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Plants of the Araceae Family for Arthritis and Related Diseases: A Review

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Abstract

Herbal plants are being used as medicine from ancient age in various system of medicine for the treatment of several disorders. We survey species of Araceae family traditionally used for arthritis and its symptoms. The aim is to reveal Araceae species as unexplored potential sources of anti-arthritic natural products. 3 plants were proved of having antiarthritic activity, while 15 plants were found to be having anti-arthritic activity considering its ethno-medico use. Ethnopharmacology has become a scientific backbone in the development of active therapeutics based upon traditional medicine of various ethnic groups. Aroids or the members of Araceae family are distributed worldwide with 117 genera and 3790 species. The ethnobotany of Aroids is diverse and fascinating based on many circumstantial stories and scientific reports.

Keywords: Arthritis, Araceae, Aroids, protein denaturation.

Introduction

Arthritis is a chronic, inflammatory, and systemic autoimmune disease that mainly affect the joints of human body. It may affect other tissues and organs such as heart, skin and muscles. Osteoarthritis (OA) and Rheumatoid arthritis (RA) are the form of arthritis which exists. The initial symptoms of this disease are fatigue, musculoskeletal pain and stiffness and after some weeks to months it progresses to involve joints. At first the small joints are affected, particularly the small bones of the hands. Later, larger joints are affected, become swollen, warm and painful. One of the most important symptoms of the disease is morning stiffness.⁽¹⁾ According to WHO, 0.3-1% of the world population is affected from Rheumatoid arthritis and among them females are three times more prone to the disease as compared to males. Although the exact etiology is unknown but several hypotheses said that it is triggered by the combination of genetic predisposition and exposure to environmental factors like viruses. The goal of treatment for RA patients is to eliminate symptoms, slow disease progression, and optimize quality of life. Therefore, before starting the treatment of RA certain goals must be kept in mind such as relief of analgesia, reduction of inflammation, protection of articular structure, maintenance of function, and control of systemic involvement.⁽²⁾ There are four main groups of drugs used to treat arthritis: Analgesics, Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), Disease Modifying Anti-Rheumatic Drugs (DMARDs) and corticosteroids. Despite considerable progress in the treatment of arthritis by NSAIDs and other drugs, search for newer drugs continue because the existing synthetic drugs have several limitations. The modern medicine has also started admitting that ayurveda and herbal medicine, has a lot of positive influence on the treatment of arthritis. A large number of medicinal plants have been tested and found to contain active principles with curative properties against arthritis. Antiarthritic plants contain a variety of chemical constituents like phenols, coumarins, essential oils, monoterpenes, catechins, quinones, carotenoids, flavanoids, alkaloids, anthocyanins and xanthenes. Considerable studies have been carried out on ethno-medicinal plants; however, only few medicinal plants have attracted the interest of scientist, to investigate them as a remedy for arthritis.⁽³⁾

The family Araceae is one of the common monocotyledonous flowering plants in the world

and has a total of 117 genera and more than 3790 species. Araceae is also one of the largest families in the world after the orchids, grasses and sedges. Most of the species are found in tropical areas. Nowadays, Araceae is becoming more familiar to humans and recognized as an important source of food, ornamental plants. The local inhabitants have used aroid early in cooking, religious ceremony and medicinal purposes.⁽⁴⁾ This family remains with one of the most poorly known taxonomy with a large proportion of its species in all areas.⁽⁵⁾

This paper deals with the study of indigenous herbs of family Araceae showing potential for treatment of arthritis by considering its related studies, phytoconstituents and ethno-medico use. The review work was carried out by searching of different research articles of various journals from PubMed, Google scholar, Science direct etc. we also have collected the literature of scientifically validated plants which are having good antiarthritic property.

Plants of Araceae Family Having Anti-Arthritic Activity

1. *Rhaphidophora glauca*

Rhaphidophora glauca (Wall.) Schott is an aroid native to the subtropical and warm temperate regions of the eastern Himalaya, which is also distributed in Nepal through North East India to Bangladesh and Myanmar. Leaves of *R. glauca* have activities like antiarthritic, membrane stabilizing, α -amylase inhibitory and anthelmintic.⁽⁶⁾ The in-vitro anti arthritic activity of leaves of *Rhaphidophora glauca* was studied by inhibition of protein denaturation using diclofenac sodium as a standard. The production of auto antigen in certain arthritic disease may be due to denaturation of protein, membrane lysis and proteinase action. The maximum percentage inhibition of protein denaturation of *R. glauca* was observed as 53.16%, 43.04%, 35.44%, 30.38% and 21.52%.⁽⁷⁾

2. *Pistia stratiotes*

Pistia stratiotes is a floating, stoloniferous herb found in ponds and streams almost throughout India. Leaves are green in color, odorless and bitter in taste. The biologically active chemical constituents of *P. stratiotes* are alkaloids, glycosides, flavonoids and steroids. It has been used effectively to treat a number of inflammatory conditions in Ayurvedic medicines. Studies indicate that *P. stratiotes* possesses diuretic, antidiabetic, antidermatophytic, antifungal and antimicrobial properties.⁽⁸⁾ Arthritis was induced in Sprague-Dawley rats, paw swelling was measured, and arthritis indices were estimated in rats treated with aqueous and ethanolic leaf extracts of *P. stratiotes*, methotrexate, diclofenac, dexamethasone, and normal saline-treated rats. Radiologic imaging, haematological assessment of red and white blood cells, C-reactive protein and erythrocyte sedimentation rate, as well as histopathological studies were also done. The data were analysed using GraphPad Prism 5. This study establishes that aqueous and ethanolic extracts of *P. stratiotes* have antiarthritic activity in Sprague-Dawley rats with induced arthritis. The aqueous extract had better activity than the ethanolic extract.⁽⁹⁾

3. *Stuednera colocasiifolia*

Stuednera colocasiifolia K. Koch is a kind of evergreen herb with short stem and green petiole. Its petiole is slender

and cylindrical, and leaves of *S. colocasiifolia* are paler with sharp edge. It commonly grows in dense forests, wet meadows, by streams and in seasonally moist lowland forest. It distributed in Bangladesh, India, Myanmar, Thailand and China. Locally it is used to treat injuries, cuts, snake and insect bites and skin ulcers. The in-vitro anti-arthritic activity of leaves of *S. colocasiifolia* are done using the method inhibition of protein denaturation using Diclofenac sodium as standard. The maximum inhibition of protein denaturation was found to be 62.03%. The study establishes that ethanol extract is capable of controlling the production of auto-antigen and inhibits protein denaturation, membrane lysis and proteinase action in rheumatic disease.⁽⁷⁾

Plants of Araceae Having Anti-Arthritic Activity Considering Its Ethno-Medico Use

Herbal therapy although still an unwritten science, is well established in some cultures and traditions and has become a way of life of almost 80% of the people in rural areas. Inflammatory and arthritic conditions are among those treated using traditional remedies, with considerable success.⁽¹⁰⁾ Traditional medicine is a powerful source of biologically active compounds. Ethno-Pharmacology has become a scientific backbone in the development of active therapeutics based upon traditional medicine of various ethnic groups. Screening program based on Ethno-Pharmacological information has more success rate than random screening.⁽¹¹⁾ In India there is a huge potential in the research of the natural products because nature blessed us by giving a large variety of medicinal plants. From the knowledge and detailed survey of the medicinal plants we might be able to discover new drugs which are therapeutically effective and also cheaper.⁽¹⁾ In this review we described the medicinal plants having anti-arthritic activity by considering its ethno-medico use.

1. *Acorus calamus L*

The leaves of *Acorus calamus* was used in the treatment of Gout and rheumatism by the people of Assam. The treatment involves usage of crushed leaves with other compound preparation.

The same plant is used for the treatment of arthritis by the Boro tribe in Kamrup district of Assam. But they used it in the form of paste and applied locally.⁽¹¹⁾

2. *Anthurium cf. tridigitatum*

The people residing in Costa Pacifica, Colombia used *A. tridigitatum* for the treatment of rheumatic pain caused by malaria. The leaves of the plant are mainly used. Leaves are macerated with suitable solvent and rubbed over whole body.⁽¹²⁾

3. *Dieffenbachia costata*

Native to Peru, this species is used in the Peruvian Amazon as a remedy for rheumatism by placing a warmed leaf on the inflamed area.

4. *Dieffenbachia seguine*

This plant has been used in the treatment of gout as well as rheumatism. The slices of the root, boiled in wine and then used to soak the feet, were used in the relief of gout. In Guatemala, the smashed leaves are still used as poultices for gout and rheumatism.⁽⁵⁾

5. *Lasia spinosa* (Linn.) Thumb.

The Chorei tribe of Southern Assam used *Lasia spinosa* for the treatment of rheumatic pain and arthritis. The rhizome part of the plant is mainly used. Rhizomes are boiled with water and garlic, and applied locally.⁽¹¹⁾

6. *Monstera deliciosa*

The species ranges from Mexico to Panama. In Mexico, a decoction of the plant is used as a remedy for arthritis.

7. *Montrichardia arborescens*

Montrichardia arborescens ranges from Guatemala to Northern Brazil. The decoction of this plant is used for the treatment of gout.

8. *Philodendron bipinnatifidum* Schott

The species occurs in Southern Brazil, Paraguay, and Argentina. The juices of the species are used as a remedy for orchitis, rheumatism and ulcers.

9. *Philodendron imbe* Schott

A decoction of the leaves of this South-eastern Brazilian species is used in a bath or a poultice made from fresh leaves as a remedy for acute and chronic orchitis. Similar dressings may be used for rheumatic joints, ulcers or edemas. The species are native to Eastern Brazil.

10. *Philodendron pedatum* (Hook)

The species ranges from Venezuela and the Guianas to Brazil. It also has been collected in the Choco of Colombia. In Brazil fresh leaves spread with oil are used as a dressing for gout pains.

11. *Philodendron radiatum* Schott

The species ranges from Mexico to Colombia. In Central America, decoction of leaves is used as a remedy for gout and rheumatic pains.

12. *Philodendron speciosum* Schott

The species are endemic to the region near Rio de Janeiro. Juice from the stem and root of this plant is used for gout.

13. *Philodendron warszewiczii* K. Koc

The species ranges from Southwestern Mexico to Honduras. The decoction of its leaves with water are used for the treatment of arthritis.

14. *Symplocarpus foetidus* (L)

The species are native to East-central North America. Although large doses of powdered root may cause nausea, vomiting, vertigo and headaches, smaller doses have allegedly been successful against chronic rheumatism.

15. *Xanthosoma violaceum*

A widespread South American species that is often cultivated. The people of Peru use the leaves to apply directly to body parts with pain, especially the legs and also to treat rheumatic pain.⁽⁵⁾

Conflict Of Interest

Nil

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