ISSN 2456-3110
Vol 9 · Issue 8
August 2024

JAiMS
INTERNATIONAL

Journal of Ayurveda and Integrated Medical Sciences

www.jaims.in

JAIMS

An International Journal for Researches in Ayurveda and Allied Sciences

Maharshi Charaka
Ayurveda

Indexed

Journal of
Ayurveda and Integrated Medical Sciences
ISSN 2456-3110
REVIEW ARTICLE August 2024

A summarize review of few plants: Its Anti-Inflammatory properties due to their Phytochemical Components

Polly Gupta[1], Shashank Tiwari[2]

[1]*Associate Professor, Lucknow Model College of Pharmacy, Lucknow, Uttar Pradesh, India.*

[2]*Director, Lucknow Model College of Pharmacy, Lucknow, Uttar Pradesh, India.*

ABSTRACT

The aim of this review paper was to summarize some commonly available plants which have anti-inflammatory activity with their phytochemical constituents. The data were collected from Current Contents and Scientific Journals, which included in publications. In this paper, the plants have anti-inflammatory activity along with their phytochemical constituents and also mention the family, part used of the every plants. Herbal plants play a significant role in human health in relation to the prevention and treatment of inflammatory conditions. Herbal medicines are popular among the public and improvements in their formulation have resulted in a new generation of phytomedicines that are more potent than before. This paper highlights on the phytochemical constituents of anti-inflammatory activity of some herbal medicines used for treating inflammatory disorders and recent developments in various herbal species. The review gives a comprehensive overview of the phytochemical constituents of medicinal plants with anti-inflammatory potential.

Key words: *Anti-Inflammatory Activity, Phytochemical Constituents, Medicinal Plants, Phytomedicines, Plants*

INTRODUCTION

Inflammation is the reaction of vascularized living tissues to local injury. It is a pathophysiology response in which the tissue and their cell comprises a series of changes in the terminal vascular bed, in blood and in connective tissues with the purpose of eliminating the offending irritant and to repair the damaged tissue. India is one of the 12th mega biodiversity centers having over 45,000 plant species. About 1500 plants with medicinal uses are mentioned in ancient texts and around 800 plants have been used in traditional medicine.[1] However, India has failed to make an impact in the global market with drugs derived from plants and the gap between India and other countries is widening rapidly in the herbal field.[2] The export of herbal medicine from India is negligible despite the fact that the country has a rich traditional knowledge and heritage of herbal medicine.[2] In this review an attempt has been made out to compile the anti-inflammatory medicinal plants with their prominent chemical ingredients and phytochemical constituents.

Inflammation is a pathophysiological response to injury, infection or destruction characterized by heat, redness, pain, swelling and disturbed functions. Inflammation is a normal protective response to tissue injury caused by physical trauma, noxious chemical or microbial agents. It is the body response to inactivate or destroy the invading organisms, to remove the irritants and set the stage for tissue repair. It is triggered by the release of chemical mediators from injured tissue and migrating cells.[3] The most commonly used drug for management of inflammatory conditions are nonsteroidal anti-inflammatory drugs (NSAIDs), which have several adverse effects especially

Address for correspondence:
Dr. Polly Gupta
Associate Professor, Lucknow Model College of Pharmacy, Lucknow, Uttar Pradesh, India.
E-mail: pollygupta99@gmail.com

Submission Date: 13/07/2024 Accepted Date: 21/08/2024

Access this article online	
Quick Response Code	Website: www.jaims.in
	DOI: 10.21760/jaims.9.8.13

ISSN: 2456-3110 REVIEW ARTICLE August 2024

gastric irritation leading to formation of gastric ulcers.[4] In modern times the trend towards the use of alternative and complementary medicine is increasing and it offers unprecedented opportunities for the development of herbal medicine.

Herbal plants play a significant role in human health in relation to the prevention and treatment of inflammatory conditions. These medicines are popular among the public and improvements in herbal formulation have resulted in a new generation of phytomedicines that are more potent than before. The aim of this review paper was to summarize some commonly available plants which have anti-inflammatory activity with their phytochemical constituents. The data were collected from Current Contents and Scientific Journals, which included in publications.

Table 1: List of plants having anti-inflammatory activity along with their phytochemical constituents

SN	Herbs Name	Family	Part Used as Anti-inflammatory	Phytochemical Constituents	References
1.	*Sida cardifolia*	Malvaceae	Roots, Aerial parts	Ephedrine, Saponine, Choline Pseudoephedrine, Betaphenethylamine, Vasicine, Hypaphorine, Ecdysterone and related Indole alkaloides. Palmitic, Stearic and β – sitosterol, Hexacosanoic acids, 6-phenyl ethyl amine, Carboxylated tryptomines, Qunazoline, Hypaphorine, Vasicinol.	5,6,7
2.	*Cassia fistula L.*	Caesalpiniaceae	Barks, Leaves	Flavonol glycosides: 5,7,3',4'-tetrahydroxy-6, 8dimethoxyflavone-3-O-α-arabinopyranoside. Xanthone glycoside: 1,8-dihydroxy-3, 7-dimethoxyxanthone-4-O- α-L-rhamnosyl(1→2)-Oβ-D-glucopyranoside. Sennosides A & B, Hentriacontanoic, Triacontanoic, Nonacosanoic, Heptacosanoic acids.	8,9.10
3.	*Sesbania sesban Linn*	Legunminosae	Leaves	3-o-[α-L-rhamnopyranosyl]-oleanolic acid, Ilexoside XL VIII cholesterol, Campesterol, β-sitosterol. Others: Lupeol, α-amyrin, Galactomannan, Stigmasta-5, Cholesterol, Campesterol, β-sitosterol, Linoleic acid, Oleic acid, Palmitic acid, Stearic acid, Lignoceric acid.	11
4.	*Ricinus communis Linn.*	Euphorbiaceae	Leaves, Roots	Steroids, Saponins, Alkaloids, Flavonoids, and Glycosides. Alkaloids: Ricinine and N-demethylricinine, and Flavones Glycosides: Kaempferol-3-O kaempferol-3-O-β-D-glucopyranoside, Quercetin, Xylopyranoside, Quercetin-3-O-β-D-glucopyranoside, Kaempferol O-β-rutinoside and Quercetin-3-O-β- monoterpenoids (1, 8-cineole, camphor and α sesquiterpenoid (β-caryophyllene), Gallic	12,13,14

ISSN: 2456-3110 REVIEW ARTICLE August 2024

				acid, Quercetin, Gentisic acid, Rutin, Epicatechin and Ellagic acid are the major phenolic compounds. Indole-3-acetic acid.	
5.	*Phyllanthus emblic*	Euphorbiaceae	Fruits	Hydrolysable tannins: Emblicanin A, Emblicanin B, punigluconin, pedunculagin. Flavonoids: (Kaempferol O alpha L (6" methyl) rhamnopyranoside, Kaempferol 3 O alpha L (6" ethyl) amnopyranoside. Alkaloids: Phyllantidine and Phyllantine. Gallic acid, Ellagic acid, 1-Ogalloyl-beta-D-glucose, 3,6-di-O-galloyl-D-glucose, Chebulinic acid, Quercetin, Chebulagic acid, Corilagin together with Isostrictinnin.	15,16.17
6.	*Albizia lebbeck*	Leguminosae	Barks	Tannins, Catechin, isomer of Leucocyanidin, Melacacidin, Leucoanthracyanidine, Lebbecacidin, Friedelin, β-setosterol, Butulinic acid and Glycosides. Saponins- Albizia Saponin A,B and C Phenolic glycosides- albizinin	18
7.	*Bauhinia variegate Linn.*	Leguminosae	Non woody aerial part	Flavanoids: Kaempferol, Ombuin, Kaempferol 7,4'-dimethyether-3-o-β-D-glucopyranoside, kaempferol-3-o-β-D-glupyranoside, Isorhanetin-3-o-β-D-glucopyronoside, Hesperidin, Triterpene caffeate, 3β trans-(3,4 dihydrooxycinnamoyloxy) olean-12-en-28-oic acid. Novel flavanol glycosides: 5,7,3'4' tetrahydroxy-3-methoxy-7-o-α-L-rhamnopyranosyl (1-3)-o-β-d-galactopyranoside.	19,20
8.	*Achyranthes aspera*	Amaranthceae	Seeds, Roots	α-L-rhamnopyranosyl-(1_4)-(β-Dglucopyranosyluronicacid)-(1_3)-oleanolic acid, α-L rhamnopyranosyl-(1_4)-(β-Dglucopyranosyluronicacid)-(1_3)-oleanolic acid-28-O-β-D- glucopyranoside and α-Lrhamnopyranosyl-(1_4)-(β-Dglucopyranosyluronic acid)-(1_3)-oleanolic acid-28-O-β-Dglucopyranosyl-(1_4)-β-Dglucopyranoside, Betaine, Achyranthine, Hentriacontane, Ecdysterone, Achyranthes Saponins A,B,C,D are the major chemical constituents Strigmasta-5, 22-dien-3-β-ol, trans-13-docasenoic acid, n-hexacosanyl n-decaniate,	21,22,23, 24

ISSN: 2456-3110 REVIEW ARTICLE August 2024

				n-hexacos-17-enoic acid and n-hexacos-11-enoic acid, Strigmasta-5, 22-dien-3-β-ol is a Phytosterol	
9.	*Amomum Subulatum* Roxb	Zingiberaceae	Whole plants	Glycosides such as Subulin, Petunidin-3,5-diglucoside, Leucocyanadin-3-O-β-D-glucopyranoside along with Cardamom and Alpinetin, 1-8, Cineole, α-terpinyl Acetate. Other constituents are α- and β-pinenen, Sabinene, p-cymene, Terpinen-4-ol, α- and β-terpineol, Nerolidol, Terpinene, Terpinyl acetate and Bisabolene, Protocatechualdehyde, 1,7-bis (3,4-dihydroxyphenyl) hepta-4E,6E-dien-3-one, Protocatechuic acid, and 2,3,7-trihydroxy-5-(3,4-dihydroxy-E-styryl) -6,7,8,9- tetrahydro - 5H – benzocycloheptene, Protocatechualdehyde and Protocatechuic acid.	25
10.	*Annona squamosal*	Annonaceae	Leaves	4-(2-nitro-ethyl 1)-1-6-((6-o-β-Dxylopyranosy1-β-D-glucopyranosyl)-oxy)benzene, Anonaine, BenzyltetrahydroisoquinolieBorneol, Camphene, Camphor, Car-3-ene, Carvone, β-caryphyllene, Eugenol, Farnesol, Geraniol, 16-Hetriacontanone, Hexacontanol, Higemamine, Isocorydine, Limonine, Linalool acetate, Menthone, Methyl anthranilate, Methylsalicylate, Methylheptenone, p-(hydroxybenzyl)-6,7-(2-hydroxy,4-hydro)isoquinoline, n-octacosanol, α- pinene, β-pinene, Rutin, Stigmasterol, β-sitosterol, Thymol and n-triacontanol. Alkaloids ,proteins & amino acids are absent in the leaf extract.	26
11.	*Hypericum triquetrifolium*	Hypericaceae	Aerial part, Leaves	Humulene *cis*-calamene *δ*-cadinene, Pinene, Caryophyllene oxide	27,28
12.	*Hibiscus mutabilis*	Malvaceae	Stem, Flowers, Leaves	Naringenin-5,7-dimethyl ether,4'-β-D-xylopyranosyl- β-D-arabinopyranoside, and eriodictyol-5,7-dimethyl ether-4'-β-D- arabinopyranoside.	29,30

ISSN: 2456-3110 REVIEW ARTICLE August 2024

				Quercetin, Quercemeritrine, Quercetin-3-D-Xyloside, Quercetin-3-sambubioside, Isoquercetin, Meratrin, Hybridin, Kaempferol, Hyperin, Guaijaverin, Cyanidine-3-xlosyl glucose, Cyanidin-3-monoglucoside, Hibiscones, Hibiscoquinones. β-sitosterol, β-carotene, and Quercetin 3-sambubioside, Isoquercitrin, Hyperin , Quercetin 3-a-L-arabopyranoside (Guaijaverin) and Avicularin	
13.	*Moringa oliefera*	Moringaceae	Stem, Leaves	4-(α-L-rhamnopyranosyloxy)-benzylglucosinolate, 4 hydroxymellein, Vanillin, β-sitosterone, Octasanic acid, β-sitosterol. Niazirin, Niazirrinin, 4-[4(4'-O-acetyl-α-L-rhamnosyloxy)benzyl] isothiocyanate, Quercetin-3-O(6"-molonyl-glucoside), Kaemoferol-3-O-glucoside and Kaempferol-3-O-(6"-malonyl-glucoside.	31,32
14.	*Caesalpinia pulcherrima*	Caesalpiniaceae	Leaves, Root, Flower, Leaves sap	Ceasalpin, β-sitosterol, Sebacic acid, Quercimeritrin, Leukodelphinidin, Cyanin, Isovouacapenol, 6β-cinnamoyl-7β hydroxyvouacapen-5α-ol, α,β- butenolide moiety, 2,3-disubstituted furan.	33
15.	*Malvestrum Coromandelianum*	Malvaceae	Aerial part	β-phenyletylamine, N-methyl-β-phenylethylamine, Dotriacontane, Dotriacontanol, β-sitosterol, Stigmasterol, Campesterol, Lutein.	34
16.	*Calendula officinalis Linn*.	Asteraceae	Flowers	Triterpenoids: Sitosterols, Stigmasterols, Taraxasterol, Taraxasterol, Lupeol, Erythrodiol, Brein, Ursadiol, Faradiol-3-O-palmitate, Faradiol- 3-O-myristate, Faradiol-3-O-laurate, Arnidiol-3-O-palmitate, Arnidiol-3-O-myristate, Arnidiol-3-O-laurate, Calenduladiol-3-O-palmitate, Calenduladiol-3-O-myristate, Oleanolic acid Saponins: Calenduloside, Oleanane. Triterpene glycoside: Calendulaglycoside A, Calendulaglycoside A6-O-n-methyl ester, Calendulaglycoside A6'- O-n-butyl ester, Calendulaglycoside B, Calendulaglycoside B 6-O-n-butyl ester, Calendulaglycoside C, Calendulaglycoside C	35,36

ISSN: 2456-3110 REVIEW ARTICLE August 2024

				6-O-n-methyl ester, Calendulaglycoside C 6-O-n-butyl ester, Calenduloside F6-O-n-butyl ester, Calenduloside G6-O-n-methyl ester glucosides of Oleanolic acid and Glucuronides(mainly found in flowers and green parts)	
17.	*Abrus precatorious*	Fabeceae	Leaves	Premotrin, Abrusides A,B,C and D, Sapogenol-abrisapogenol J, Sophradiol, 22-O-acetate, Hederagenin methyl ester, Kaikasaponin	37,38
18.	*Litchi chinensis*	Sapindaceae	Fruits	Cyanidin-3-rutinoside, Cyaniding-3-glucoside, Malvidin-3-acetylglucoside, Cyclopropanoic fatty acid, Palmitic acid, Linoleic acids, cis-7,8-metyllenehaxadecanoic, cis-5,6-methylene-tetrdecanoic, cis-3,4-methylene-tetradodecanoic acid, cis-3,4-methylenedodecanoic acids.	39
19.	*Polygala japonica*	Polygalaceae	Flowering tops	Oleanane soponin: Saponin C and D, Astragalin, Kaempferol, 3-O-(6''-O-acetyl)-β-D-glucoside and 3,7-di-O-β-D-glucoside Flavanoids glycosides: Kaempferol-3-O-[6"-O-(3-hydroxy-3-methylglutaroyl) glucosid]	40
20.	*Carthamus lanatus*	Asteraceae	Aerial parts, Seeds	Sesquiterpene glycosides: Bisabolane fucoside and Trinor-bisabolane fucoside Eudesmane glycosides: Intermedeol-β-D-fucopyranoside, 2'α-methylbutyryl N-(p-methoxycinnamoyl)-serotonin-β-D-glucoside, Apigenin, Quercitrin.	41
21.	*Ocimum sanctum Linn.*	Lamiaceae	Leaves	Eugenol, Carvacrol and Sesquiterpine Hydrocarbon, Caryophyllene, Cirsilineol, Circimaritin, Isothymusin, Apigenin and Rosameric acid. Two flavonoids: Orientin and Vicenin. Ursolic acid, Apigenin, Luteolin, Apigenin-7-O-glucuronide, Luteolin-7-O glucuronide, Orientin and Molludistin, Sesquiterpenes and Monoterpenes viz., Bornyl acetate, α-elemene, Neral, α and β-pinenes, Camphene, Campesterol, Cholesterol, Stigmasterol and	42,43

ISSN: 2456-3110 REVIEW ARTICLE August 2024

				β-sitosterol.	
22.	*Terminalia catappa*	Combretaceae	Leaves, bark and fruits	Hydrolysable tannins: Terflavins A and B, Tergallagin and Tercatain, Punicalin, Punicalagin, Chebulagic acid, Geraniin, Granatin B, 1-desgalloyl eugeniin, Corilagin and 2,3-[(S)]4,4',5,5',6,6'-hexahydroxydiphenoyl]-D-glucose.	44
23.	*Sambucus ebulus*	Adoxaceae	Whole plant	Lauric, Myristic, Tetradecenoic, Heptadecenoic, Palmitic, Stearic, Oleic, Linoleic and Linolenic acids, Lectin- SNA-II, Isorhamnetin-3-O-glucoside and Isorhamnetin-3-O-rutinoside.	45
24.	*Helotropium indicum*	Boraginaceae	Root, Leaves	Heliotrine, Helindicine, Lycopsamine, Indicine, Iindicine-N-oxide, Acetylindicine, Heleurine, Supinine	46
25.	*Costus speciosus*	Costaceae	Rhizome, Seeds	Two new Furostanol Saponins: Costusosides I and J as 3-O-[β-D-glucopyranosyl(1→4)-β-D-glucopyranosyl]-26-O-(β-Dglucopyranosyl- 22α-methoxy (25R) furost-5-en-3β, 26-diol, β-sitosterol-β-D-glucoside, Prosapogenins A and B of Dioscin, Dioscin, Gracillin, 3-O-[α-L-rhamnopyranosyl(1→2)-β-D-glucopyranosyl]-26-O-[β-D-glucopyranosyl]- 22α-methoxy-(25R) furost-5-en-3β,26-diol, 24-hydroxytriacontan-26-one and 24-hydroxytriacontan-27-one with Methyl triacontanoate, Diosgenin, Sitosterol, 8-hydroxy triacontane-25-one and Methyl triacontanoate, β-sitosterol-β-D-glucoside, Protodioscin and Methyl Protodioscin. 31-norcycloartanone, Cyloartanol, Cycloartenol and Cycloalaudenol.	47
26.	*Foeniculum vulgare*	Apiaceae	Fruits and stem	p-allylanisole, Anethole, y-cadinene, Thiujene, Camphene, Car-3-ene, p-cymene, Duraldehyde, p-propylanisole, Farnesene, Fenchone, Limonene, 1-methoxythylbenzene, 1-(p-methoxyphenyl)-α-propanone, Ocimene, β-phellandrene, α-and β-pinenes and Trimethylbicycloheptanol Volatile oil: Petroselinic acid Seed oil: Limonene and Trans anethole.	48
27.	*Dodonaea viscose*	Sapindaceae	Leaves, Flowers	Labdane-ent-15, 16-epoxy-9α-labda-13(16), 14-dien-3β, 8α-diol(I) and a new p-caumaric acid, ester of myoinositol-1-L-O-methyl-2-acetyl-3 p-caumarylmyoinositol(II).	49

ISSN: 2456-3110 REVIEW ARTICLE August 2024

				Penduletin, Quercetin, Isorhamnetic, Diviscogenin, 4-hydroxy-3,5-diprenylbenzaldehyde, Clemiscosins A and C, Fraxetin, Stearic acid and Syringic acid, β-sitosterol.	
28.	*Carica papaya*	Caricaceae	Fruits	β-carotenoids and Rutin	50
29.	*Pluchea indica*	Asteraceae	Roots	Terpenic glycosides: Plucheosides A and B, Linalyl glucoside, Linalylapiosyl glucoside and 9-hydroxylinalyl glucoside. Thiophene derivatives: 2-(prop-1-inyl)-5-(5,6-dihydroxyhexa-1,3-diinyl)-thiophene and 2-(prop-1-inyl)-5-(6-acetoxy-5-hydroxyhexa-1,3-diinyl)-thiophene, hop-17(21)-en-3β-yl acetate and Boehmeryl acetate.	51
30.	*Calotropis procera*	Apocynaceae	Roots	New steroidal Hydroxylketone: Procesterol, C-6 and C-24 diepimer of stigmast-4-en-6β-ol-3-one Triterpene: Taraxast-20(30)-en-3-(4-methyl-3-pentenoate), Taraxasteryl acetate, Multiflorenol, Cyclosadol, Cycloart-23-en-3β, 25-diol, β-sitost-4-en-3-one, α and β-amrins, Stigmasterol and β-sitosterol, C18-isoursane derivative(I).	52
31.	*Boerhaavia Diffusa*	Nyctaginaceae	Whole part	Two new Rotenoids: Boeravinone A and Boeravinone B Sitosterol, Stigmasterol, Campesterol, Heptadecylic, Oleic, Stearic, Arachidic, Behenic acid, 12a-hydroxyrotenoid-Boeravinone C, Repenone and Repenol, Liridendrin, Syringaresinol-β-D-glucoside, Boeravinones D,E,F, Borhavine characterized as methyl 3,10-dihydro-11-hydroxy-1-methoxy-4,6-dimethyl-10-oxo-1H-furo[3,4-b]xanthene-3-carboxylate.	53,54
32.	*Euphorbia prostrate*	Euphorbiaceae	Whole plants	Rogosins A, B, D, E and G, Tellimagrandins I and II, Corilagin, Geraniin, galic acid, 1,2,3-tri-O-galloyl-D-glucose. Three new ellagitannins: Prostratins A, B and C, β-sitosterol, Stigmasterol, Cycloart-3β,25-diol, Alanine, Isoleucine, 2-aminobutyric acid, Ornithine hydrochloride and Threonine.	55
33.	*Phyllanthus amarus*	Phyllanthaceae	Leaves	Four new Lignans: 2,3-desmethoxy seco-isolinteralin diacetate, Linnanthin and Demethylenedioxyniranthin, Phyllanthusiin D New cyclic tannin: Amarulone, Amariin, Geraniin, Corilagin, 1,6-digalloyl-β-D-glucoside, Rutin, Quercetin-3-O-glucoside.	56
34.	*Bacopa monniera*	Scrophulariaceae	Whole plants	Alkaloids: Nicotinine, and Herpestine The isolation of D-mannitol and a Saponin, Hersaponin, Bacosides A, as 3-(α-L-	57

ISSN: 2456-3110 REVIEW ARTICLE August 2024

				arabinopyranosyl)-O-β-D-glucopyranoside-10, 20-dihydroxy-16-keto-dammar-24-ene. Three new dammarane-type triterpenoid: Saponins A, B and C as 3-O-α-L-arabinopyranosyl-20-O-α-L-arabinopyrasonyl-jujubogenin,3-O-[α-L-arabinofuranosyl-(1→2)-α-L-arabinopyranosyl] pseudojujubogenin and 3-O-β-D-glucopyranosyl(1→3)-{α-L-arabinofuranosyl-(1→2)}-α-L arabinopyrasonyl] The new dammarane: Pseudojujubogenin glycoside, Bacopasaponin D, defined as 3-O-[α-L-arabinofuranosyl-(1→2)-β-D-glucopiranosyl] Two new pseudojujubogenin glycosides: Bacopasides I and Bacopasides II. Three new Phenylethnoid Glycosidews,viz Monnierasides B Three new saponin: Bacopasides III, IV, V	
35.	*Cordia myxa*	Boraginaceae	Fruit	5,7-Dimethoxytaxifolin-3-O-α-L-rhamnopyranoside(I), β-sitosterol, Palmitic acid, Stearic acid, Arachidonic acid, Behenic, Oleic and Linoleic acids and other Fatty acids, Kernels, Hesperetin-7-rhamnoside, Lup-20(29)-ene-3-O-β-D-maltoside(II), 3',5-dihydroxy-4'-methoxy-flavanone-7-O-α-L-rhamnopyranoside, Allantoin isolated from stem barks, Taxifolin-3-rhamnoside isolated from seeds.	58
36.	*Withania somnifera*	Solanaceae	Leaves	5,20α-dihydroxy-6α,7α-epoxy-1-oxowitha-2,24-dienolide Nine new steroidal lactones: Withanolides E,F,G,H,I,J,K,L and M,20-hydroxy-1-oxo-20R,22R-with a-2,58(14),24-tetraenolide (Withanolide G), 20,27dihydroxy-1-oxo-20R,22R-witha-2,5,8(14), 24-tetraenolide (Withanolide H), 20-hydroxy-1-oxo-20R,22R-with a-3,5,8(14), 24-tetraenolide (Withanolide I), 17,20-dihydroxy-1-oxo-20S,22R-witha-2,5,8(14), 24-tetraenolide (Withanolide J), 17,20-hydroxy-1-oxo-20S,22R-with a-3,5,8(14), 24-tetraenolide(Withanolide K), 17,20-dihydroxy-1-oxo-20S,22R-witha-2,5,814,24-tetraenolide (Withanolide L), 17,20-dihydroxy-1-oxo-14,15α-epoxy-20S,22R-witha-2,5,8,24-tetraenolide (Withanolide M)	59
37.	*Argyreia speciosa* Linn.f.	Convolvulaceae	Roots	Kaemperol, Kaemperol-3-o-lrhamnopyranoside. Two new flavone glycosides: 7,8,3',4',5'-pentahydroxyflavone5-o-α-lrhamnopyranoside and 7,8,3',4',5'-pentahydroxyflavone5-	60

ISSN: 2456-3110 REVIEW ARTICLE August 2024

				o-α-l-glucopyranoside, tetradecanyl palminate, 5, 8-oxidotetracosan-10-one, Stigmasteryl, Phydroxycinnamate and Hexadecanyl p-hydroxycinnmate along with Scopoletin, Palminate, Stearic, Linoleic, Linolenic, Myristoleic, Nonadecanoic, Eicosenoic, Eicosanoic, Heneicosanoic and Behenic acids, Ergometrin, Caffeic acid and Ethyl caffeate. Glutamic acid, Glycine, Isoleucine, Leucine, Lysine, Phenylalanine, Tyrosine, Praline and α-amino butyric acid, n-tricontanol, β- sitosterol, p-hydroxycinnamoyloctadecanolate and Caffeic acid.	
38.	*Morus alba*	Moraceae	Leaves	Diel-Alder type adduct: Mulberrofuran T and kuwanol E 2-arylbenzofuran-ω-hydroxymoracin N: Moracin C and Moracin N, β-amyrin, β-sitosterol, Bergapten, Scopoletin, and Umbelliferone, Isoquercitrin, Quercetin-3-O-(6”-O-acetyl)-β-D-glucoside, Astragalin and kaempferol-3-O-(6”-O-acetyl)-β-D-glucoside. Roots-1-deoxynojirimycin, N-methyl-1-deoxynojirimycin, Fagomine, 3-epifagomine, 1,4-dideoxy-1,4-imino-D-arabinitol, 1,4-dideoxy-1,4-imino-2-O-β-D-glucopyranosyl-D-arabinitol, 1,4-dideoxy-1,4-imino-D-ribitol, Calystegin B2, Calystegin C1, 2-O- and 6-α-D-galactosyl-1-deoxynojirimycins and 2-O-,3-O, 4-O- and 6-O-β-D-glucosyl-1-deoxynojirimycins.	61
39.	*Barleria prionitis*	Acanthaceae	Whole plants	Scutellarein-7-rhamnosylglucoside isolated from flowers Iridoids: Barlerin, Acetylbarlerin	62
40.	*Nyctanthes arbortristis*	Oleaceae	Leaves	Iridoid: Nyctanthoside; Crocin-1-(β-digentiobioside ester of α-crocetin), and Crocin-3 (β-monogentibioside ester of α-crocetin), D-mannitol, Astrgalin, Nicotiflorin.	63
41.	*Paederia foetida*	Rubiaceae	Leaves	Hentriacontane, Hentriacontanol, Methyl mercaptan Ceryl alcohol, Palmitic acid, Sitosterol, Stigmasterol, Campesterol, Ursolic acid, Iridoid glycosides-Asperuloside, Paederoside and Scandoside.	64
42.	*Pistacia integerrima*	Anacardiaceae	Whole plants	α-pinene, β-pinene, α-phellandrene, Car-3-ene, β-phellandrene, γ-terpinene, Limonene, α-and β-terpineols	65

ISSN: 2456-3110 REVIEW ARTICLE August 2024

				Three tetracyclic terpenoids: Pistacigerrimones A, B, and C characterized as 20(R),24(R)3-oxo-9β-lanosta-1(2),7,24-trien-26-oic acid, 20(R),24(R)3-oxo-9β-lanosta-1(2),8,24-trien-26-oic acid and 20(R),24(R)3-oxo-tirucalla-1(2),24-dien-26-oic acid Tetracyclic triterpenes: Pistacigerrimones D, E and F	
43.	*Eugenia uniflora*	Myrtaceae	Leaves	Selina-1,3,7(11)-trien-8-one, Oxidoselina-1,3,7(11)-trien-8-one.	66
44.	*Arnebia euchroma*	Boraginaceae	Roots	Caffeic acid Tetramers: 1,2-dihydro-6,7-dihydroxy-1-(3',4'-dihydroxyphenyl)naphthalene-2,3-dicarboxylic acid, 3-(3',4'-dihyroxyphenyl)-(R)-lactic acid, deoxyshikonin, β,β-dimethylacryishikonin, Acetylshikonin, Tetracrylshikonin, Shikonin, β-hydroxy-isovalerylshikonin. Phenolics: Arnebinol, Shikonofuran, de-O-methyllasiodiplodin. Quinones: Arnebinone and Arnebifuranone, Mannose, Galactose, Glucose, Rhamnose, Fucose, Arabinose.	67
45.	*Euphorbia Lactea*	Euphorbiaceae	Latex	24-Methylenecycloartenol, Euphorbol hexacosanoate, Tinyatoxin and 12-deoxyphorbol-13,20-diacetate.	68
46.	*Coccinia indica*	Cucurbitaceae	Fruits	Taraxerone, taraxerol, and (24R)-24- ethylcholest- 5- en-3β- ol glucoside, B- carotene, Lycopene, Cryptoxanthin, and Apo- 6'- lycopenal, β- sitosterol and Taraxerol, Triterpenoid, Saponin Coccinioside – k(i). C41H66O12, Flavonoid glycoside ombuin 3-o- arabinofuranoside, 3- o-β- (α-l- arabinopyranosyl)-(1→2) –β-d-glucopyranosyl-(1→3)- β- hydroxylup – 20(29)- en-28- oic acid, Lupeol, β-amyrin, and β- sitosterol, Stigmast -7- en-3-one, Cephalandrol, C29H58O tritriacontane C33H68 B- sitosterol alkaloids Cephalandrine a and Cephalandrine b, Aspartic acid, Glutamic Acid, Asparagine, Tyrosine, Histidine, Phenylalanine and Threonine,Valine.	69
47.	*Wedelia chinensis*	Asteraceae	Leaves	Isoflavonoids: .Norwedelic acid (III) (5, 6-dihydroxy-2 (2', 4', 6'-trihydroxyphenyl)-benzofuran-3-carboxylic acid. Bisdesmisidic oleanolic acid saponin: β -D-glucopyranosyl-3-o-[o-β-D-xylopyranosyl-(1→2)- β -D-Gl u c u r o n o p y r a n o s y l] o l e a n o l a t e (I V) , β -D-glucopyranosyl 3β-[(o-β-D-xylopyranosyl-(1→)-(pD-glucuronopyranosyl)]-olean-12-en-28 oate) (V)	73

ISSN: 2456-3110 REVIEW ARTICLE August 2024

48.	*Curcuma longa*	Zingiberaceae	Root	1,8-Cineole, 2-bornanol, 2-hydroxy methyl-antraquinone, 4-hydroxy-cinnamoyl-methane, alpha-pinene, Arabinose, Beta-carotene, Bis-demethoxycurcumin, bisabolene, bixin, cinnamic acid, curcuminol, cuminyl alcohol, cryophyllene, eugenol, epi-percumenol, Feruloyl-p-coumaroyl-methane, L-alpha-curcumene, monodesmethoxycurcumin, o-coumaric acid, p-coumaric acid.	74

CONCLUSION

In terms of the prevention and treatment of inflammatory disorders, herbal plants are important to human health. The public enjoys using herbal remedies, and advances in their composition have led to a new generation of phytomedicines that are stronger than earlier versions. This essay focuses on the phytochemical components that give some herbal medications their anti-inflammatory properties, as well as on recent advancements in a variety of herbal species. The paper provides a thorough summary of the phytochemical components of medicinal plants with promise for reducing inflammation.

REFERENCES

1. Kamboj V.P. “Herbal Medicine.” Current Science.2000; 78:35-39.
2. Valiathan M.S. “Healing Plants.” Current Science. 1998;75:1122 –7.
3. Tripathi K.D. “Essentials of medical pharmacology.” 6th ed. Jaypee Brothers Medical Publishers (P) Ltd.: New Delhi; 2008.
4. Bennett P.N., Brown M.J. Clinical pharmacology. Churchill Livingstone: New Delhi; 2005.
5. R.K. Sutradhar, A.K.M. Matior Rahman, M.U Ahmad, B.K Datta, S.C. Bacchar, A. Saha. “Analgesic and anti-inflammatory activities of sida cardifolia linn.” Indian J Pharmacol, June 2006, Vol 38, Issue 3, 207-08
6. Franzotti EM., Santos CV, Rodrigues HM, Mourão RH, Andrade MR, Antoniolli AR. Anti-inflammatory, analgesic activity and acute toxicity of Sida cordifolia L. Journal of Ethnopharmacology 2000; 72: 273-7.
7. Ankit Jain, Shreya Choubey, P.K.Singour, H. Rajak and R.S. Pawar. “Sida cordifolia (Linn) – An overview” Journal of Applied Pharmaceutical Science 01 (02); 2011: 23-31
8. Anonymous. “The Wealth of India, First Supplement Series (Raw Materials),” National Institute of Science Communication and Information Resources, CSIR, 2007, 1st supplementary series, Vol 1 (A-C), 223-224.
9. R. P. Rastogi, B. N. Mehrotra. “Compendium of Indian Medicinal plants,” Central Drug Research Institute, Lucknow and National Institute of Science Communication and Information Resources, New Delhi, 2004, Vol 4, 155, 156.
10. T. Bhakta, P. K. Mukherjee, K. Saha, M. Pal, B. P. Saha, S. C. Mandal, Journal of Herbs, Spices & Medicinal Plants, 1999, 6(4), 67-72
11. M.S. Navahath, “Evaluatiion of anti-inflammatory activity of cassia fistula and ficus bengalensis”. Journal of Pharmacy Research, 2009; 2-8
12. Mukherjee BT, Saha K, Pal M, Saha BM. Evaluation of Anti-Inflammatory Effects of Cassia fistula (Leguminosae) Leaf Extract on Rats. Journal of Herbs, Spices & Medicinal Plants 2008; 6: 67-72.
13. Dande PR. Talekar VS. Chakraborthy GS., “Evaluation of crude saponins extract from leaves of Sesbania sesban (L.) Merr. for topical anti-inflammatory activity.” Int. J. Res. Pharm. Sci.2010. (3), 296-299.
14. Ilavarasan R, Mallika M, Venkataraman S. “Anti-inflammatory and free radical scavenging activity of Ricinus communis root extract.” J Ethnopharmacol. 2006; 103: 478-80.
15. Adriana Cristina Valderramas; Sérgio Henrique Pereira Moura;Maira Couto, Silvana Pasetto ; Gilberto Orivaldo Chierice; Sergio Augusto Catanzaro Guimarães5; Ana Claudia Bensuaskie Paula Zurron; “Anti-inflammatory activity of Ricinus communis derived polymer;” Braz J Oral Sci. October/December 2008 - Vol. 7 - Number 27.

ISSN: 2456-3110 **REVIEW ARTICLE** August 2024

16. Anil Kumar Saini; Rohit Goyal; Vinod Kumar Gauttam; Ajudhia Nath Kalia; "Evaluation of anti-inflammatory potential of Ricinus communis Linn leaves extracts and its flavonoids content in Wistar rats," Journal of Chemical and Pharmaceutical Research, 2010, 2(5):690-695.

17. Dang GK, Parekar RR, Kamat SK, Scindia AM, Rege NN. "Anti-inflammatory activity of Phyllanthus emblica, Plumbago zeylanica and Cyperus rotundus in acute models of inflammation." Phytother Res.2011; 25(6):904-908.

18. Muthuraman A, Sood S, Singla SK. "The anti-inflammatory potential of phenolic compounds from Emblica officinalis L. in rat." Inflammopharmacology. 2010 Jul 2. [Epub ahead of print]

19. Nicolis E, Lampronti I, Dechecchi MC, "Pyrogallol, an active compound from the medicinal plant Emblica officinalis, regulates expression of pro-inflammatory genes in bronchial epithelial cells." Int Immunopharmacol. 2008; 8(12):1672-1680.

20. Babu NP, Pandikumar P, Ignacimuthu S. "Anti-inflammatory Activity of Albizia lebbeck Benth., an Ethnomedicinal Plant, in Acute and Chronic Animal Models of Inflammation." J Ethnopharmacol 2009; 125: 356–360.

21. Rao, Yerra Koteswara, Fang Sheh-Hua, Tzeng Yew-Min, "Anti-inflammatory activity of flavonoids and a triterpene caffeate isolated from Bauhinia variegata," Phytotherapy Research, 2008; 22: 957-962.

22. Yadava RN, Reddy Madhusudhan, "Anti-inflammatory activity of novel flavanol glycosides from Bauhinia variegate Linn." Natural Product Research 2002; 17(3); 165-169.

23. Kumar S V, Sankar P, Varatharajan R. "Anti-inflammatory activity of roots of Achyranthes aspera." Pharmaceutical Biology, 2009, 47(10): 973- 975.

24. Mehta, F. A., Patel, B. G., Pandya, S. S., Ahir, K. B. and Patel, S. B. "Antinociceptive and anti-inflammatory activity of Achyranthes aspera L. extracts". Pharmacologyonline.2009; 3: 978-985.

25. Gokhale, A. B., Damre, A. S., Kulkami, K. R. and Saraf, M. "Preliminary evaluation of anti-inflammatory and antiarthritic activity of S. lappa, A. speciosa, A. asper." Phytomedicine 2001; 9(5): 433-437

26. Vetrichelvan, T. and Jegadeesan, "Effect of alcoholic extract of Achyranthes aspera Linn. on Acute and Sub-acute Inflammation." Phytotherapy research. 2003; 17(1): 77-79.

27. Alam K, Pathak D, Ansari SH. "Evaluation of Anti-Inflammatory activity of Amomum Subulatum fruit extract". Int. J. Pharmaceu. Sci.Drug. Res. 2011, 3(1), 35-37

28. Chavan M, Wakte P, Shinde D. Analgesic and anti-inflammatory activity of Caryophyllene oxide from Annona squamosa L. bark. International journal of phytotherapy and phytopharmacology 2009; 17: 149-51.

29. Apaydin, S., U. Zeybek and I. Ince (1999). "Hypericum triquetrifolium Turra. extract exhibits antinociceptive activity in the mouse." J Ethnopharmacol 67: 307-312.

30. Ozturk B, Apaydin S, Goldeli E, Ince I, Zeybek U: "Hypericum triquetrifolium Turra. extract exhibits antiinflammatory activity in the rat." Journal of Ethnopharmacology 2002, 80(2-3):207-209

31. Barve VH, Hiremath SN, Shashikant PR, Pal SC. "Phytochemical and Pharmacological Evaluation of Hibiscus mutabilis leaves." J Chem Pharm Re 2010;2:300-309.

32. Ishikura N. "Anthocyanins and flavonols in the flowers of Hibiscus mutabilis F. versicolor." Kumamoto J Sci Biol 1973;11:51–59.

33. Caceres A, Saravia A, Rizzo S, Zabala L, De Leon E, Nave F: "Pharmacologie properties of Moringa oleifera: Screening for antispasmodic, antiinflammatory and diuretic activity." Journal of Ethnopharmacology 1992, 36(3):233-237.

34. Ezeamuzie IC, Ammbakederemo AW, Shade FO and Ekwebelm SC, "Anti-inflammatory effects of Moringa oleifera root extract," Int J Pharmocogn, 1936, 34(3), 207-212.

35. V. Sharma, G.P. Rajani. "Evaluation of Ceasalpinia pulcherrima Linn. For anti-inflammatory and antiulcer activity." Indian Journal Pharmacol. 2011, Apr:43(2): 168-171.

36. P. Khonsung, S. Nantsupawat, S.N. Jesadanont, V. Chantharateptawan, A. Panthong "Anti-inflammatory and Analgesic Activities of Water Extract of Malvastrum coromandelianum (L.)" Thai J Pharmacol;Vol. 2006 28:3, 8-15.

37. Della LR. "Topical anti-inflammatory activity of Calendula officinalis extracts." Planta Med, 1990; 56: 658-658.

38. Della LR, Della LR, Tubaro A, Sosa S, Becker H, Saar S, Isaac O. "The role of triterpenoids in topical anti-inflammatory activity of Calendula officinalis flowers." Planta Med, 1994; 60: 516- 520

39. I Vane; R Bottling. FASEB J., 1987, 1, 89-96.

40. G Toneli; L Thuboult; I Rinler. Endocrinol., 1965, 77, 625-634.

41. Besra SE, Sharma RM, Gomes A: "Antiinflammatory effect of petroleum ether extract of leaves of Litchi chinensis Gaertn. (Sapindaceae)." Journal of Ethnopharmacology 1996, 54(1):1-6.

42. Kou J, Si M, Dai G, Lin Y, Zhu D: "Antiinflammatory activity of Polygala japonica extract." Fitoterapia 2006, 77(6):411-415.

43. Bocheva A, Mikhova B, Taskova R, Mitova M, Duddeck H: "Antiinflammatory and analgesic effects of Carthamus lanatus aerial parts". Fitoterapia 2003, 74(6):559-563.

44. Godhwani S, Godhwani JL, Vyas DS. "Ocimum sanctum: an experimental study evaluating its antiinflammatory, analgesic and antipyretic activity in animals." J Ethnopharmacol 21(2):1987,153-163.

45. Singh S, Majumdar DK. "Evaluation of anti-inflammatory activity of fatty acids of Ocimum sanctum fixed oil." Indian J Exp Biol 35:1997,380-383.

46. Fan YM, Xu LZ, Gao J, Wang Y, Tang XH, Zhao XN, Zhang ZX: "Phytochemical and anti-inflammatory studies on Terminalia catappa." Fitoterapia 2004, 75(3-4):253-260.

47. Ebrahimzadeh MA, Mahmoudi M, Salimi E: "Antiinflammatory activity of Sambucus ebulus hexane extracts." Fitoterapia 2006, 77(2):146-148.

48. R. P. Rastogi, B. N. Mehrotra. "Compendium of Indian Medicinal plants" Central Drug Research Institute, Lucknow and National Institute of Science Communication and Information Resources, New Delhi, 2004, Vol 4, 155, 156.

49. Binny K, Sunil Kumar G, Dennis Thomas, "Antiinflammatory and Antipyretic properties of the rhizome of Coctus speciosus". Journal of Basic and Clinical Pharmacy, 2010, 1(3), 177- 181

50. Choi E-M, Hwang J-K: "Antiinflammatory, analgesic and antioxidant activities of the fruit of Foeniculum vulgare." Fitoterapia 2004, 75(6):557-565.

51. Khalil NM, Sperotto JS, Manfron MP: "Antiinflammatory activity and acute toxicity of Dodonaea viscosa." Fitoterapia 2006, 77(6):478-480.

52. Amazu LU, Azikiwe CCA, Njoku CJ, Osuala FN, Nwosu PJC, Ajugwo AO, Enye JC: "Antiinflammatory activity of the methanolic extract of the seeds of Carica papaya in experimental animals." Asian Pacific Journal of Tropical Medicine 2010, 3(11):884-886.

53. Sen T, Chaudhuri AKN: "Antiinflammatory evaluation of a Pluchea indica root extract." Journal of Ethnopharmacology, 33(1-2):135-141.

54. Basu A, Chaudhuri AKN: "Preliminary studies on the antiinflammatory and analgesic activities of Calotropis procera root extract." Journal of Ethnopharmacology 1991, 31(3):319-324.

55. Hiruma Lima C.A., Gracioso J.S., Bighetti E.J.B., Germonse´n Robineou L. and Souza Brito A.R.M., "The juice of fresh leaves of Boerhaavia diffusa L. (Nyctaginaceae) markedly reduces pain in mice," Journal of Ethnopharmacology, 267-274 (2000)

56. Krishna Murthi, Mayank AP and Vijay Lambole. "Pharmacological properties of Boerhaavia diffusa-A Review" In editor. Indian Journal of Experimental Biology, 5(2), 107-110 (2010)

57. Singla AK, Pathak K: "Topical antiinflammatory effects of Euphorbia prostrata on carrageenan-induced footpad oedema in mice." Journal of Ethnopharmacology 1990, 29(3):291-294.

58. Kassuya CAL, Silvestre A, Menezesde- Lima JO, Marotta DM, Rehder VLG, Calixto JB: "Antiinflammatory and antiallodynic actions of the lignin niranthin isolated from Phyllanthus amarus. Evidence for interaction with platelet activating factor receptor." European Journal of Pharmacology 2006, 546(1-3):182-188.

59. Jain P, Khanna NK, Trehan T, Pendse VK, Gohwani JL. "Anti-inflammatory effects of an ayurvedic preparations,Brahmi Rasayan,in rodents." Indian J Exp Biol 1994; 32: 633-636.

60. Al-Awadi FM, Srikumar TS, Anim JT, Khan I: "Antiinflammatory effects of Cordia myxa fruit on experimentally induced colitis in rats." Nutrition 2001, 17(5):391-396.

ISSN: 2456-3110 **REVIEW ARTICLE** August 2024

61. Jayaprakasam B, Nair MG: "Cyclooxygenase-2 enzyme inhibitory withanolides from Withania somnifera leaves." Tetrahedron 2003, 59(6):841-849.
62. Srivastava MC, Kant V and Tewari JP (1972). "Antiinflammatory activity of roots of Argyreia speciosa (Samundrashokha)." Mediscope 15: 219-222.
63. Choi E-M, Hwang J-K: "Effects of Morus alba leaf extract on the production of nitric oxide, prostaglandin E2 and cytokines in RAW264.7 macrophages." Fitoterapia 2005, 76(7-8):608-613.
64. Singh B, Bani S, Gupta DK, Chandan BK, Kaul A: "Anti-inflammatory activity of [`]TAF' an active fraction from the plant Barleria prionitis Linn." Journal of Ethnopharmacology 2003, 85(2-3):187-193.
65. Saxena RS, Gupta B, Saxena KK, Singh RC, Prasad DM: "Study of anti-inflammatory activity in the leaves of Nyctanthes arbor tristis Linn. – an Indian medicinal plant." Journal of Ethnopharmacology 1984, 11(3):319-330.
66. De S, Ravishankar B, Bhavsar GC: "Investigation of the anti-inflammatory effects of Paederia foetida." Journal of Ethnopharmacology 1994, 43(1):31-38.
67. Ahmad NS, Waheed A, Farman M, Qayyum A: "Analgesic and anti-inflammatory effects of Pistacia integerrima extracts in mice." Journal of Ethnopharmacology 2010, 129(2):250-253.
68. Schapoval EES, Silveira SM, Miranda ML, Alice CB, Henriques AT: "Evaluation of some pharmacological activities of Eugenia uniflora L." Journal of Ethnopharmacology 1994, 44(3):137-142.
69. Kaith BS, Kaith NS, Chauhan NS: Anti-inflammatory effect of Arnebia euchroma root extracts in rats. Journal of Ethnopharmacology 1996, 55(1):77-80.
70. Fernandez-Arche A, Saenz MT, Arroyo M, de la Puerta R, Garcia MD: Topical anti-inflammatory effect of tirucallol, a triterpene isolated from Euphorbia lactea latex. Phytomedicine 2010,17(2):146-148.
71. Niazi, Junaid; Singh, Parabhdeep; Bansal, Yogita and Goel, RK (2009), "Anti-inflammatory, analgesic and antipyretic activity of aqueous extract of fresh leaves of Coccinia indica", Inflammopharmacology, 17(4), 239-44.
72. Wedelia chinenis (Asteraceae) - An overview Sameksha Koul, A Pandurangan, RL Khosa School of Pharmacy Bharat Institute of Technology, Partapur, By-Pass road, Meerut-250103, India
73. Sayantani Chanda, T.V. Ramachandra "Phytochemical and Pharmacological Importance of Turmeric (Curcuma longa): A Review" Research & Reviews: A Journal of Pharmacology ISSN: 2230-9861 (Online), ISSN: 2349-1299 (Print) Volume 9, Issue 1.

How to cite this article: Polly Gupta, Shashank Tiwari. A summarize review of few plants: Its Anti-Inflammatory properties due to their Phytochemical Components. J Ayurveda Integr Med Sci 2024;8:83-97. http://dx.doi.org/10.21760/jaims.9.8.13

Source of Support: Nil, **Conflict of Interest:** None declared.

****