

CARDORIUM PLUS POLYHERBAL SYRUP: A COMPREHENSIVE REVIEW OF ITS HERBAL COMPONENTS AND THERAPEUTIC BENEFITS

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ABSTRACT

Cardorium Plus Syrup is a meticulously blended polyherbal Ayurvedic medication that promotes cardiovascular health by enhancing blood flow and preserving vascular integrity. It breaks down arterial obstructions, fortifies blood vessels, and encourages the best possible cardiac performance. It also helps manage vascular disorders, maintains normal blood pressure, and inhibits platelet aggregation. Cardorium Plus Syrup is an expertly formulated, hygienic natural remedy for circulatory health, varicose veins, and heart-related conditions. Although there is some evidence that Cardorium Plus has anti-inflammatory properties, more research is still required. This review paper will describe the composition and the medicinal applications of Cardorium Plus polyherbal Syrup.

KEYWORDS: Arterial obstruction, Cardorium plus, circulatory health, meticulously, platelet aggregation, vascular integrity, varicose veins.

INTRODUCTION

A proprietary herbal ayurveda liquid decoction made from polyherbal ingredients to treat atherosclerosis and vascular endothelial dysfunction. It is a powerful herbal treatment that increases the rate of blood circulation. This improves blood flow by breaking down the blockages and fortifying the heart and other blood vessels. It is a powerful medication that causes vathanulomatha in the bloodstream. Following on top of correcting medodushti, it also helps to eliminate srothorodha and prevent dhamaniprathichaya. It lowers the chance of prameha-related problems. It's called jeevana medication.^[1] Cardorium Plus has been shown to have anti-inflammatory, antioxidant, and vasodilator properties.^[2] Arjuna, Gokshura, Pushkaramoola, Vrikshamla, Jatamansi, Kurubaka, and Vetasamla are among the members of the composition, and they all have different activities.^[3] The dynamic duo of these herbs helps to normalize lipid ratios, enhance fat metabolism, and provide antioxidant activity against free radical damage.

ESSENTIAL BENEFITS

- **Promotes Cardiovascular Health:** Enhances blood circulation, strengthens heart muscles, and enhances overall cardiac function.^[3]
- **Dissolves Arterial Blockages:** Helps break down plaque deposits and increases blood flow through arteries and veins.^[4]

- **Promotes Healthy Lipid Levels:** Promotes fat metabolism and excretion by returning triglyceride and cholesterol levels to normal.^[5]
- **Lowers Vascular Inflammation:** Prevents vascular damage by offering antioxidant and anti-inflammatory protection.^[4]
- **Supports the Management of Circulatory Disorders:** Beneficial for diseases such as peripheral artery blockages, atherosclerosis, hypertension, varicose veins, Reynaud's disease, and deep vein thrombosis.^[6]
- **Promotes Kidney and Liver Health:** Aids in maintaining metabolic balance, detoxification, and reducing excessive fluid retention.^[7]



Figure 1: Cardorium Plus Syrup.^[8]

HERBAL COMPOSITION

Table 1: Composition of Cardorium plus.^[3]

Name of the Herbal Ingredients	Scientific Names	Family Name	Part Used	Indications	Amount taken (in mg)
Arjuna	<i>Terminalia arjuna</i>	<i>Combretaceae</i>	Stem	Cardioprotective (improves heart functions), Corrects Dhamaniprathichaya (Atherosclerosis)	100
Gokshura	<i>Tribulus Terrestris</i>	<i>Zygophyllaceae</i>	Fruit	Potent Vatha pacifying herb	100
Pushkaramoola	<i>Inula racemosa</i>	<i>Asteraceae</i>	Root	Removes Kapha vitiation and inhibits the process of Srothorodha	60
Vrikshamla	<i>Garcinia indica</i>	<i>Clusiaceae</i>	Fruit	Act on Medodushti, which prevents Dyslipidemia and Atherosclerosis	20
Jatamansi	<i>Nardostachys jatamansi</i>	<i>Valerianaceae</i>	Root	Acts against Vyana Vatha Dosha and helps to maintain normal Raktha Vaha Srotas	20
Kurubaka	<i>Rhododendron arboreum</i>	<i>Ericaceae</i>	Flower	Act against Kapha Dosha, Vyana Vatha Dosha, Medodushti and improve Raktha Vaha Srotas	3
Vetasamla	<i>Garcinia pedunculata</i>	<i>Clusiaceae</i> (formerly known as <i>Guttiferae</i>)	Fruit	Boosts immune system and acts as potent antioxidant additionally acts against Vyana Vatha Dosha, Medodushti and improves Raktha Vaha Srotas	1

CHEMICAL AND PHARMACOLOGICAL CHARACTERISATION OF HERBAL COMPONENTS

ARJUNA

Arjuna, or *Terminalia arjuna*, is a member of the *Combretaceae* family. The Indian subcontinent has been using its bark decoction for ages to treat anginal discomfort, hypertension, congestive heart failure, and dyslipidemia, according to the observations of ancient physicians.^[9] They include a number of phytochemicals that give them the aforementioned therapeutic qualities, including flavonoids, polyphenols, triterpenoids, tannins, glycosides, and various minerals and proteins. Where the inotropic effects of *Terminalia arjuna* are thought to be caused by its saponin glycosides. At the same time, the flavonoids and phenolics may have vascular-strengthening and antioxidant properties, confirming the plant's multifaceted cardioprotective function. According

to Nadkarni & Nadkarni (1954) and Warriar et al. (1996), the powdered stem bark is traditionally used as an alcoholic decoction (asava), with clarified butter (ghrita), or with boiled milk (kshirpak).^[10,11] The Hridya medication is well-known for its cardioprotective properties. It works well for rakta dhatu, blood vessels, and the heart. It gives the heart sustenance. It functions as a cardiac tonic and lengthens the heart's rest period. It controls the heart's rhythm and strengthens its contractions. It is a stimulant of the heart.^[12,13] Vagabhatta was the one who initially promoted the use of powdered stem bark for heart conditions.^[14] Additionally, it has been found to have hypolipidemic, prostaglandin E2 boosting, moderate diuretic, anti-ischemic, antioxidant, and antithrombotic properties. Its favorable effects in treating coronary artery disease, both alone and in combination with statins, are well supported by clinical evidence.^[15, 16]

Major chemical constituents present in "*Terminalia arjuna*" include the following table:

Table 2: Chemical constituents in *Terminalia arjuna*.^[9,17]

Part of plant	Secondary metabolites	Major chemical constituents
Stem bark	Glycosides	Arjunoside I, arjunoside II, arjunetin, terminoside A
	Flavonoids	Arjunolone, arjunone, luteolin, quercetin, kempferol, gallic acid
	Tannins	Pyrocatechols, penicillin, casuarinin, casuarinin, terchebulin, punicalagin, terflavin C
	Triterpenoids	Arjunin, arjunic acid, arjunolic acid, arjungenin, terminic acid, terminolitin
	Minerals and trace elements	Calcium, magnesium, aluminium, zinc, copper, silica
	Other compounds	β -Sitosterol
Roots	Triterpenoids	Arjunic acid, arjunolic acid, oleanolic acid, terminic acid
	Glycosides	Arjunoside I, arjunoside II, arjunoside III, arjunoside IV

Leaves and seeds	Flavonoids	Luteolin
	Cardenolide	14,16-dianhydrogitoxygenin-3-beta-d-xylopyranosyl (1-->2)-O-beta-d-galactopyranoside
	Alkaloids	
	Tannins	
	Steroids	
	Phenolic compounds	
	Inorganic acid	
	Oxalic acid	
Fruits	Glycosides and flavonoids	Luteolin, gallic acid

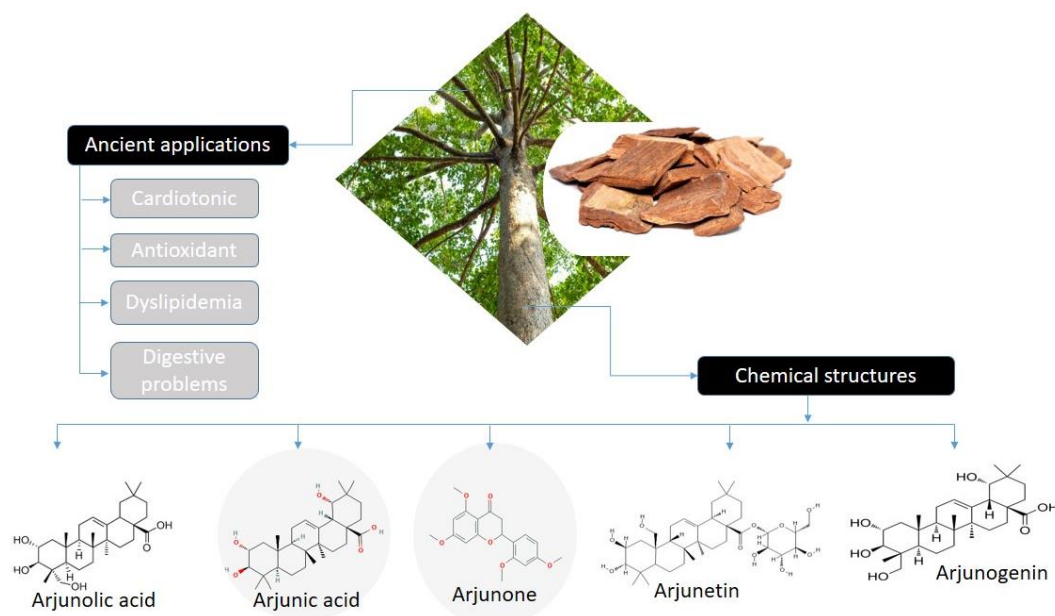


Figure 2: Overview of Terminalia Arjuna.

Pharmacological applications

1) Antioxidant: Free radicals harm cells and upset the body's balance since they are highly reactive and unstable. They are created by metabolic processes such as physical activity, ischemia/reperfusion injury, or exposure to radiation and harmful substances. Natural herbs, especially arjuna's flavonoid and phenolic components, are rich in antioxidants, which boost the immune system and regulate the overproduction of free radicals. These substances quench singlet oxygen, reduce, give electrons, and bind metal ions. Side chains and the conjugation of aromatic rings with free hydroxyl radicals are two examples of how phenolic compounds in plants exhibit their antioxidant qualities. By scavenging hydrogen peroxide radicals, flavonoids further demonstrate their antioxidant qualities. All things considered, antioxidants are essential for preserving a strong immune system.^[10,18-21]

2) Anti-inflammatory: Infection, xenobiotics, and a weakened immune system are the main causes of inflammation. In the first stage of the inflammatory response, neutrophils and macrophages are recruited, and they release several mediators that result in acute inflammation. One important mediator that causes

inflammation by triggering the production of inducible NOS is nitric oxide. Plant flavonoids suppress the expression of iNOS (nitric oxide synthase) and prevent the synthesis of nitric oxide (NO). Flavonoids also prevent prostaglandin formation by molecularly blocking the enzymes COX-1 and COX-2 and cyclo-oxygenase. These flavonoids also suppress the pro-inflammatory cytokines.^[22]

3) Cardiotonic activity: Arjuna bark stems have chronotropic, inotropic, and diuretic qualities.^[9] Positive inotropic activity results from the flavonoids found in arjuna bark, such as arjunolic acid, which strengthen heart contractions. By phosphodiesterase inhibition, flavonoids raise cAMP levels, which in turn improve cardiac contractility. Saponins found in arjuna bark, such as oleic acid, reduce heart rate via modifying calcium channels, which results in negative chronotropic activity.^[23]

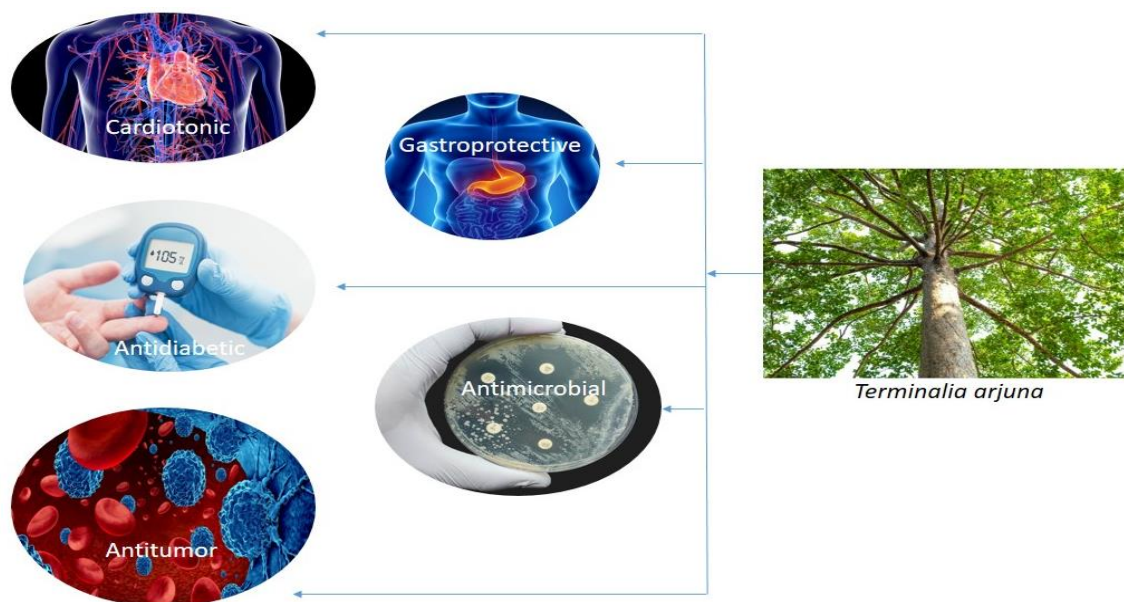


Figure 3: Pharmacological applications of *Terminalia arjuna*.

PUSHKARAMOOLA

Inula racemosa, the scientific name for pushkaramoola, is a perennial herbaceous plant that is widely used in traditional medicine, especially in the age-old Ayurvedic method of treatment. Pushkaramoola, a native of the Himalayan area, has long been regarded for its contributions to many facets of health and wellbeing as well as its many medicinal uses. Pushkaramoola is referred to as a "Rasayana," or revitalizing herb, in Ayurvedic writings since it is a powerful plant with various medical applications. Its Sanskrit moniker, "Pushkara," which means "the best," highlights its prestigious standing in conventional medical procedures. Although other plant parts may also have therapeutic significance, the main medicinal component utilized in Ayurveda is the roots, which are distinguished by their mushy and fragrant texture. Pushkaramoola has been used historically to treat a wide range of medical issues, from liver malfunction and irregular menstruation to

digestive and respiratory diseases. Its traditional use also includes boosting immunity, reducing pain and inflammation, and enhancing general health. Scientific studies have recently placed a greater emphasis on examining the pharmacological characteristics of Pushkaramoola and confirming its traditional usage. Pushkaramoola has a wide range of bioactive substances, including sesquiterpene lactones, flavonoids, and polysaccharides, which have been found via phytochemical research and contribute to its therapeutic benefits.^[24]

This plant has pharmacological properties such as antipyretic, sedative, antiviral, hepatoprotective, anti-asthmatic, and antifungal. Its intense heat potency balances the vata dosha, while its strong, bitter flavor balances the kapha.^[25]

Major chemical constituents in "*Inula racemosa*" includes in following table:

Table 3: Chemical constituents in Pushkaramoola.^[25-28]

Part of Plant	Secondary metabolites	Major chemical constituents
Roots	Sesquiterpene	Alantolactone, isoalantolactone
	Essential oil	Azulene and Alantodine
	Flavonoids and polyphenols	
	sterols	Beta-sitosterol
	Alkaloids and tannins	
Leaves	Sesquiterpene lactone	Alantolactone, Isoalantolactone, dihydroalantolactone.
	Essential oils and volatile compounds	Azulene, Germacrene-D, Beta-caryophyllene
	Flavonoids and polyphenols	Quercetin, kaempferol, luteolin
	Alkaloids and glycosides	Insulin and cardiac glycosides
	Tannins and sterols	Beta-sitosterol
Bark	Sesquiterpene Lactones	Alantolacton and Isoalantolactone
	Essential oils	Beta-caryophyllene

	Flavonoids and polyphenols	Quercetin and kaempferol
	Tannins	
	Sterols	Beta-sitosterol and stigmasterol
	Alkaloids and Glycosides	
Flowers	Sesquiterpene lactones	Alantolactone and Isoalantolactone
	Essential oils	Azulens, Camphene and Germacrene
	Flavonoids	Quercetin and Kaempferol
	Sterols	Beta-sitosterol and sigmasterol
	Phenolic Compounds	Chlorogenic acid and Caffeic acid
	Alkaloids	Insulin and related polysaccharides



Figure 4.1: Roots of Pushkaramoola and 4.2 Plant of *Inula racemosa*.^[25]

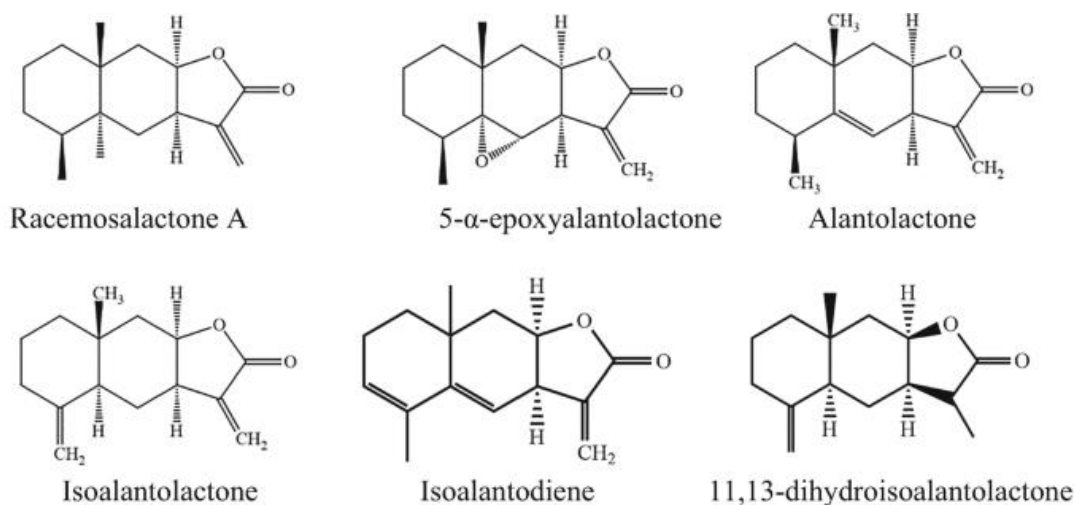


Figure 5: Chemical structures of Pushkaramoola phytoconstituents.^[29]

Pharmacological Benefits

1) Anti-inflammatory and analgesic: The traditional use of pushkaramoola as an analgesic and anti-inflammatory medication has been documented. It is used to lessen pain and inflammation brought on by a number of ailments, including rheumatism, arthritis, and muscle injuries. The herb can be applied topically as liniments or poultices, or taken internally.

2) Menstrual problems: Pushkaramoola is frequently suggested in traditional Ayurvedic medicine for women's

health concerns, especially in the treatment of menstrual problems. It is thought to have emmenagogue qualities, which aid in controlling menstrual periods and easing symptoms like cramping and anomalies.^[24]

3) Anti-allergic, anti-histamine, and mast cell stabilizing properties

Inula racemosa was studied in relation to several asthmatic stimuli, including immunological, physiological, and biochemical circumstances. The activity of petroleum ether extract is higher than that of

conventional ethanol and water extracts. It was discovered that petroleum ether extract was efficient against clonidine-induced mast cell formation, milk-induced leucocytosis, histamine-induced contraction, and milk-induced eosinophilia. The immunologically induced degranulation of mast cells is considerably inhibited by the ethanolic extract from *I. racemosa* roots. In a histamine-induced bronchoconstriction experiment on guinea pig ileum, the polyherbal formulation containing *I. racemosa* demonstrates antihistaminic properties, mast cell stabilization, and spasmolytic activities.^[30]

VRIKSHAMLA

Vrikshamla, Ayurvedic Grass, is also known as *Garcinia cambodia* or Malabar Tamarind. This is originally a tropical tree with the fruits of India, which is usually called kokum. In India's western ghats, the ancient fruit kokum (*Garcinia indica*), which belongs to the *Clusiaceae* family, is commonly consumed as sharbat. The kokum fruit tree is used in cooking, medicinal, and nutrition. Fruit rinds contain high levels of benzophenone garcinol, which has been linked to a number of possible bioactivities, including cytotoxic and antioxidant properties. The primary red pigments found in fruit rinds have been identified as cyanidin-3-glucoside and cyanidin-3-sambubioside. A variety of pharmacological activities, such as anti-inflammatory, anti-helminthic, anti-ulcer, cardioprotective, UV protection, anti-hyperglycemic, and Parkinson disease protective properties.^[31]

Oil is extracted Kokum seeds. This oil is known as Kokum Oil used in Curry, cosmetics, pharmaceuticals and expensive Confectionery recipes in other countries. It is used in products like lip balms, soaps, and lotions because of its emollient qualities, which make it appropriate for moisturizing products.^[32]

Numerous bioactive substances, such as citric acid, oxalic acid, hydroxy citric acid lactone, and hydroxy citric acid (HCA), are present in the fruit of the *Garcinia* species, especially *Garcinia indica* and contribute to its therapeutic qualities. Moreover, polyisoprenylated benzophenones such as isoxanthochymol and garcinol are abundant in the fruit rind. These substances have strong antioxidant properties, as do xanthenes as α -mangostin, β -mangostin, and mangostinone (found in *Garcinia mangostana* or *mangosteen*). Additionally, flavonoids that are frequently found in *Garcinia* species, such as quercetin and kaempferol, strengthen the antioxidant properties of the plant. Moreover, the plant includes xanthenes and benzophenones, which are recognized for a variety of biological activities, including antioxidant qualities. Together, these substances support *Garcinia*'s medicinal potential and provide a host of health advantages.^[31, 33, 34]

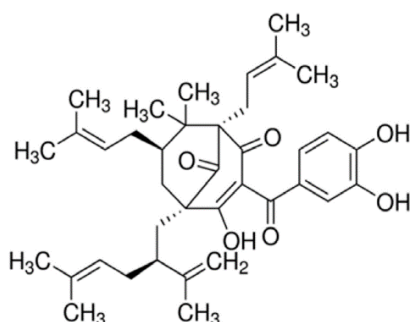
Major chemical constituents of "*Garcinia indica*" are included in following table:

Table 4: Chemical constituents of Vrikshamla.^[35-37]

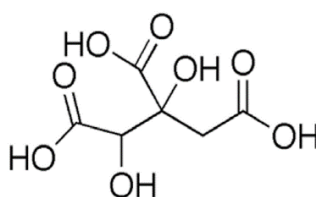
Part of Plant	Secondary metabolites	Major chemical constituents
Fruit rind	Polyisoprenylated benzophenones	Garcinol, Isogarcinol
	Xanthenes	Xanthochymol, Isoxanthochymol
	Flavonoids	Quercetin
	Anthocyanins	Cyanidin-3-sambubioside, Cyanidin-3-glucoside
	Organic acids	Hydroxycitric Acid (HCA), Citric acid, Malic acid
	Essential Oils	Volatile aromatic compounds
	Phenolic Compounds	Tannins, Phenolic acids (ascorbic acid)
Seeds	Amino acids	L-Leucine
	Flavonoids	Volkensiflavone
	Xanthenes	Cuxanthone
	Lipids	Kokum Butter, Neutral lipids, Glycolipids, Phospholipids
	Fatty acids	Stearic acid, Oleic acid, Palmitic acid, Linoleic acid
Leaves	Organic acids	(-)-Hydroxycitric Acid (HCA), HCA Lactone, Citric acid
	Phenolic compounds	Ortho/Para-Coumaric acid, Naringenin, Apigenin
	Triterpenoids	Friedelin, Lupeol
Stem Bark	Tannins	Ellagic acid, Gallic acid
Resin	Terpenoids	9,19-Cyclo-25,26-epoxyergostan-3-ol, 4,4,14-trimethyl-acetate

Figure 6.1: *Garcinia indica* fruits.^[38]

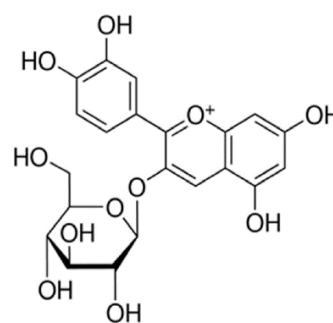
6.2 Dried fruits of Vrikshamla.



Garcinol



Hydroxycitric acid



Cyanidin-3-glucoside

Figure 7: Chemical structures of bioactive compounds of *Garcinia indica*.^[39]

Pharmacological applications

1) Antioxidant activity

Antioxidant is a trace element that can neutralize free radicals or its action. Free radicals participated in the etiology of several major diseases, including office, cardiovascular disease, diabetes and arthritis. One of the important characteristics of the ingredient is that it is antioxidant because of the recent food trends in the direction of healthy product development in the form of functional products. Garcinol is a peeled polycycle benzophenone from the fruit shell *Garcinia indica*, which shows antioxidant, anticancer and anti-pulse characteristics. KOKUM contains other natural compounds having antioxidant characteristics such as citric acid, polyphenol, carbohydrates, anthocyanin flavonoids and ascorbic acid.^[40]

2) Antiobesity activity: Kokum fruit juice is very sour with pH of 1.5 to 2.0 and contains multiple mountains. The main part of Kokum's organic acid is Hydroxycitric Acid (HCA) (1, 2-dihydroxy Pro Poppa-1, 2, 3-Diacarbon). *Garcinia indica* shell contains about 20-30% hydroxycitric acid (HCA) on a dry basis. Hydroxycitric acid (HCA) has been patented to use as a low-collect testerolemia due to the activity of obesity. Hydroxycitric acid and its derivatives are useful for the treatment of obesity. It suppresses the synthesis of fatty acids, fat

production, and food consumption and causes weight loss. Hydroxycitric acid (HCA), fruit juice *Garcinia indica* also contains therapeutic acid, citric acid, and Tartaric acid.^[41, 42]

3) Antiulcer activity: *Garcinia indica*'s ethanolic and aqueous extract showed notable antiulcer action ($p < 0.001$) in rats with stomach lesions caused by ethanol and HCl and ulcerogenesis caused by indomethacin. The body breaks down ethanol to create superoxide anion and hydroperoxy free radicals, which are involved in the mechanisms of both acute and chronic stomach ulcers.^[43]

4) Antifungal activity

Garcinia indica extract is equipped with both antifungal and antibacterial agents, and may be used as a biological contact as an in food and treatment in cancer treatment. Studies have shown that the Kokum Rind extract has an antifungal effect on *Candida Albicans* and *Penicillium* SP. And *Aspergillus flavus*.^[44]

JATAMANSI

Nardostachys Commonly referred to as Indian spikenard, jatamansi is a plant in the Valerian family that is used in Ayurvedic medicine to treat a variety of conditions, including menopause, flatulence, epilepsy, intestinal fistula discomfort, neurologic headaches, and excitation.

Its pharmaceutical application has been thoroughly studied since its discovery in the Himalayas. Numerous illnesses, including those of the digestive, circulatory, neurological, pulmonary, urinary, reproductive, and skin systems, have historically been treated with jatamansi. Additionally, it exhibits strong anti-ischemic, antiarrhythmic, anticonvulsant, hepatoprotective, neuroprotective, hypotensive, hypolipidemic, and tranquilizing effects. With its cold-water network, jatamansi oil is used to treat headaches, kidney problems, sleeplessness, and abdominal pain. In steam baths,

external oils are often utilized to alleviate uterine inflammation. Among the many actions of jatamansi are its anticonvulsive and antiparkinsonian effects. The roots' essential oil has a range of pharmacological properties, such as hypotensive, antifungal, antibacterial, antiarrhythmic, and anticonvulsant effects. The main constituents of the plant are sesquiterpenes, such as nardostachone and jatmansone. New terpenoids have been found in *N. jatamansi's* roots and rhizomes as a result of chemical testing.^[45,46]

Major chemical constituents of "*Nardostachs jatamansi*" includes as following table :

Table 5: Chemical constituents of Jatamansi.^[47,48]

Parts of Plant	Secondary metabolites	Major chemical constituents
Leaves	Terpenoids (Sesquiterpenes and Diterpenes)	Valeranone, Patchouli alcohol, Calarenol, Nadol and Nardostachysin.
	Flavonoids	Quercetin, Kaempferol, luteolin.
	Alkaloids	Actinidine, Matairesinol
	Phenolic compounds	Ferulic acid, Chlorogenic acid and caffeic acid
	Glycosides	Iridoid glycosides
	Coumarins	Scopoletin, Umbelliferone
Flowers	Terpenoids (Monoterpenes and Sesquiterpenes)	Valeranone, patchouli alcohol, Nardostachon and Calarenol
	Flavonoids	Quercetin, luteolin
	Alkaloids	Actinidine
	Phenolic Compounds	Ferulic acid, caffeic acid
	Coumarins	Scopoletin
Roots	Sesquiterpenes (Major Bioactive compounds)	Jatamansone (Valeranone), Nardol, Nardal, Patchouli Alcohol, Calarenol, Seychellene.
	Coumarins	Jatamansin (Xanthogalin)
	Alkaloids	Actindine
	Lignans	Pinoresinol, Kanshone A & B
	Flavonoids & Polyphenols	Gallic acid, Catechin & Epicatechin, Chlorogenic acid, Homovanillic acid, Rutin hydrate, Quercetin-3-rhamnoside.



Figure 8.1 Jatamansi plant illustration.^[49]



and 8.2 Roots of Jatamansi.^[50]

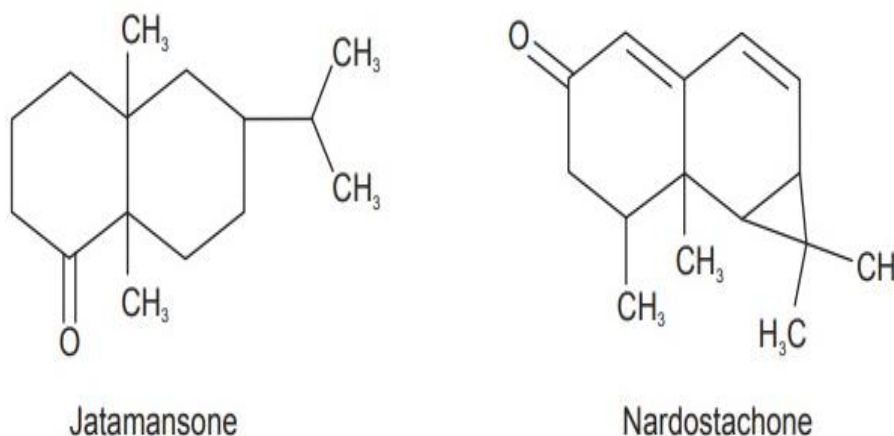


Figure 9: Chemical structures of Bioactive components of Jatamansi.^[51]

Pharmacological applications

1) Cardio portative activity

Doxorubicin, I.P. in a dose of 15 mg/kg. Indeed, rats administered showed myocardial damage. This was demonstrated by increasing serum marker enzymes [lactic acid dehydrogenase, creatine phosphokinase, aspartate transaminase, alanine aminotransferase]. Animals showed significant changes in antioxidant enzymes [superoxidie dismutase, glutathione peroxidase, catalase, and glutathione Transferase] and lipid peroxidation levels. Pretreatment with *N.Jatamansi* Extract was important, and recovered to antioxidant enzyme activity and lipid peroxide in a near-normal mirror.

2) Anticonvulsant activity

Rao et al. Ethanol extracts of Jatamansi DC roots were investigated for their anticonvulsive activity. Neurotoxicity alone combined with rat phenytoin. The results shows a significant increase in attacks the threshold for the *N. jatamansi* DC root extract is shown by the reduction, for the maximum electric shock fitting model (MES). Expansion/flexibility. However, the extract was ineffective against pentylenetetrazole induced seizures. Furthermore, pretreatment of rats with phenytoin at doses of 12. 50 and 75 mg/kg in combination with 50 mg/kg led to a significant increase in the protective index (PI) of phenytoin from 3.63 to 13.189.^[52]

3) Neuroprotective activity

Salim et al. Pretreatment with alcoholic extract from Jatmans DC. This was administered in 15 days of protective rats at 250 mg/kg. For local ischemia caused by clasp in the midcerebral artery. You can connect protective effect Improvement of glutathione content system.^[53]

KURUBAKA

Rhododendron arboreum Known in Sanskrit as "Krabaka" and Nepal's "Rarigrass," the rhododendron is

a tree with bright red flowers, a tree in the Nepal national flower, Uttarakhand state.

Rhododendron arboreum, or tree rhododendron, is a member of the *Ericaceae* family and is found in the highlands of Assam and Manipur, as well as northern India and the Himalayas. With a height of 1200-400 meters, this evergreen tree thrives in partial shade and needs protection from the scorching afternoon sun. Its exquisite blossoms are provided as decorations in temples and have religious significance. The plant is well-known for its medicinal properties and financial worth, and it now holds the Guinness record for the largest *Rhododendron* in the world.

Nutrients such as water and fat-soluble pigments, vital antioxidants, flavanols, and total flavonoids are abundant in rhododendron blooms. They also have significant levels of iron, manganese, zinc, and salt, all of which are necessary for sustaining biological functions that are vital to health. Flowers range in protein content from 4.85 to 5.59%, with regional, soil, and temperature changes causing variances. The alkaloids, flavonoids, glycosides, saponins, tannins, and steroids found in rhododendrons increase the system's total antioxidant content. Among the compounds in the plant that have physiological activity are polyphenol molecules. The chemical state of plants extends beyond their blossoms to include their bark, roots and stems.^[54]

Major chemical constituents of "*Rhododendron arboretum*" are included as following table:

Table 6: List of Bioactives present in *Rhododendron arboretum*.^[55]

Part of Plant	Secondary metabolite	Major chemical constituents
Leaves	Flavonoid	Quercetin-3-O-galactoside, Quercetin
	Sterol	Beta-sitosterol
	Flavonol glycoside	Rutin
	Triterpenoid	Epifridelinol, 3,10-Epoxyglutinane
	Pentacyclic triterpenoid	Ursolic acid, Alpha-amyrin, Beta-amyrin, Friedelin
Flowers	Flavonoid	Quercetin-3-O-galactoside, Quercetin
	Flavonol glycoside	Quercitrin
	Pentacyclic triterpenoid	Ursolic acid
Bark	Triterpenoid	3-O-acetylbetulnic acid, Beta-sitosterol-3-O-beta-Dglucosidose, 3-Beta-acetoxyurs-11 en-13 Beta, 28-olide, Betulin, Lupeol, 3-O-acetylursolic acid, Betulinic acid, Taraxerol,
	Pentacyclic triterpenoid	Ursolic acid, 15-oxoursolic acid



Figure 10.1 Botanical view of Kurubaka.^[56]



10.2 Dried flowers of Kurubaka.

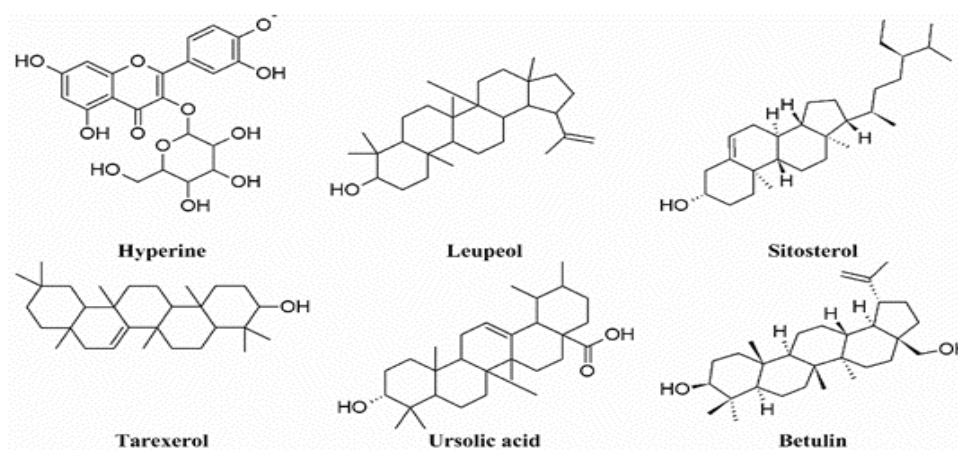


Figure 11: Chemical structures of *Rhododendron arboretum*.^[57]

Pharmacological applications

1) Anti-microbial activity

Arboretum flowers have antibacterial properties. They investigated the antibacterial efficacy of isolated but Chemical Quercetin for seven different microorganisms only discovered. it was effective against *Staphylococcus aureus* and *E. coli*. Up to a dosage of 12.5 mg/ml. It showed a certain level of action. Lal et al. (2017) antibacterial activity of plant extracts was evaluated *Rhodendron arboretum* for six different bacterial

pathogens like Typhi, Shigella, *E. Coli*, *S. Aureus*, *B.Celeus*. Low inhibitory concentration results show even in lower concentrations. The extract was sufficient to prevent the development of all harmful bacteria. These results were found by the doing Analysis of data from tests. Ethanol extracts were found to be efficient against *Staphylococcus aureus*, but not against *Staphylococcus aureus*. Methanol extracts were more effective against all other bacteria than permeate against all other bacteria.^[58]

2) Anti-inflammatory activity

Pharmacological properties of the Pakistani plant *Rhododendron arboreum* include sialagogic effects, convergent diuresis, and spasmolysis. The potential for anti-inflammatory medications in *Rhododendron* was examined by Nisar et al. using methanol extracts of the bark of the *Rhododendron arboreum*. These compounds included ursolic acid, -sitosterol, pineal, dandelion, betulinol, and acetic acid-induced torsion and carrageenan-induced mouse foot edema. When it came to acetic acid-induced writhing, the ethyl acetate fraction had the strongest analgesic effect, followed by the crude extract and chloroform fractions. Additionally, the extracts demonstrated dose-dependent anti-inflammatory action against mice's paw edema caused by carrageenan.^[59]

3) Anti-diabetic activity

Antidiabetic activity is (*Rhododendron arboreum*) Flower and active connections were then isolated. Aqueous methanol extracts of Laliguran flowers have been found to exhibit inhibitory activity on intestinal \pm glucosidase. Both the water soluble and acetate soluble ethyl moieties from the water-soluble methanol extract showed inhibitory activity against \pm glucosidase. From the ethylacetate, soluble moiety, the \pm glucosidase inhibitor quercetin-3-O-glucopyranoside (hyperlin) was separated by enzyme assay driven separation. The isolated connections showed Dosedependent \pm glucosidase inhibitory activity with IC₅₀ values of 1.66 mm and 0.76 mm in sucrose or maltose. This study found that flowers

have antidiabetic potential that can help support medical preparation, nutritional or functional foods for diabetes and its complications.^[60]

VETASAMLA

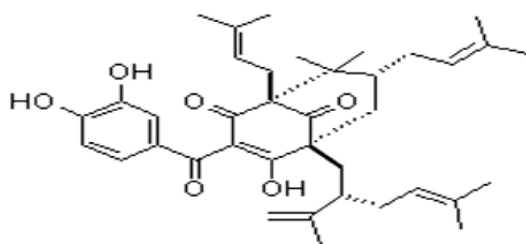
The tropical plant Amlavetasa, also called *Garcinia pedunculata*, has a long history of use in traditional medicine and Ayurveda. It is used to balance doshas, detoxify, and treat digestive issues. For therapeutic purposes, the ripe fruit is sliced and dried. Its scorching potency and sour taste make it problematic in traditional Ayurvedic therapy. According to recent studies, flavonoids, polyphenols, and hydroxy citric acid give it antihelmintic, antifungal, antidiabetic, hepatoprotective, and neuroprotective qualities.^[61, 62] It supports all aspects of digestion. It is used to treat hiccups, cough, asthma, heart weakness, discomfort, calculi, sinusitis, and dysuria. Commercially, revandachini branches are marketed as amlavetas. Amlavetas should be regarded as fruit since Charak mentioned them in Phalavarg.^[63]

Certain *Garcinia* species have been shown to contain (-)-hydroxycitric acid (HCA) in their fruits. This HCA has been shown to decrease body weight growth, decrease fatty acid synthesis and lipogenesis, raise hepatic glycogen synthesis rates, suppress hunger, and suppress food consumption. An excellent dietary supplement for any weight management program is this HCA. It is also used as ayurvedic medicine for treating female obesity as they are rich in (-) – hydroxycitric acid (HCA).^[64]

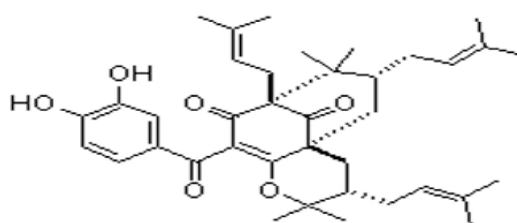
Major chemical constituents of "*Garcinia pedunculata*" are included in the following table:

Table 7: Phytochemicals present in *Garcinia pedunculata*.^[65-67]

Part of Plant	Secondary metabolite	Major chemical constituents
Fruits	Flavonoids	Quercetin, kaempferol, Rutin
	Carotenoids	Beta-Carotene, Lycopene
	Phenolic compounds	Gallic acid, Caffeic acid, Ferulic acid
	Fatty acids	Palmitoleic acid (Omega-7), Oleic acid, Linoleic acid.
	Xanthones	Mangosteen
Seeds	Flavonoids	Kaempferol, Quercetin, Rutin
	Fatty acids	Linolic acid (Omega-6), Alpha-Linolenic acid (Omega-3), Palmitic acid
	Tannins	Proanthocyanidins
	Phenolic Compounds	Vanilic acid, syringic acid.
Leaves	Flavonoids	Quercetin, Rutin, myricetin, isorhamnetin.
	Phenolic Acids	Caffeic acid, Chlorogenic acid, Ellagic acid.
	Tannins	Condensed tannins
	Terpenoids	Ursolic acid, Betulinic acid.
Bark and stem	Phenolic compounds	Ellagitannis, Lignans
	Alkaloids	Similar like Hippophae alkaloids
	Flavonoids	Catechins, Epicatechin
	Sterols	Campesteol, Beta-sitosterol
Roots	Alkaloids	Uncharacterized Hippophae alkaloids.
	Phenolic compounds	Cinnamic acid, Ferulic acid
	Terpenoids	Ursolic acid

Figure 12.1: Dried fruits of Vetasaamla.^[68]12.2: Unripe fruits of Vetasaamla.^[69]

Garcinol (1)



Isogarcinol (2)

Figure 13: Chemical structure of Vetasaamla phytochemicals.^[70]

Pharmacological applications

1) Antiobesity activity

Obesity (Medo roga)- Amlavetas contains the active principle HCA, or hydro citric acid, which is well-known for being a weight-loss aid. Amlavetas is also rich in flavonoids, which gives it antioxidant, anti-obese, and anti-atherosclerosis properties. It also lowers cholesterol and triglyceride levels and aids in reducing the body's fat deposition.^[62]

2) Neuroprotective activity

One well-known strong environmental neurotoxin that causes progressive neurodegenerative alterations in the brain is aluminum chloride (AlCl₃). Behavioral deficiencies, lipid peroxidation, AChE activity, decreased catalase and glutathione peroxidase levels, and histological abnormalities were all brought on by long-term AlCl₃ injection. *G. pedunculata* aqueous extract co-administration has reduced the behavioral, lipid peroxidation, catalase, glutathione peroxidase, AChE, and histological alterations in brain tissue caused by AlCl₃. Based on histological, behavioral, and biochemical investigation, the aqueous extract of *Garcinia pedunculata* demonstrated significant neuroprotection against AlCl₃-induced neurotoxicity in mice. The observed neuroprotection may potentially be attributed to the test drug's antioxidant impact and AChE activity.^[71]

3) Cardioprotective activity

The dried fruits of the plant were widely used by the Assamese tribal people as a cardiotonic in addition to their regular diet. Comparing the *G. pedunculata* extract-treated isoprenaline injection group to the control isoprenaline group; the latter showed less severe

degenerative alterations. Histological analysis of cardiac slices from the group treated with isoprenaline revealed significant cytoarchitecture alterations. Rats with experimentally induced myocardial infarction were protected by an aqueous extract of *G. pedunculata* fruits, as evidenced by the improvement of histological alterations and biochemical and inflammatory indicators of heart tissue damage.^[72]

GOKSHURA

One well-known and well-respected Ayurvedic medication is *Tribulus terrestris*. It is often known as Gokshura in Ayurveda. Dashmoola, a collection of 10 medicinal plants that mostly consist of roots as the effective element, including Gokshura Moola (the root of *Tribulus terrestris* Linn.). According to Madanapala Nighantu's commentary, the fruit is called Vrushya (aphrodisiac), while the root is employed in Dashmoola. It is an important medicinal plant that has been used historically and therapeutically to cure a number of illnesses.

Brihat Gokshura (*Pedaliu murex* linn.) and Laghu Gokshura (*Tribulus terrestris* linn.) are the two main types of Gokshura that are seen in Samhitas and Nighantus. *Tribulus terrestris*, sometimes known as a punctate vine, is a yellow-flowered annual plant that grows in hot climates and is a member of the *Zygophyllaceae* family. According to reports, *Tribulus terrestris* contains antibacterial, antihypertensive, diuretic, anti-acetylcholine, hemolytic, spermatogenesis-stimulating, and antitumor properties. The matured dry fruit, which is named Khar-e Khasak Khurd, is utilized to cure dysuria and gonorrhea illness in the Unani medicinal system.^[73,74]

Major chemical constituents of “*Tribulus Terrestris*” includes in following table:

Table 8: Phytochemical in Gokshura (*Tribulus terrestris*).^[73,75]

Part of Plant	Secondary Metabolites	Major Chemical Constituents
Whole plant	Alkaloids	Tribulusin A, Tribulusamide C, Tribulusterine, Harman, Harmaline
	Flavonoids	Quercetin, Kaempferol, Luteolin, Apigenin
	Terpenoids	Diosgenin, Beta-sitosterol
	Saponins	108 types of steroidal saponins, 58 types of Spirostanoland, 50 types of furostanol
	Phenolic Compounds	Ellagic acid, Gallic acid, Ferulic acid
	Steroids	Beta-sitosterol, Campesterol, Stigmasterol
Fruits	Flavonoids	Luteolin, Quercetin, Kaempferol
	Saponins	Tribulosin, Furostanol saponins
Roots	Alkaloids	Harmaline, Harman
	Phenolic Compounds	Caffeic acid, Chlorogenic acid, Ellagic acid
Leaves	Flavonoids	Apigenin, Luteolin
	Terpenoids	Saponins, Betulinic acid



Figure 14.1 Plant of Gokshura.^[76]



14.2 Dried extract of Gokshura.^[77]

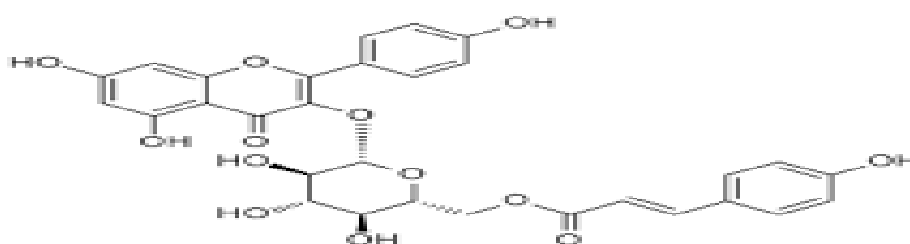


Figure 15: Chemical structure of Tribuloside.^[78]

Pharmacological activity

1) Antiurolithiatic action

Urinary tract disorders have been effectively treated with *Tribulus terrestris*. In albino rats, *Tribulus terrestris* fruit ethanolic extract demonstrated a strong dose-dependent defense against uroliths brought on by the implantation

of glass beads. Urinary stones are frequently discovered to include calcium oxalate monohydrate (COM) and calcium oxalate dihydrate (COD). A *Tribulus terrestris* extract was found to inhibit the formation of COM crystals.

2) Antispasmodic activity: In a dose-dependent way, the plant's lyophilized saponin combination significantly reduced the peristaltic movement of rabbit jejunum preparation.

3) Analgesic action: By employing the formalin and frick test to analyze male mice, it was discovered that the extract of *Tribulus terrestris* exhibited pain-reducing action. It was discovered that 100 mg/ml of methanolic extract is adequate to provide an analgesic effect.

4) Immunomodulatory action: A substantial dose-dependent rise in humoral antibody titre and delayed type hypersensitivity reaction were seen in an alcoholic extract of the whole *Tribulus terrestris* plant, suggesting an elevated specific immune response.

5) Anticariious activity: Dental caries is caused by the *Streptococcus mutans* bacterium, which is effectively inhibited by *Tribulus terrestris* extract.^[73]

CONCLUSION

Seven plants are included in the cardorium plus polyherbal syrup composition that was described. The rich phytochemical profiles and varied pharmacological actions of these seven medicinal plants have been clarified. Alkaloids, flavonoids, terpenoids, saponins, and phenolic acids are among the many bioactive substances found in these plants that support their medicinal qualities. These herbs can be used to treat a wide range of illnesses, including infections, inflammation, metabolic problems, and illnesses brought on by stress. It is important to recognize, nevertheless, that misuse or overconsumption can have negative consequences. In order to ensure their safe integration into contemporary therapeutic practices, more research and clinical trials are necessary to completely grasp their efficacy, ideal doses, and safety profiles.

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