Natural Remedies – A cure for arthritis?

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INTRODUCTION

Musculoskeletal diseases such as arthritis, gout, osteomalacia, osteoporosis etc., cause severe long term joint pain, swelling and limitation of the movement. These diseases affect a significant population of the society and often lead to major personal, family and financial consequences as well as increased mortality [1].

Arthritis is a disease as old as mankind and is globally the most common musculoskeletal disorder. The word arthritis is derived from Greek word arthron meaning ‘joint’ and the Latin word itis means ‘inflammation’. There are more than 100 forms of arthritis. Some of them are osteoarthritis, rheumatoid arthritis, psoriatic arthritis and other related autoimmune diseases.

In the year of 2007, arthritis foundation has estimated that two-third of the population was suffering from arthritis and census reports that by 2030 it increases beyond to 40% [2]. It also have been reported that women were affected more comparatively with men.

Numerous treatments are available for various arthritis but they have their own drawbacks. The regular usage of conventional medicines such as NSAIDS like Ibuprofen, Acceclofenac etc are limited to minimize the degree of pain and steroids such as cortisone and hydrocortisone remains unsatisfactory for prolonged treatment. The prolonged usage of steroids results in deleterious effects like GI disturbances and renal morbidity.
| S.No. | Botanical Name of plant and family | Common name | Bioactive compounds | Mechanism of Action | Animal model activity | References |
|-------|----------------------------------|-------------|---------------------|---------------------|-----------------------|------------|
| 1     | Curcuma longa (Zingiberaceae)    | Turmeric    | Curcumin, Demethoxycurcumin, Bisdesmethoxycurcumin, | Inhibits NF-κB, COX-2, and MMP-9 | Streptococcal cell wall-induced arthritis | [3]        |
| 2     | Zingiber officinialis (Zingiberaceae) | Ginger     | Sesquiterpenes, camphene, β-phellandrene, curcumene, cineole, geranyl acetate, terpineol, terpenes, borneol, geraniol, limonene, β-elemene, 6-Shogaol | Inhibits NF-κB, COX-2, PGE2 | Freund’s Adjuvant-induced arthritis | [1,2]      |
| 3     | Boswellia serrata (Burseraceae)  | Indian Frankincense | Boswellic acid and its derivatives | Inhibits IL-1, IL-6, TNF-α, PGs, Nitric oxide (NO), NF-κB, COX-2 and 5-LOX | Bovine serum albumin-induced arthritis | [2,4]      |
| 4     | Carica papaya (Cracicaeae)       | Papaya      | Inhibits prostaglandin-mediated inflammation | Formaldehyde-induced arthritis | Antiarthritic and anti-inflammatory | [2]        |
| 5     | Camellia sinensis (Theaceae)     | Green Tea   | Epigallocatechin-3-gallate | Inhibits COX-2, interferon-γ, TNF-α, NF-κB, iNOS, PGE2 phosphorylation of c-Jun-N-terminal kinase (JNK) p46 and decreases phosphor-c-Jun and DNA-binding activity of AP-1 | Collagen-Induced Arthritis | [2,3]      |
| 6     | Cynodon dactylon (Graminacae)    | Durva Grass | Decreases myeloperoxidase, nitrite, C-reactive protein, ceruloplasmin and thiobarbituric acid reactive substances and increases antioxidants | Adjuvant-Induced arthritis | Antiarthritic | [2]        |
| 7     | Semecarpus anacardium (Anacardiaceae) |            | Inhibits production of IL-1β and IL-12p40. Suppresses LPS-induced nuclear translocation of NF-kB, inhibits IκBa phosphorylation and nuclear translocation of AP-1 and increases | Adjuvant-Induced arthritis | Antiarthritic | [5]        |
| No. | Species (Family)          | Antioxidant/Inflammation Compounds | Antioxidant/Inflammation Activities                                                                 | Antioxidant status               |
|-----|--------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------|
| 8   | *Vitis vinifera* (Vitaceae) | Grape vine, Resveratrol           | Inhibits NF-κB, COX-2, PGE2, IL-1β and IL-6                                                         | Antiarthritic                    |
| 9   | *Commiphora mukul* (Burseraceae) | Guggul, Guggulisterone           | Inhibits NF-κB, COX-2 and MMP-9                                                                     | Adjuvant-Induced arthritis      |
| 10  | *Withania somnifera* (Solanaceae) | Withania, Withanolide             | Inhibits NF-κB                                                                                       | Adjuvant-Induced arthritis      |
| 11  | *Costus speciosus* (Zingiberaceae) | Crepe Ginger, Alkaloids and flavonoids | Inhibits COX-2 pathway                                                                            | Freunde’s Adjuvant-induced arthritis |
| 12  | *Ficus lacor* (Moraceae)     | Fig, Alkaloids, glycosides and flavonoids |                                                                                                      | Antiarthritic                    |
| 13  | *Strychnos potatorum* (Loganiaceae) | Clearing-nut                     | Inhibits increase of Lipid peroxidation, Nitric oxide                                               | Freund’s Adjuvant-induced arthritis |
| 14  | *Nigella sativa* (Ranunculaceae) | Nigella, Thymoquinone             | Inhibits increase of Lipid peroxidation, Nitric oxide                                               | Collagen-Induced Arthritis      |
| 15  | *Plumeria alba* (Apocynaceae) | Frangipani                        | Maybe inhibition of PGs                                                                            | Antiarthritic                    |
| 16  | *Ajuga bracteosa* (Labiatae)  | Bugle weed, Ajugarin, lupulin A, Withaferin A, repto side and 6-deoxyharpagide | Inhibits COX-1 and COX-2                                                                            | Formaldehyde induced arthritis  |
| 17  | *Cassia uniflora* (Caesalpinaceae) | Oneleaf senna, Sennosides A, B, C & D | Maybe due to Inhibition of histamine and PGs                                                        | Complete Freunds Adjuvant Arthritis |
| 18  | *Mytilus edulis* (Mytilidae)  | Black Mussel, n-3 analogue of arachidonic acid, 7,11,14,17- eicosatetraenoic acid (20: 4n-3) | Inhibition of COX-1 and COX-2                                                                        | Adjuvant induced arthritis      |
| 19  | *Costus afer* (Zingiberaceae) | Ginger-Lily                       | May due to Inhibition of PGs                                                                          | Complete Freunds Adjuvant Arthritis |
| 20  | *Bergenia strachey* (Saxifragaceae) | Elephant ears, Bergenin and Norbergenin | Decreases in lipophilic character O-demethylation                                                   | Adjuvant induced arthritis      |
Hydrotherapy is one of the oldest forms of treatment for patients with arthritis but the beneficiary of this treatment is very few. Podiatry deals with the importance of appropriate footwear provision for comfort, mobility and stability is well recognised in clinical practice but there is little evidence based research to support such observations in patients with early RA (Management of early rheumatoid arthritis a national clinical guideline, Scottish Intercollegiate Guidelines Network 2011). To overcome all these difficulties, the uses of natural remedies from plant origin were considered for safety, effectiveness and devoid of side effects which offers a novel opportunity.

The phytoconstituents derived from plants like flavonoids, terpenes, quinines, catechins, alkaloids, anthocyanins and anthoxanthins are potential against arthritis by modulating the expression of proinflammatory signals. Few natural remedies were addressed in Table No. 1:

**Others:**

Several other natural phytoconstituents have also been found to exhibit antiarthritis potential. For instance – Dihydrourucurbitacin B—the active principle of *Cayaponia tayuva* was justified its potential antiarthritic activity. J.M. Escandel et al. [16] found that Dihydrourucurbitacin B reduces chronic inflammatory response in the arthritic paws of female lewis rats. The mechanism of Dihydrourucurbitacin B is associated by modifying the cell infiltration and the expression of both Nitric Oxide Synthase 2 and Cyclooxygenase 2.

Apart from the treatment of arthritis by natural remedies, it is utmost importance for the reliable assessment of parameters which is having a great potential to identify arthritis. One parameter namely Range of Motion (ROM) is of great clinical importance in arthritis patients. This measure describes the maximum flexion and extension measurements in a joint from a neutral angle. There are many readout systems to monitor the locomotion of the animals in the study. In the year 2011 Video graphic analysis was employed for the first time to describe the ROM in inflamed and noninflamed knee joints of freely moving rats. Videoradiography is a digital high speed x-ray system. Radiographs were recorded with a sampling rate of 500Hz and a resolution of 1,530 x 1,024 pixels from the amplifier using a high speed camera (Speed cam Visario G2; Weinberger Vision Gmbtt, Erlangen, Germany).

**Conclusion:**

Even though many treatments are available for the treatment of arthritis but they have their own drawbacks. In order to overcome these drawbacks the conventional treatments are made replaced by the natural remedies which results in safety, effective, devoid of side effects, low cost and readily available. Few plants like *Curcuma longa, Zingiber officinalis* etc., shows promising effects against arthritis but with the other plants the well characterization of the extracts are required at the level of bioactive compounds to make the observations are valid and reproducible.

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