



ANTI INFLAMMATORY

Acorus calamus
Boswellia serrata
Cedrus deodara
Curcuma Longa
Cyperus rotundus
Ocimum sanctum
Semecarpus anacardium
Sida cordifolia
Vitex negundo
Withania somnifera

HERBS FOR TOPICAL APPLICATIONS

Boswellia serrata
Cedrus deodara
Celastrus paniculata
Curcuma longa
Dashmool
Moringa oliefera
Rubia cordifolia
Vitex negundo
Withania somnifera

Acorus calamus

Sweet Flag botanically known as *Acorus calamus* is a valuable medicinal plant found almost throughout India. Ayurvedic science has always propagated the use of Sweet Flag as effective treatment against a wide variety of illnesses. *Acorus calamus* is also found to possess anti-inflammatory activity, which is evident from a number of studies.

Preclinical studies reported that the extract of *Acorus calamus* at a dose of 400 mg/kg produced 41.2 percent inhibition of carrageenin induced inflammation in rat paw edema. Extract of *Acorus calamus* rhizomes also exhibited significant anti-inflammatory effect in experimental animals like acute and chronic models which was observed to be well comparable with that of the reference drugs like hydrocortisone, phenylbutazone etc.

In another study for evaluating anti-inflammatory effect revealed that the oral administration the extract of *Acorus calamus* caused 45 percent inhibition of the carrageenin induced paw oedema, 13.6 percent inhibition of cotton pellet granuloma

formation and 61 percent inhibition of croton oil granuloma pouch inflammatory response in rats.

Boswellia serrata

Boswellia serrata (Salai Guggal in Sanskrit) is one of the most ancient and respected herbs in Ayurveda, the Indian system of traditional medicine. "Gajabhakshya" a Sanskrit name sometimes used for *Boswellia* suggests that elephants enjoy this herb as a part of their diet. Historically *Boswellia serrata* is recommended for osteoarthritis, juvenile rheumatoid arthritis, soft tissue fibrositis and spondylitis without any side effect.

A number of clinical trials have also been conducted to evaluate this antiarthritic and antiinflammatory activity and which have shown promising results. Few of these studies are listed below.

Two placebo-controlled studies, involving a total of 81 individuals with rheumatoid arthritis, found significant reductions in swelling and pain over the course of 3 months.

A comparative study in 60 arthritic patients over 6 months showed that *Boswellia* extract produced symptomatic benefits comparable to oral gold therapy in arthritic patients.

A double-blind, placebo-controlled, cross-over study involving treatment of osteoarthritis with a herbomineral formulation containing *Boswellia serrata* showed that the formulation produced a significant drop in severity of pain and disability score proving its effectiveness in osteoarthritis.

Studies revealed that the Boswellic acids isolated from the *Boswellia serrata* are the active principles responsible for its anti-inflammatory activity. Boswellic acids exert specific inhibition of leukotriene synthesis which is one of the key intermediate leading to inflammatory response. 5-lipoxygenase is an enzyme catalyzing leukotriene synthesis pathway in the body leading to inflammatory reaction. By inhibition of the 5-lipoxygenase either by direct interaction or by blocking its translocation, boswellic acids exert anti-inflammatory response by preventing leukotriene synthesis.

Cedrus deodara

Deodar, a large evergreen tree botanically known as *Cedrus deodara* growing through out Western Himalayas lives to a great age. Deodar is one of the most important and valuable timbers of Indian coniferous woods and about as strong as teak.

It is being traditionally used for its anti-inflammatory and anti-spasmodic properties in Ayurveda, Siddha and Unani systems of medicine. Recent preclinical studies on the Volatile oil of *Cedrus deodara* reveals that the anti-inflammatory activity of *Cedrus deodara* wood oil could be attributed to its mast cell stabilizing activity and the inhibition of leukotriene synthesis. Yet another study on volatile oil produced significant inhibition of carrageenan-induced rat paw edema and of both exudative-proliferative and chronic phases of inflammation in adjuvant arthritic rats at doses of 50 and 100 mg/kg body weight.

The golden yellow essential oil with characteristic balsamic odor has been used in indigenous system of medicine for treatment of skin diseases including mange in horses and against sarcoptic mange in buffalo-calves, dog, sheep, goat and camel. The oil shows in vitro anti-bacterial and anti-fungal activity and is found to be more active than most of the commercial fungicides.

Curcuma Longa

Turmeric has been used in Indian systems of medicine for a long time. In India it is popularly known as "Haldi". In traditional Hindu medicine, turmeric is extensively used in religious ceremonies & in treatment of sprains and swellings caused by injury. It is said that use of *Curcuma longa* for numerous medicinal problems ranging from constipation to skin disease goes back to 600 BC as mentioned in literature. Curcumin is a major component in *Curcuma longa* being responsible for its biological actions.

Curcuma longa (turmeric) or haridra has been mentioned in Charaka Samhita and Sushruta Samhita for its diverse properties like anthelmintic anti-inflammatory wound healing etc., Scientific studies demonstrate that curcumin present in *Curcuma longa* inhibited platelet aggregation induced by arachidonate, adrenaline and collagen. Clinical studies on curcumin obtained from rhizomes of *Curcuma longa*, was administered orally to patients suffering from chronic anterior uveitis (CAU) at a dose of 375 mg three times a day for 12 weeks. Of 53 patients enrolled, 32 completed the 12-week study. They were divided into two groups: one group of 18 patients received curcumin alone, whereas the other group of 14 patients, who had a strong PPD reaction, in addition received antitubercular treatment. The patients in both the groups started improving after 2 weeks of treatment. All the patients who received curcumin alone improved, whereas the group receiving antitubercular therapy along with curcumin had a response rate of 86%.

Yet another preclinical study on volatile oil of *Curcuma longa* showed inhibition in Carrageenin and formaldehyde induced hind paw oedema and arthritis in rats.

Cyperus rotundus

Cyperus rotundus (Nut grass), known as Mustha in Ayurveda is used as Diaphoretic, astringent, diuretic, anti-inflammatory, carminative, and stimulant properties in Indian traditional systems of medicine.

Studies on murine macrophage cell line suggested that the extract of rhizomes of *C. rotundus* could be used as anti-inflammatory candidate for the treatment of inflammatory diseases mediated by overproduction of nitric oxide and superoxide. Other preclinical studies suggest its activity is comparable to hydrocortisone and phenylbutazone. This perennial weed is also claimed to possess anti-rheumatic activity, which is reported to be 8 times as effective as hydrocortisone.

Other experimental studies have proven its antibacterial, antifungal, antimalarial, diuretic, antiobesity, and analgesic activities.

Enicostemma littorale

The anti-inflammatory activity of *E. littorale* was assessed by carrageenan-induced inflammation and cotton pellet granuloma method in rats. *E. littorale* exerted 54% anti-inflammatory activity for a dose of 100 mg/100 g body wt, respectively, in carrageenan-induced acute inflammation. In chronic inflammation of cotton pellet

granuloma, *E. littorale* exerted 30 anti-inflammatory activity at the above dosage. The optimal dose for these drugs was determined in carrageenan inflammation. The effect of the alcoholic extract of these drugs on human erythrocyte membrane stabilization and inhibition of cobra venom phospholipase A2 was studied in vitro and the drugs were found to be effective. Further, these drugs were found to inhibit the levels of lipid peroxides, acid phosphatase, and gamma-glutamyl transpeptidase activity in the exudate of cotton pellet granuloma. The effects were compared with those of standard anti-inflammatory drug, hydrocortisone. A possible mode of action of these drugs is suggested.

Withania somnifera

Ashwagandha is one of those in the Ayurvedic drugs that have been used in several indigenous drug preparations for maintaining health as well as for several disease conditions. It is known to the scientific world as *Withania somnifera* Dunal, belonging to the family Solanaceae. In herbal medicine, ashwagandha has been traditionally used as alterative, aphrodisiac, nervine tonic, rejuvenator, inflammation, arthritis and number of other disorders.

Withania somnifera administered orally at the dose of 1g/kg produced significant anti-inflammatory activity on chronic inflammatory reaction induced by cotton pellet granuloma in rats. Preclinical studies of extracts of *Withania somnifera* reveals that the antiinflammatory activity is by blocking histamine receptors, 5HT receptors in early phase and inhibition of PG synthesis in delayed phase of inflammation. Yet another preclinical studies reported its significant antiinflammatory activity of 60.09 percent at 2nd hour of its administration against carrageenin induced paw oedema in rats. Few other experimental data suggest that the extract of *Withania* is a potent herb useful .

It deserves further trials for its utility in rheumatoid arthritis and inflammation.

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