** |
| **425.** | ***Setaria italic Beauv*** | ***Graminae*** |
| **426.** | ***Shorea robusta Gaertn*** | ***Dipterocarpaceae*** |
| **427.** | ***Sida acuta Burm*** | ***Malvaceae*** |
| **428.** | ***Sida cordifolia Linn*** | ***Malvaceae*** |
| **429.** | ***Sida rhombifolia Linn*** | ***Malvaceae*** |
| **430.** | ***Siegesbeckia orientalis Linn*** | ***Compositae*** |
| **431.** | ***Skimmia laureola Sieb*** | ***Rutaceae*** |
| **432.** | ***Smilax china Linn*** | ***Liliaceae*** |
| **433.** | ***Smilax lanceafolia Roxb*** | ***Liliaceae*** |
| **434.** | ***Smilax officinalis Kunth*** | ***Smilaceae*** |
| **435.** | ***Smilax zeylaciea Linn*** | ***Liliaceae*** |
| **436.** | ***Smithia conferta Sm*** | ***Papilionaceae*** |
| **437.** | ***Solanum dulcamara Linn*** | ***Solanaceae*** |
| **438.** | ***Solanum nigrum Linn*** | ***Solanaceae*** |

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| **439.** | ***Solanum xanthocarpum Schrad&Wendll*** | ***Solanaceae*** |
| **440.** | ***Spilanthes acmella Murr*** | ***Compositae*** |
| **441.** | ***Spondis pinnate Kurz*** | ***Anacardiaceae*** |
| **442.** | ***Stachytarpheta indica Vahl*** | ***Verbenaceae*** |
| **443.** | ***Strychnos bourdilloni Trees*** | ***Loganiaceae*** |
| **444.** | ***Strychnos cinnamomofolia Thw.Enum*** | ***Loganiaceae*** |
| **445.** | ***Strychnos nux-vomica Linn*** | ***Loganiaceae*** |
| **446.** | ***Strychnos potatorum Linn*** | ***Loganiaceae*** |
| **447.** | ***Teucrium polium Linn*** | ***Labiatae*** |
| **448.** | ***Teramus labialis Spreng*** | ***Combretaceae*** |
| **449.** | ***Teramus belerica Roxb*** | ***Combretaceae*** |
| **450.** | ***Terminalia chebula Retz*** | ***Combretaceae*** |
| **451.** | ***Tinospora cordifolia Miers*** | ***Menispermaceae*** |
| **452.** | ***Tinospora malabarica Miers*** | ***Menispermaceae*** |
| **453.** | ***Thevetia nerifolia Juss*** | ***Apocynaceae*** |
| **454.** | ***Thymus vulgaris Linn*** | ***Labiatae*** |
| **455.** | ***Toddalia aculeate Lamk*** | ***Rutaceae*** |
| **456.** | ***Toddalia asiatica Lam*** | ***Rutaceae*** |
| **457.** | ***Toddalia bilocularis W.&A*** | ***Rutaceae*** |
| **458.** | ***Toluifera pereirae Bail*** | ***Fabaceae*** |
| **459.** | ***Trewia nudiflora Linn*** | ***Eiphorbiaceae*** |
| **460.** | ***Tribulus terrestris Linn*** | ***Zygophyllaceae*** |
| **461.** | ***Trichosanthes palmate Roxb*** | ***Cucurbetaceae*** |
| **462.** | ***Trigonella foenum-gaeceum Linn*** | ***Papilionaceae*** |
| **463.** | ***Tylophora asthmatica W.&A*** | ***Acslepiadaceae*** |
| **464.** | ***Unona narum Dun*** | ***Anonaceae*** |
| **465.** | ***Uraria lagopoides DC*** | ***Papilionaceae*** |
| **466.** | ***Urena lobata Linn*** | ***Malvaceae*** |
| **467.** | ***Urgenia indica Kunth*** | ***Liliaceae*** |
| **468.** | ***Urtica dioica Linn*** | ***Urticaceae*** |
| **469.** | ***Vanda roxburghii Br*** | ***Orchidaceae*** |
| **470.** | ***Vanda tessellate Hook*** | ***Orchidaceae*** |
| **471.** | ***Valeriana officinlais Linn*** | ***Valerianaceae*** |
| **472.** | ***Vateria indica Linn*** | ***Dipterocarpaceae*** |
| **473.** | ***Vepris bilocularis Engler*** | ***Rutaceae*** |
| **474.** | ***Veratrum viride Solander*** | ***Melanthaceae*** |
| **475.** | ***Verbascum Thapsus Linn*** | ***Scrohulariaceae*** |
| **476.** | ***Verbena officinalis Linn*** | ***Verbenaceae*** |
| **477.** | ***Vernonia anthelmitica Willd*** | ***Compositae*** |

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| **478.** | ***Viola tricolor Linn*** | ***Violaceae*** |
| **479.** | ***Vitex negundo Linn*** | ***Verbenaceae*** |
| **480.** | ***Vitex trifolia Linn*** | ***Verbenaceae*** |
| **481.** | ***Vitis pallid W.&.A*** | ***Vitaceae*** |
| **482.** | ***Vitis vinifera Linn*** | ***Vitaceae*** |
| **483.** | ***Withania somnifera Dunal*** | ***Solanaceae*** |
| **484.** | ***Xylia dolabriformis Benth*** | ***Papilionaceae*** |
| **485.** | ***Zingiber officinale Roscoe*** | ***Taminaceae*** |
| **486.** | ***Zizyphus jujube Mill*** | ***Rhambaceae*** |

**TABLE-2. ANTI-ARTHRITIC MEDICINAL PLANTS**

| S.NO | BOTANICAL NAME | FAMILY |
|---|---|---|
| **1.** | ***Acyranthus aspera Linn*** | ***Amaranthaceae*** |
| **2.** | ***Achyranthea aspera Linn*** | ***Amaranthaceae*** |
| **3.** | ***Aconitum vilmorinianum Kom*** | ***Ranunculaceae*** |
| **4.** | ***Ajuga bracteosa Wall*** | ***Labiatae*** |
| **5.** | ***Ajuga decumbens Thunberg*** | ***Lamiaceae*** |
| **6.** | ***Alsonic noonei DE Wild*** | ***Apocynaceae*** |
| **7.** | ***Alstonia scholaris Linn R.Br*** | ***Apocynaceae*** |
| **8.** | ***Ammania bracifera Linn*** | ***Lythraceae*** |
| **9.** | ***Aristolochia bracteata Lam*** | ***Aristolochiaceae*** |
| **10.** | ***Argyreia speciosa Sweet*** | ***Convulvulaceae*** |
| **11.** | ***Arisaema rhizomatum Fischer*** | ***Aroideae*** |
| **12.** | ***Arnebia euchroma Johnst*** | ***Boraginaceae*** |
| **13.** | ***Artocarpus tonkinensis A*** | ***Moraceae*** |
| **14.** | ***Asystasia dalzelliana Santapau*** | ***Acanthaceae*** |
| **15.** | ***Baccharis genistelloides Linn*** | ***Asteraceae*** |
| **16.** | ***Bacopa monniera Penell*** | ***Scrophulariaceae*** |
| **17.** | ***Barleria monniera Lindl*** | ***Acanthaceaea*** |
| **18.** | ***Barleria lupulina Lindl*** | ***Acanthaceae*** |
| **19.** | ***Bauhinia variegate Linn*** | ***Caesalpiniaceae*** |
| **20.** | ***Bergenia stracheyi Linn*** | ***Saxifragaceae*** |
| **21.** | ***Boerhaavia diffusa Linn*** | ***Nyctaginaceae*** |
| **22.** | ***Boswellia carterii, Birdw*** | ***Burseraceae*** |
| **23.** | ***Boswellia serrata Triana*** | ***Burseraceae*** |
| **24.** | ***Butea monosperma Linn*** | ***Facaceae*** |
| **25.** | ***Caesalpinia sappan Linn*** | ***Leguminosae*** |
| **26.** | ***Caesalpinia sappan Linn*** | ***Leguminosae*** |
| **27.** | ***Calotropis gigantean R.Br*** | ***Asclepiadaceae*** |
| **28.** | ***Calatropis procera*** | ***Apocynaceae*** |

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| **29.** | ***Caltha palustris Linn*** | ***Ranunculaceae*** |
| **30.** | ***Cannabis sativum Linn*** | ***Cannabaceae*** |
| **31.** | ***Capparis erythrocarpus Isert*** | ***Capparaceae*** |
| **32.** | ***Capparis spinosa Linn*** | ***Capparaceae*** |
| **33.** | ***Cardiospermum halicacabum Linn*** | ***Spindaceae*** |
| **34.** | ***Cassia uniflora Mill*** | ***Caesalpiniaceae*** |
| **35.** | ***Cayaponia tayuya Cogn*** | ***Cucurbitaceae*** |
| **36.** | ***Celastrus aculeatus Merr*** | ***Celastraceae*** |
| **37.** | ***Centella asiatica Urban*** | ***Mackinlayaceae*** |
| **38.** | ***Cinnammomum zeylcanium Breyn*** | ***Lauraceae*** |
| **39.** | ***Cissampelos pareira Linn*** | ***Menispermaceae*** |
| **40.** | ***Chelidonium majus Linn*** | ***Papaveraceae*** |
| **41.** | ***Clematic chinensis Osbeck*** | ***Ranunculaceae*** |
| **42.** | ***Cleome gyandra L*** | ***Cleomaceae*** |
| **43.** | ***Coriandrum sativum Linn*** | ***Apiaceae*** |
| **44.** | ***Costus speciosus Sm*** | ***Zingieraceae*** |
| **45.** | ***Curcuma longa Linn*** | ***Zingiberaceae*** |
| **46.** | ***Curcuma zeodaria Rosc*** | ***Zingiberaceae*** |
| **47.** | ***Delonix elata, Gambles*** | ***Ceasalpinoideae*** |
| **48.** | ***Dipsacus asperoides Linn*** | ***Dipsacaceae*** |
| **49.** | ***Drynaria queercifolia L*** | ***Polypodiaceae*** |
| **50.** | ***Elaecarpus sphaericus L.f*** | ***Elaecarpaceae*** |
| **51.** | ***Ephedra sinica Staph*** | ***Ephedrceae*** |
| **52.** | ***Euphobia antiquorum Linn*** | ***Euphorbiaceae*** |
| **53.** | ***Ficus bengalensis Linn*** | ***Moraceae*** |
| **54.** | ***Ginko bloba Linn*** | ***Ginkgoaceae*** |
| **55.** | ***Glycosmis pentaphylls Linn*** | ***Rutaceae*** |
| **56.** | ***Glycyrrhiza glabra Linn*** | ***Fabaceae*** |
| **57.** | ***Hedera helix Linn*** | ***Araliaceae*** |
| **58.** | ***Hemidesmus indicus R.Br*** | ***Asclepdiaceae*** |
| **59.** | ***Hippocratea excels H.B.K*** | ***Hipocreataeceae*** |
| **60.** | ***Hybanthus enneaspermus Muell*** | ***Violaceae*** |
| **61.** | ***Jatropha isabellei Mull*** | ***Euphorbiaceae*** |
| **62.** | ***Justica gendarussa Linn*** | ***Acanthaceae*** |
| **63.** | ***Lantana camara Linn*** | ***Verbinaceae*** |
| **64.** | ***Laportea bulbifera Weddell*** | ***Urticaceae*** |
| **65.** | ***Lawsonia inermis Linn*** | ***Lythraceae*** |
| **66.** | ***Leucas aspera Willd*** | ***Lamiaceae*** |
| **67.** | ***Linum usitatissimum Linn*** | ***Linaceae*** |

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| **68.** | ***Lonicera japonica Thumb*** | ***Caprifoliaceae*** |
| **69.** | ***Mallotus oppositifolim Mull*** | ***Euphorbceaceae*** |
| **70.** | ***Merremia emarginata Burm*** | ***Convolvulaceae*** |
| **71.** | ***Merremia tridentate Hall*** | ***Convulvulaceae*** |
| **72.** | ***Operculina trupethum Linn*** | ***Convolvulaceae*** |
| **73.** | ***Panax ginseng C.A. Meyer*** | ***Araliaceae*** |
| **74.** | ***Phyllanthus amarus Schum.and Thomm*** | ***Euphorbiaceae*** |
| **75.** | ***Physalis angulate Linn*** | ***Solanaceae*** |
| **76.** | ***Pinus maritime Roxb*** | ***Pinaceae*** |
| **77.** | ***Piper betle Linn*** | ***Piperaceae*** |
| **78.** | ***Piper longum Linn*** | ***Piperaceae*** |
| **79.** | ***Pisonia grandis R.Br*** | ***Nyctaginaceae*** |
| **80.** | ***Pistia stratiotes Linn*** | ***Araceae*** |
| **81.** | ***Pleurotus sajorcaju Singer*** | ***Pleurotaceae*** |
| **82.** | ***Premna serratifolia Linn*** | ***Verbenaceae*** |
| **83.** | ***Pseudocdrea kotschyi Schweinf*** | ***Meliaceae*** |
| **84.** | ***Punica granatum Linn*** | ***Lythraceae*** |
| **85.** | ***Rhus verniciflua Stokes*** | ***Anacardeaceae*** |
| **86.** | ***Ruta graveolens Linn*** | ***Rutaceae*** |
| **87.** | ***Salacia reticulate Wight*** | ***Celastraceae*** |
| **88.** | ***Salix nigra Linn*** | ***Saliaceae*** |
| **89.** | ***Saraca asoca Roxb*** | ***Rubeacea*** |
| **90.** | ***Saussurea lappa Clarke*** | ***Compositae*** |
| **91.** | ***Semecarpus anacardium Linn*** | ***Anacardiaceae*** |
| **92.** | ***Sida rhombifolia Linn*** | ***Malvaceae*** |
| **93.** | ***Sinomenium acutum Rehd*** | ***Menispermaceae*** |
| **94.** | ***Smithia sensitive Smith*** | ***Fabaceae*** |
| **95.** | ***Sophora flavescens Aoton*** | ***Fabaceae*** |
| **96.** | ***Strobilanthus callosus Nees*** | ***Acanthaceae*** |
| **97.** | ***Strychus potatorum Linn*** | ***Loganaceae*** |
| **98.** | ***Torilis japonica Houtt*** | ***Apiaceae*** |
| **99.** | ***Toxicodendron pubescens P.Mill*** | ***Anacardiaceae*** |
| **100.** | ***Trewia polucarpa Benth*** | ***Euphorbiaceae*** |
| **101.** | ***Tridax procumbens Linn*** | ***Asteraceae*** |
| **102.** | ***Trigonella foenum raecum Linn*** | ***Fabeceae*** |
| **103.** | ***Urtica pilulifera Linn*** | ***Urticaceae*** |
| **104.** | ***Vernonia cinerea Less*** | ***Asteraceae*** |
| **105.** | ***Vitex negundo Linn*** | ***Verbenaceae*** |
| **106.** | ***Withania somnifera Dunal*** | ***Solanaceae*** |

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| **107.** | ***Xanthium srtuarium Linn*** | ***Compositae*** |

**MEDICINAL PLANTS FOR THE TREATMENT OF ARTHRITIS:**

Herbal medicines are used for the treatment of various ailments from ancient times and it is not an exaggeration to say that the use of the herbal drugs is as old as mankind. Herbal medicines are synthesized from the therapeutic experience of generation of practicing physicians of ancient system of medicine for more than hundreds of years. Nowadays, researcher shows a great interest in those medicinal agents that are derived from plants because the currently available drugs are either have certain side effects or are highly expensive. Nature has blessed us with enormous wealth of herbal plants which are widely distributed all over the world as a source of therapeutic agents for the prevention and cure of various deseases. Accoding to WHO, world's 80% population uses herbal medicines for their primary health care needs. Herbal medicines will act as parcels of human spciety tp co,bat disease form the dawn of civilization. The medicinally important parts of these herbal plants are chemical constituents that produce a desired physiological action on the body.

Since ancient time india uses herbal medicines in the officially alternative systems of health such as Ayurveda, Unani, Sidha, Homeopathy, and Nathuropathy. In india, there are more than 2500 plants species which are currently used as berbal medicaments. For than 3000 years, the herbal medicines are used either directly as folk medication or indirectly in the preparation of recent pharmaceuticals. Thus, from the knowledge of traditional plants, one might be able to discover new effective and cheaper drugs.

**CONCLUSION:**

Traditional medicines used for the treatment of arthritis are used in various tribal and rural cultures worls wide. The plant extracts would be served as an alternate therapy for the treatment of arthritis with lessor side effects. Plant have been a prime source of highly effective conventional drugs for the treatment of many forms of arthritis. There are many medicinal plants which exert anti-arthritic avtivity at a particulat dose. This article makes an attempt to give scientific account of use of valuable medicinal plants extracts in arthritis.

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