

A MINI REVIEW OF ETHNOMEDICINAL HERBS WITH STRONG ANTI-INFLAMMATORY AND ANTI-ARTHRITIC EFFECTS

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Abstract- Throughout history, medicinal plants have played a crucial part in providing medicine. The therapeutic benefits of these plants have been extensively recorded in traditional medical systems, such as Indian, Chinese, and Korean medicine, and are used to treat chronic inflammatory diseases. Millions of people worldwide suffer from the discomfort of arthritis, one of the dangerous chronic inflammatory diseases. Arthritis is an inflammatory disease that can spread quickly, damaging cartilage or bone in the joints as a result of several inflammatory mediators. NSAIDs, DMARDs, and corticosteroids are currently the most often recommended medications for the treatment of inflammation or arthritic pain. Long-term usage of them could have a wide range of harmful effects. Therefore, it is imperative to discover alternative treatment agents with the least amount of hazardous side effects. The people of the Eastern Himalayan region have long utilised a wide variety of medicinal herbs that have strong anti-inflammatory and/or anti-arthritic effects. There haven't been many studies conducted on Himalayan medicinal plants to confirm their therapeutic benefits. Thus, novel and more affordable medications for treating various types of inflammation may be found through research on plant materials and traditional medicine expertise. This review focuses on the Eastern Himalayan medicinal herbs that have demonstrated promise therapeutic effectiveness against inflammatory illnesses, along with innovative methods for preparing these plants.

Key words: Medicinal plants, Traditional medicine, Eastern Himalayan region, Inflammatory mediators, Anti-inflammatory, Anti-arthritic.

Introduction-The immune system's intricate biological response, inflammation can be brought on by a number of things, including harmed cells, pathogens (viral, bacterial, or fungal infections), and dangerous chemicals.1] Swelling, redness, heat, pain, and loss of tissue function are all signs of inflammation. These symptoms are brought on by the local immune response, vascular dilatation, leukocyte reinforcement, and the release of inflammatory mediators, which are all factors that contribute to the development, persistence, and ultimate resolution of the acute state of inflammation.[2,3] Acute inflammation is a

fundamental, innate, and sterile reaction that mostly results from tissue damage over a brief period of time.[4] Inflammation may transition into a chronic phase if it is unmanageable or does not show up during the acute phase. Long-term, persistent inflammation is referred to as chronic inflammation, and it is mostly responsible for the burden that chronic inflammation places on the world since it can lead to a number of chronic inflammatory disorders, including diabetes, cancer, heart disease, and arthritis.[5]

In addition to the many chronic inflammatory disorders, arthritis's unclear aetiology poses a serious problem for the pharmaceutical and medical professions. Millions of individuals throughout the world suffer from the chronic inflammatory disease known as arthritis. Estimates place the number of people with arthritis at 1-2 percent worldwide, with women three times more likely than males to have the condition. [6-8] Numerous forms of arthritis have been reported, some of which have an influence on public health. The two most prevalent kinds are rheumatoid arthritis, sometimes referred to as inflammatory arthritis, and osteoarthritis, also known as non-inflammatory arthritis. [9,10] Arthritis is primarily characterised by pain, stiffness, swelling, loss of joint function, and synovial membrane inflammation. If arthritis is not treated in a timely manner, it may cause the eroding of bone and cartilage in the joints, which could leave a person permanently disabled. Eliminating symptoms, managing disease activity, delaying progression, and preventing joint degeneration all depend on early treatment. [11-13]

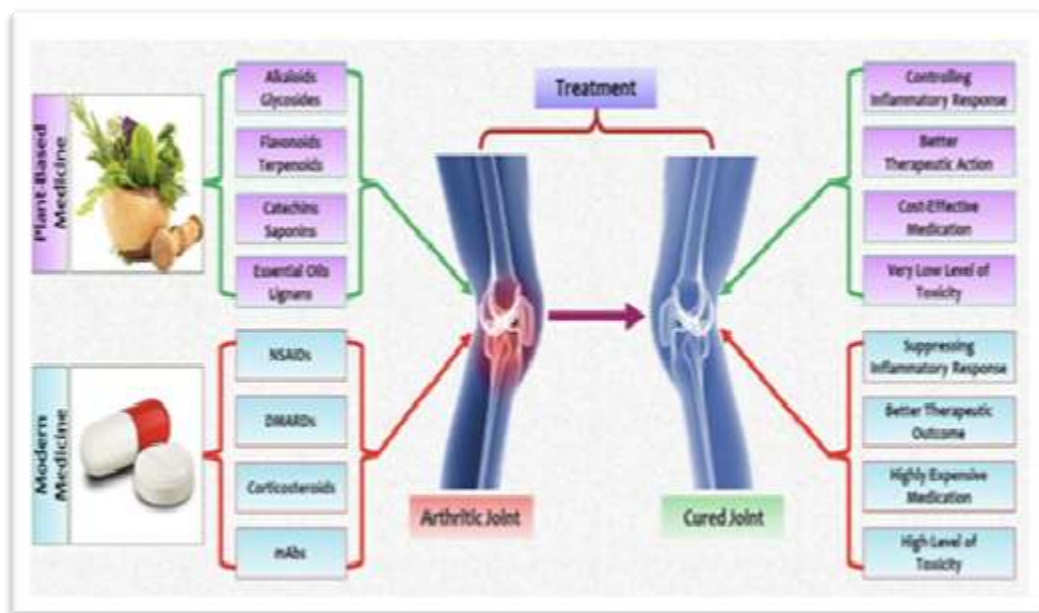


Figure 1- Plants-based medicine vs modern medicine for the management of inflammation and arthritic pain.

key players in arthritis inflammation-

It has been discovered that inflammation plays a crucial role in the pathophysiology of arthritis by starting the pain process. Innate immunity receptors recognise the molecular templates during an inflammatory response, which causes the synthesis of several inflammatory mediators.[14,15] Through modifications to gene expression, intracellular signalling pathways, and the composition of joint tissues, these mediators play a crucial regulatory role in the development and resolution of inflammation.[16,17] Increased activation of the inflammatory pathways and the release of additional inflammatory agents and enzymes

are the results of modifications in cellular signal transduction. Consequently, the joint's anatomical and physiological systems are altered. [18]

The Eastern Himalayan region is known for its rich biodiversity, including a vast array of medicinal plants used traditionally by local communities for various health conditions, including inflammation and arthritis. Here are some medicinal plants along with their probable anti-inflammatory and anti-arthritic mechanisms:

Boswellia serrata (Indian Frankincense):

Mechanism: Contains boswellic acids, which inhibit the enzyme 5-lipoxygenase, reducing leukotriene synthesis and inflammation. It also suppresses pro-inflammatory cytokines like TNF-alpha and IL-1 beta.

Zingiber officinale (Ginger):

Mechanism: Contains gingerol and related compounds with potent anti-inflammatory effects. It inhibits the production of inflammatory cytokines and prostaglandins, and it also acts as an antioxidant, scavenging free radicals.

Curcuma longa (Turmeric):

Mechanism: Curcumin, the active compound in turmeric, has strong anti-inflammatory properties by inhibiting NF-kB, a transcription factor involved in the expression of pro-inflammatory genes. It also inhibits enzymes like cyclooxygenase (COX) and lipoxygenase (LOX) involved in the production of inflammatory mediators.

Rheumemodi (Himalayan Rhubarb):

Mechanism: Contains anthraquinones like emodin, which have anti-inflammatory effects by inhibiting NF-kB and reducing the expression of pro-inflammatory cytokines. It also inhibits COX-2 activity, reducing the production of prostaglandins.

Aconitum heterophyllum (Atis):

Mechanism: Contains alkaloids like aconitine, which have analgesic and anti-inflammatory effects by blocking voltage-gated sodium channels, reducing neuronal excitability and pain perception.

Polygonum bistorta (Himalayan Bistort):

Mechanism: Contains polyphenols with antioxidant and anti-inflammatory properties. It inhibits NF-kB activation and reduces the production of inflammatory mediators like TNF-alpha and IL-6.

Angelica glauca (Himalayan Angelica):

Mechanism: Contains coumarins and flavonoids with anti-inflammatory effects. It inhibits NF-kB activation and reduces the production of inflammatory cytokines and chemokines.

Terminalia chebula (Chebulic Myrobalan):

Mechanism: Contains tannins and polyphenols with antioxidant and anti-inflammatory properties. It inhibits NF-kB activation and scavenges free radicals, reducing oxidative stress and inflammation.

Berberis aristata (Indian Barberry):

Mechanism: Contains berberine, which has anti-inflammatory effects by inhibiting NF-kB activation and reducing the expression of inflammatory cytokines like TNF-alpha and IL-6. It also inhibits COX-2 activity.

Asparagus racemosus (Shatavari):

Mechanism: Contains saponins and flavonoids with anti-inflammatory effects. It inhibits NF-kB activation and reduces the production of inflammatory mediators like TNF-alpha and IL-1 beta.

These plants represent just a small fraction of the diverse medicinal flora of the Eastern Himalayan region, each offering unique bioactive compounds with potential anti-inflammatory and anti-arthritic

properties. Further research is needed to fully understand their mechanisms of action and potential therapeutic applications. [19-26].

Conclusion and future perspectives-

The potential for medicinal plants, which are widely found throughout the world and have hidden medicinal properties, is promising for the treatment of chronic illnesses. Because of the wide range of natural environments and variations in regional climate, the eastern Himalayas are home to an abundance of medicinal plants. This region's medicinal plants have been used for centuries to treat and prevent arthritis and inflammation in a variety of traditional ways. Local cultures have closely linked these traditional uses of medicinal plants—which have not yet been thoroughly studied by science—with their traditional practises as plant medicines. For these reasons, not much research has been done to confirm the medical benefits of Himalayan medicinal plants. According to scientific studies, the presence of various bioactive compounds in medicinal plants helps to treat inflammation and arthritis by influencing different stages of the inflammatory response process, suppressing oxidative stress, reducing the production of inflammatory cytokines, and downregulating abnormal intracellular signalling pathways.

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