



**International Journal of Biology, Pharmacy  
and Allied Sciences (IJBPAS)**  
*'A Bridge Between Laboratory and Reader'*

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**HERBAL RESOURCES HAVING POTENTIAL ANTI- INFLAMMATORY ACTIVITY:  
AN INSIGHT TO ECOSYSTEM DIVERSITY OF CHHATTISGARH**

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Received 27<sup>th</sup> Oct. 2020; Revised 29<sup>th</sup> Nov. 2020; Accepted 12<sup>th</sup> Dec. 2020; Available online 1<sup>st</sup> Sept. 2021

<https://doi.org/10.31032/IJBPAS/2021/10.9.5634B>

**ABSTRACT**

The vegetation assumes significant part in rural as well as metropolitan climate and related ecosystem. Many of the vegetation undergo different changes because of biotic and natural obstruction which modify the vegetation morphology and biology. There is a need of detail investigation of the ethno-therapeutic plants utilized by the rural local community with conceivable examination which may feature the genuine value of these plant species so they can be overlooked and preserved to help the nearby local community and for the assistance of humankind. Woodland has been the wellspring of significant therapeutic plants. These restorative plants can possibly render a green wellbeing alternative. So far appropriate conservation support structure is needed to safeguard the floral abundance of Chhattisgarh region. Appropriate distinguishing proof of the aromatic and therapeutic plant has a decisive role in the usage of these natural sources and preservation of biodiversity in the state. Inflammation, a biochemical phenomenon obnoxiously acquainted to everybody, happens in light of infection, allergen, auto immune condition and wounds. It is manifested by edema, agony, heat, and redness alongwith malfunctioning of influenced tissue. Non-narcotic Steroidal medicines are used to treat incendiary complications; on long haul treatment they produce serious unintended effects. To beat these unwanted consequences, clinical examinations must be made to recognize

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verdurous bioactive phytochemicals with remedial potential and significantly reduced side effects. This review documents information of plant resources classified in different classes based on their taxonomy, chemical constituents, pharmacological activities and geographic occurrences from where they are acquired.

**Keywords: Ecology; Ethno-therapeutic plants; Local community; Chhattisgarh; Inflammation**

## INTRODUCTION

Chhattisgarh lies in the Deccan Bio-geographic Area, which houses rich and unique biological diversity. The State is conspicuously critical with rich endemic fauna and greenery especially herbal plants of therapeutic significance. Because of this geographical status, use of herbs for traditional healing is very common phenomenon in Chhattisgarh [1].

In the State, local tribal communities and farmer communities have been using rice, rice weeds, medicinal weeds, and medicinal herbs found extensively in agro ecosystems. Some of these herbal species of the State have found usage in Industry, in the compounding of Ayurvedic and Homeopathic drugs.

Natural diversity or "biodiversity" has been characterized as, "The anomaly among living beings from all sources including terrestrial, aquatic, inter alia and marine ecosystems and the environmental complexes of which they are associated; this incorporates inter species

variety, intra species variety and ecosystems diversity" [2].

Diversity inside species (or hereditary variety) alludes to changeability in the utilitarian units of heredity found in any component of microorganisms, plant, creature or different sources. Species variety is utilized to depict the assortment of species (regardless of whether domestic or wild) inside a geological zone. Appraisals of the all-out number of species (characterized as a populace of living beings that can interbreed under natural conditions) range from 2 to 100 million, however under 1.5 million have really been portrayed [3].

Ecosystem variety alludes to the enormous variety of plant; animal and microorganism communities and ecological processes that make them function. In short, biodiversity alludes to the assortment of living beings on earth. This variety provides the building blocks to adapt to changing environmental conditions in the future.

Chhattisgarh is one of the vital states, which hold wonderful backwoods including enhanced widely varied vegetation. The timberlands of Chhattisgarh are the residence and significant wellspring of livelihood for tribal individuals. It fundamentally mirrors their high focus with customary and social

qualities which are affixed with forests. About 44% topographical region of Chhattisgarh state (**Figure 1**) is under different sorts of timberlands with rich plant variety, of these numerous species are of ethno-therapeutic significance [4].

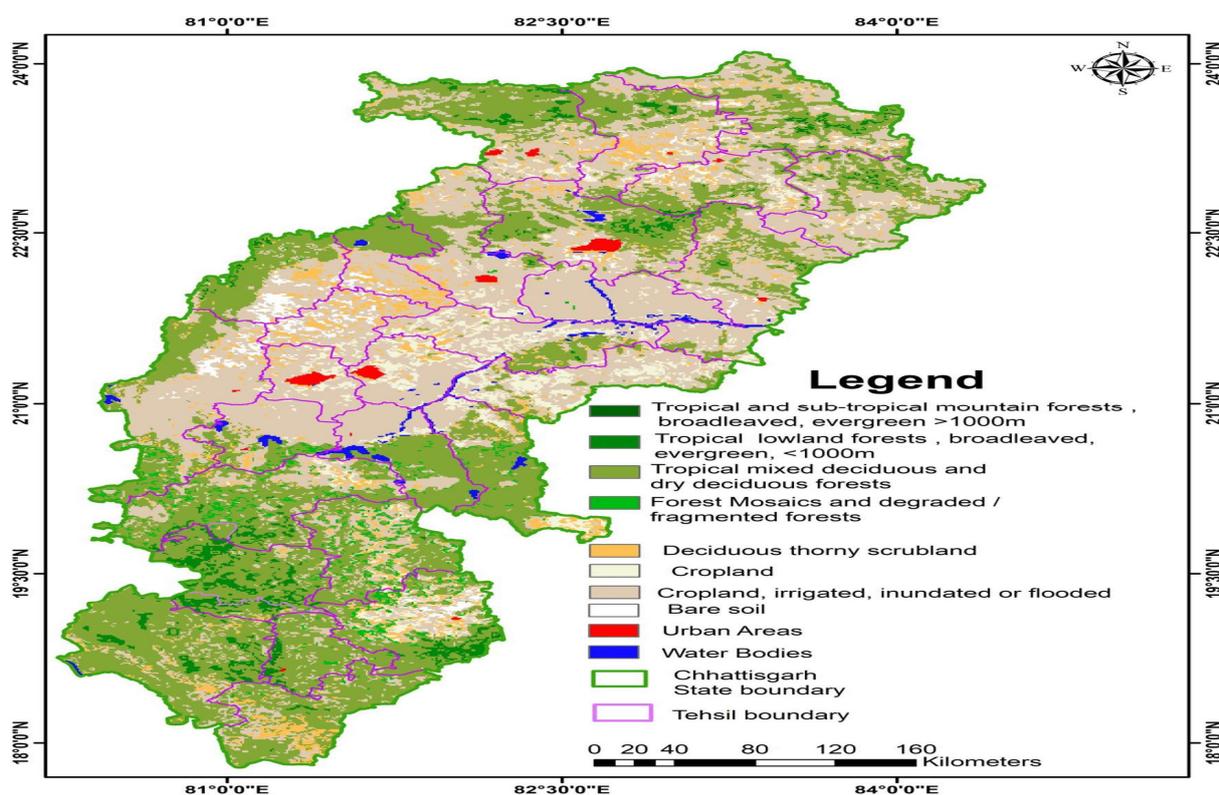


Figure 1: Map showing distribution of forest throughout Chhattisgarh [5]

The preservation of biodiversity is the fundamental to achieve sustainable development especially in case of plants with medicinal values. It provides flexibility and options for our current (and future) use of natural resources. About 80% of the population in Chhattisgarh lives in rural areas, and a large part of this population depend

directly or indirectly on natural resources [6]. Preservation of biodiversity is urgent for the maintainability of areas as different as cultivation of medicinal herbs, agri-business, power, forestry, water drainage system, fisheries, commerce, wildlife, travel industry, industry and health. Development of Chhattisgarh later on will rely upon the

establishment given by live assets, and preservation of biodiversity will guarantee that this establishment stays solid.

Therefore, we can say that conservation of biodiversity may help in setting new horizons in the pharmaceutical field. It is difficult to summarize all medicinal plants in a single review but we have tried to encompass few potential herbal sources against inflammation, which can or cannot be associated with various pathological abnormalities.

#### **Anti- phlogistic allopathic drugs and future of herbal medicines**

NSAIDs are among the most regularly recommended prescriptions around the world. They comprise a class of medications that are given in fever, agony, and inflammation on the grounds that these medications have antipyretic, pain relieving, and mitigating properties. Clinically, they are helpful in soothing torment in numerous conditions, extending from menstrual and postoperative torment to ligament torment. These medications are notable anti-inflammatory specialists, and they show their influence through the hindrance of prostaglandin by obstructing the enzyme cyclooxygenase (COX) group [7].

Then again, presently it is commonly acknowledged that NSAIDs are related with

an expanded danger of intense myocardial localized necrosis. Currently, it was accounted that myocardial dead tissue hazard was related with NSAID use. The medications trialed were diclofenac, celecoxib, ibuprofen, naproxen and rofecoxib [8].

There are generally less examinations on the danger prone impacts of NSAIDs. Studies that announced NSAIDs intervention in expanding malignant growth hazard are generally epidemiologic, and the mechanism behind expanded danger are less very much portrayed. There have been a few reports on the relationship between NSAID use and expanded danger of renal malignancy. Various examinations show conflicting and negating results regarding the function of these medications in malignancy, with some of them revealing an expanded danger in particular sorts of cancer. Epidemiologic investigations are frequently interesting however not decisive, which suggests that more exploratory examinations are required here of examination [9].

Spondylo-arthritis envelops a gathering of interrelated incendiary maladies including ankylosing spondylitis, psoriatic joint pain, joint pain identified with provocative gut ailment, and responsive joint pain. NSAIDs are commonly the primary line drugs utilized

in the treatment of Spondylo-arthritis. Other than their pain relieving impacts, research has demonstrated that NSAIDs display disease adjusting impacts in Spondylo-arthritis, for example, gastrointestinal, renal, cancer-causing and cardiovascular antagonistic impacts [10].

All NSAIDs can possibly actuate intense kidney injury, and patients with osteoarthritis with co-dreary conditions including hypertension, cardiovascular breakdown, and diabetes mellitus are at high menace. Osteoarthritis is related with overabundance mortality, which might be clarified by diminished degrees of physical action inferable from lower appendage torment, appearance of comorbid conditions, and the antagonistic impacts of hostile to osteoarthritis drugs particularly NSAIDs [11].

Nephrotoxicity is a typical symptom and leads in about 5% of pediatric cases to acute kidney injury. The nephrotoxic cause of NSAIDs emerges chiefly from two obsessive examinations: intense tubulo-interstitial nephritis (ITIN) following invulnerable response and pre-renal failure in light of decreased renal plasma flow [12].

In the course of the most recent couple of decade NSAIDs are the medications of decision for treating various fiery maladies

including rheumatoid joint pain. The NSAIDs produces anti- phlogistic action. Notwithstanding, information from clinical preliminaries have proposed that the drag out utilization of COX-2 inhibitors are likewise connected with dangerous symptoms. In these situations auxiliary metabolites from herbal compounds facilitate an incredible trust in the advancement of nascent anti-inflammatory agents [13].

Various classes of compounds have been clinically evaluated in most recent twenty years with noteworthy anti-inflammatory activity. Flavonoid, terpenoids, alkaloids and stilbenoids are the significant class of moieties with intense COX-2 inhibitory action. Alkaloids in declared skeletal sort dependent on pyridine ring system have been accounted for to have striking anti-inflammatory activity, e.g. Berberine is a customary cure against stiffness. Terpenoids essentially repress the growth of incessant joint swelling associated with inflammation [14-15].

Moreover, some investigations have explained that flavonoids are significant anti-inflammatory constituent. Some of them go about as phospholipase inhibitors and some have been accounted for as tumor necrotic factor inhibitors in various incendiary conditions. Biochemical examinations have additionally demonstrated that flavonoids can repress

both LOX and COX pathways of arachidonic metabolism relying on their concoction structures [16-17]. Moreover, most plants for the presumed biological activities are not yet investigated.

### List of Herbal Plants

There are plenty of herbal species around us. As far as anti-inflammatory herbs are concerned, humongous herbs are known for their anti-phlogistic activity. There is a summary of some selected herbs (Table 1) according to the title of this review.

**Table 1: List of natural anti-inflammatory compounds with their pharmacognostic profile**

Plant (Scientific and Vernacular name)	Geographical Occurrence/s	Chemical Constituents	Commonly used part	Pharmacological activity	Reference/s
<i>Achillea millefolium</i> (Asteraceae) Gandrain, Puthkanda, BhutKesi	Northern border area of Chhattisgarh	Camphor, borneol and artemisia ketone	Dried leaves	Anti-oxidant antiseptic	[18-19]
<i>Adhatodavasicica</i> (Acanthaceae) Arusa, Malabar nut, Isatarusa	Central India; Phatpani area of the Manendragarh, Forest Range of the Koriya District Chhattisgarh	Vasicine, vasicinone, vasicine acetate and 2-acetyl benzyl amine, adhatodine and vasicoline, vasicinolone, deoxyvasicinone and pyrroloquinazoline	Leaves	Anti-microbial, anti-arthritis	[20-21]
<i>Bacopamonnierii</i> Linn (Scrophulariaceae) Brahmi, Brahmisak	Wet lands of southern and western region of India; in Chhattisgarh Durg and Bastar districts	Tetra cyclic triterpenoid saponins, bacosides A and B, hersaponin, herpestine and brahmine	Whole Plant	Sedative, antiepileptic, vasoconstrictor	[22-23]
<i>Cassia fistula</i> L. (Fabaceae) Golden shower, Amaltas, Raja vriksha	Native to India; in Chhattisgarh found in Kanker, Narayanpur, Durg, Raipur, Dhamtari, Mungeli, Bilaspur and Korba districts	Anthraquinone, oxyanthraquinone, tannin, volatile oils and rhein	Leaves	Fever, skin diseases, leprosy	[24-25]
<i>Emblica officinalis</i> (Euphorbiaceae) Amla, Indian gooseberry	Grows in tropical and subtropical parts of India, Indonesia, China and the Malay Peninsula; everywhere in Chhattisgarh	Pyrogallol, gallic acid, ellagic acid, myricetin and phyllaemblicin-A, B and C	Leaves and Fruit	Anti-microbial, anti-oxidant, adaptogenic, hepatoprotective, anti-tumour and anti-ulcerogenic	[26-27]
<i>Lantana camara</i> Linn. (Verbenaceae) Red sage, Raimuniya, Pulikampa	Native to America; found in India, around border area of Chhattisgarh and Odisha	Lantadene $\alpha$ and $\beta$ lancamarinic acid and lancamarinin	Leaves	Febrile illness, skin infections, and diarrhea	[28-29]
<i>Lycopodium clavatum</i> Linn. (Lycopodiaceae) ground pine, clubmoss, Bendarli, nagbeli	Central India; districts of Koriya and Korba Chhattisgarh	Lycopodine, chinoline, clavatine and dihydrocaffeic acid	Aerial Part	Digestive upset, inflammations of urinary organs, dermal problems, rheumatism and epilepsy	[30-31]
<i>Ricinus communis</i> Linn. (Euphorbiaceae) castor bean, castor oil, Arand	Widespread throughout tropics and warm temperature regions of the World; Sothern region of India	Kaempferol-3-O-beta-d-rutinoside and kaempferol-3-O-beta-d-xylopyranoid) Indole-3-acetic acid and tannins	Roots, leaves	Anti-oxidant, hepatoprotective hypoglycemic, laxative, diuretic and antibacterial	[32]

	including Tamilnadu and Chhattisgarh				
<i>Sesbania sesban</i> Linn. (Leguminosae) vegetable hummingbird, Jayanti, samantha	Commonly found in tropical countries, throughout the plans in India; Durg and Raipur districts of Chhattisgarh	Delphinidinglucosides, alpha-ketoglutaric, oxaloacetic pyruvic acids, stigmasta-5, guaiacyl, syringyl and kaempferol disaccharide	Leaves and Bark	Anti-diabetic, suppuration of boils and anthelmintic	[33-34]
<i>Sidacordifolia</i> Linn. (Malvaceae) Berela, Heart-Leaf Sida, Kharinta, Barial, Kurunthotti	Common herb in the Indian subcontinent; throughout Chhattisgarh	Ephedrine, vasicinol, asicinone and N-methyl tryptophan	Whole plant	Anti- oxidant, myocardial infarction, anti- neurodegenerative, anti- pyretic, anti- bacterial and anti- ulcer	[35-36]
<i>Thespesia populnea</i> (Malvaceae) Indian Tulip tree, Aden apple, Gardha-bhanda, paraspipal	It is widely distributed in Mauritius, Mozambique and in India; everywhere in Chhattisgarh	Thespona, mansonone-d, mansonone-H, thespona and thesponon	Leaves and Barks	Dysentery, piles, diabetes, haemorrhoides, urinary disorders, scabies, anti- oxidant, psoriasis, ulcers, anti- diabetic and wound healing	[37-38]
<i>Aconitum heterophyllum</i> (Ranunculaceae) Patis, Ativisha, Atees	Endangered species of western Himalayan region; cultivated in Chhattisgarh also, under favorable condition	Alkaloids, steroids, saponins, glycoside, freidelin and stamina	Root	Analgesic and hepatoprotective activities	[39-40]
<i>Garciniamangostana</i> Linn. (Guttiferae) Mangusta, Gamboge tree	A tropical plant found in Southeast Asia	Garcinone B, and $\beta$ - and $\gamma$ -mangostin	Fruit	Anti-parasitic, antifungal, antimalarial, antibacterial, antioxidant, and anticancer	[41-42]
<i>Phyllanthus simplex</i> (Euphorbiaceae) Tandameral, Bhuiavali, Moti Bhoi-Amla	Tropical and subtropical countries of Africa, Asia, South America and West Indies; found in subtropical climatic areas of Chhattisgarh	Phyllanthin and gallic acid	Whole plant	Diarrhea, jaundice, gonorrhoea, hyperglycemia, liver disease, mammary abscess, febrifuge, anti- oxidant	[43-44]

## CONCLUSION

Ayurveda is a broadly acknowledged treatment system in South Asia for a considerable length of time and is picking up prevalence in different parts of the world, even as alternative or adjuvant treatment. Illness altering anti-rheumatic and anti-phlogistic non-steroidal drugs, either independently or in conjugation, has been the

essential management agent for controlling inflammatory disorders with extreme unintended effects. Contrasted with engineered drugs, floral medicines are viewed as holistic and rather inoffensive option, and accordingly are viewed as more reasonable for long haul treatments. Hence continuous investigations and clinical preliminaries ought to be preceded to control

and give logically based potential of flora to lessen inflammation for good health.

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