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A Simple Review on Bioactive Compounds and Medicinal Uses of Tinospora Cordifolia

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Abstract: *Tinospora cordifolia, commonly known as Guduchi or Giloy, is a well-known medicinal plant in traditional Indian systems like Ayurveda. It is valued for its wide range of health benefits. The plant contains many bioactive compounds such as alkaloids, glycosides, steroids, diterpenoid lactones, and polysaccharides. These compounds are responsible for its various medicinal properties. Tinospora cordifolia shows activities like antioxidant, anti- inflammatory, antidiabetic, hepatoprotective, immunomodulatory, antimicrobial, and anticancer. It is commonly used to boost immunity, treat fever, diabetes, liver disorders, and infections. Different parts of the plant—stem, leaves, and roots—are used in making herbal formulations. Scientific studies support many of its traditional uses, making it an important plant for drug development and modern research. This review summarizes its major chemical constituents and medicinal uses in a simple way.*

Keywords: Tinospora cordifolia , Bioactive compounds , Medicinal uses

I. INTRODUCTION

Tinospori cordifolia (Giloy) is a widely studied medicinal plant recognized for its extensive therapeutic properties and bioactive compounds. Several reviews have emphasized its significant role in traditional and modern medicine. (1) highlighted that the plant contains diverse phytochemicals such as alkaloids, glycosides, terpenoids, and phenolics that contribute to its healing effects. (2, 3) described T. cordifolia as a multifaceted herb exhibiting immunomodulatory, Tinospora antioxidant, and anti- inflammatory activities. (4) discussed recent scientific advances in identifying and characterizing its bioactive molecules responsible for pharmacological benefits. (5, 6),

T. cordifolia serves multiple roles in improving human health, including antipyretic, hepatoprotective, and antidiabetic actions. Collectively, these studies reaffirm that Tinospora cordifolia is a potent natural source of therapeutically valuable compounds with immense potential for drug discovery and development.

TINOSPORA CORDIFOLI :

Tinospora cordifolia, also known as Giloy, is recognized for its broad health benefits that have been validated and discussed in many recent research studies. Its traditional usage has now been increasingly supported by modern science, showcasing effects like immunity boosting, fever reduction, increased energy, memory improvement, cardiovascular support, joint health, detoxification, stress relief, better skin, and digestive support .Immunity and Fever ReductionTinospora cordifolia acts as an immunomodulator, enhancing the activity of various immune cells such as macrophages and T-cells. This property helps the body fight infections and boosts resistance, especially against viral and bacterial pathogens. It is also helpful in reducing fever, often used in traditional remedies for alleviating chronic and recurring fevers(7).Energy, Fatigue, and Cognitive BenefitsThe plant improves stamina by reducing oxidative stress and inflammation, leading to enhanced energy and reduced fatigue. Additionally, Tinospora cordifolia has neuroprotective compounds that can enhance memory, concentration, and support brain function.Heart, Joints, and DetoxificationTinospora cordifolia contains antioxidants that protect the heart, aid in lowering cholesterol, and regulate blood pressure, supporting cardiovascular health. Its anti-inflammatory properties are beneficial for joint health, particularly for rheumatoid arthritis sufferers. The detoxifying nature of the plant helps clear toxins from the liver and kidneys, promoting overall body cleansing(8).Stress, Anxiety, Skin, and Digestion

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The adaptogenic properties of Tinospora cordifolia help in managing stress and anxiety, while its anti-bacterial and anti-inflammatory activities support healthy skin and rapid wound healing. Finally, by enhancing liver function and supporting proper bile flow, it also benefits digestion and helps in managing issues like acidity and constipation(7 9).

(Fig .1 Tinospora cordifolia)

Synonyms : The plant is known by various names in different regions including Guduchi, Giloy, Amrita, and others like Cocculus tomentosus and Menispermum cordifolium as botanical synonyms .(10)

TAXONOMIC CLASSIFICATION

Kingdom : Plantae.
Subkingdom : Tracheophyta vascular plants.
Super division : spermatophyta seed bearing plants.
Division : Magnoliophyta flowering.
Class : Magnoliopsia dicotiledons.
Subclass : Polypeptalae petals are free.
Serics : Thalamiflorae many stamens and flower hypogynous .
Family: Menispermaceae.
Genus: Tinospora.
Species: cordifolia. (11)

ORGANOLEPTIC CHARATERISTICS OF TINOSPORA CORDIFOLIA STEM

Colour: Creamish brown.
Taste : Bitter.
odour : Not specific, better smell after removing outer loose skin .
This classification and characterization are consistent with traditional Ayurvedic and modern pharmacological descriptions of the plant .(11)

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TINOSPORA CORDIFOLIA VARIOUS PART AS FOLLOW

Stem: The stem is widely used for its immunomodulatory, anti-diabetic, and antiarthritic properties. Compounds from the stem enhance immune response by activating macrophages and increasing cytokines like IL-6. It helps regulate blood glucose by boosting insulin secretion and inhibiting enzymes related to glucose production.

Fig 2. Tinospora cordifolia stem.

The stem is thick, soft, and climbs with the help of other supports. Thin roots grow from the branches. The bark is creamy white to grey in color and has deep spiral cracks.

Root: Root extracts contribute to lowering blood glucose levels and have antioxidant properties. They help restore cellular defense enzymes and suppress oxidative stress.

Fig 3. Tinospora cordifolia root.

Leaves : leaves of tinospora cordifolia have anti-inflammatory,antimicrobial and antioxidant effects .They support immune function and help fight infection.

Fig 4. Tinospora cordifolia leaves.

The leaves are simple and have no stipules. They have long stalks (about 15 cm) that are round and heart-shaped at the base. The stalk (petiole) is slightly swollen and twisted halfway around .

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Flowers: Although less studied, the flowers are reported traditionally to have therapeutic components that complement the whole plant's healing attributes.

Fig 5. Tinospora cordifolia flower

The flowers are unisexual and grow in clusters called racemes. They are small, greenish-yellow, and found on separate male and female plants. The flowers appear when the plant has no leaves. Male flowers grow in clusters, while female flowers are usually single. There are 6 sepals arranged in two rows of 3 — the inner ones are larger than the outer ones. There are also 6 petals, smaller than the sepals, thin, and ovalshaped. Flowering takes place from March to June.

Fruits : The fruits of Tinospora cordifolia are small, fleshy, and oval-shaped drupes.They are red or orange in color when ripe and usually occur in clusters.

Each fruit contains a single curved seed.

They help in plant propagation and possess mild medicinal properties.

Fig 6. Tinospora cordifolia

The fruits are fleshy, and made up of 1 to 3 small oval parts. They are smooth and grow on thick stalks with marks near the top. The fruits develop during the winter season.

Whole Plant: The combined parts provide a broad spectrum of pharmacological activities including immunostimulation, anti-cancer, anti-osteoporotic, and antimicrobial effects. The plant's bioactive compounds include alkaloids, glycosides, steroids, and polysaccharides, responsible for these benefits.

Tinospora cordifolia is a multipurpose medicinal plant traditionally used in Ayurveda for fever, diabetes, arthritis, infections, and immune disorders. Recent research confirms its safety and efficacy in these roles with active constituents supporting modulation of immune response, oxidative stress reduction, and metabolic regulation (12 , 13)

BIOACTIVE COMPOUND

Tinospora cordifolia contains many important bioactive compounds in its different plant parts, especially the stem and roots. These compounds belong to several classes, including alkaloids, steroids, glycosides, aliphatic compounds, and some miscellaneous groups . (14)

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Alkaloids :

Alkaloids represent one of the most important groups of bioactive compounds found in Tinospora cordifolia. T. cordifolia include berberine, palmat ine, magnoflorine, tinosporin, isocolumbin, tetrahydropalmatine, and choline. These alkaloids show various biological activities such as immune-boosting (immunomodulatory), antioxidant, anti-inflammatory, and liver-protecting (hepatoprotective) effects. (15)

Berberine and palmatine : are well-known for their strong antimicrobial and antiinflammatory properties.

Magnoflorine : helps strengthen the immune system by improving the activity of immune cells and increasing nitric oxide production

Tinosporin and isocolumbin : show antifungal and neuroprotective actions.

Tetrahydropalmatine: provides pain-relieving and nerve-protecting effects

Cholin e: helps protect the kidneys from damage through its antioxidant action (16)

The synergistic effects of these alkaloids contribute to the herb's use in traditional medicine for boosting immunity, managing diabetes, protecting the liver, and combating infections. This comprehensive phytochemical profile underpins the modern therapeutic interest in T. cordifolia as a multipurpose Ayurvedic herb (17)

Glycosides :

Tinospora cordifolia is renowned for its diverse medicinal properties, attributed to its rich spectrum of bioactive compounds, particularly glycosides such as tinocordiside and syringin.

Tinocordiside: a clerodane furano diterpene glycoside, has demonstrated strong immunomodulatory effects and potential antiviral activity, including inhibition of viral entry by binding to host cell receptors. Its mechanism involves enhancing immune responses, particularly through modulation of cytokine activity and activation of macrophages, which contributes to its therapeutic potential against infectious diseases.

Syringin : another major glycoside found in T. cordifolia, also shows significant immunomodulatory and antioxidant effects. Studies have highlighted its ability to reduce oxidative stress, improve lipid profiles, and support anti-diabetic actions by improving insulin secretion and sensitivity. tinocordiside and syringin have been isolated and characterized through advanced phytochemical analyses, confirming their structures via techniques like NMR and mass spectrometry. These glycosides play crucial roles in the plant's broad therapeutic application, ranging from the management of metabolic disorders to supporting immunity.(18 , 19)

STEROIDS:

Tinospora cordifolia contains bioactive steroid compounds such as ecdysterone and beta-sitosterol, which contribute to its therapeutic properties.

Ecdysterone : is a natural steroid known for enhancing protein synthesis and muscle growth by activating the PI3K/Akt signaling pathway, which promotes cell growth, hypertrophy, and muscle differentiation. It also increases mitochondrial density in muscle cells, improving endurance and reducing fatigue without androgenic side effects (20) .

Beta-sitosterol: another prominent steroid found in Tinospora cordifolia, has multiple health benefits like anti-inflammatory, anti-cancer, and immunomodulatory effects. It can reduce inflammation by modulating cytokine production and has been shown to mitigate disorders such as glucocorticoid-induced osteoporosis and inflammatory arthritis. Beta-sitosterol also contributes to lowering cholesterol absorption and exhibits antioxidant properties, supporting overall health (21).

Both compounds are significant in the plant’s pharmacological profile, with ecdysterone mainly linked to enhancing physical performance and muscle metabolism, and beta- sitosterol contributing to anti-inflammatory and immune-boosting actions. These steroids have been scientifically studied for their roles in managing chronic conditions and improving physiological functions (20 , 21)

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ALPHABETICAL COMPOUNDS

Tinospora cordifolia contains various bioactive aliphatic compounds, notably octacosanol and heptacosanol, which have shown significant pharmacological potential.

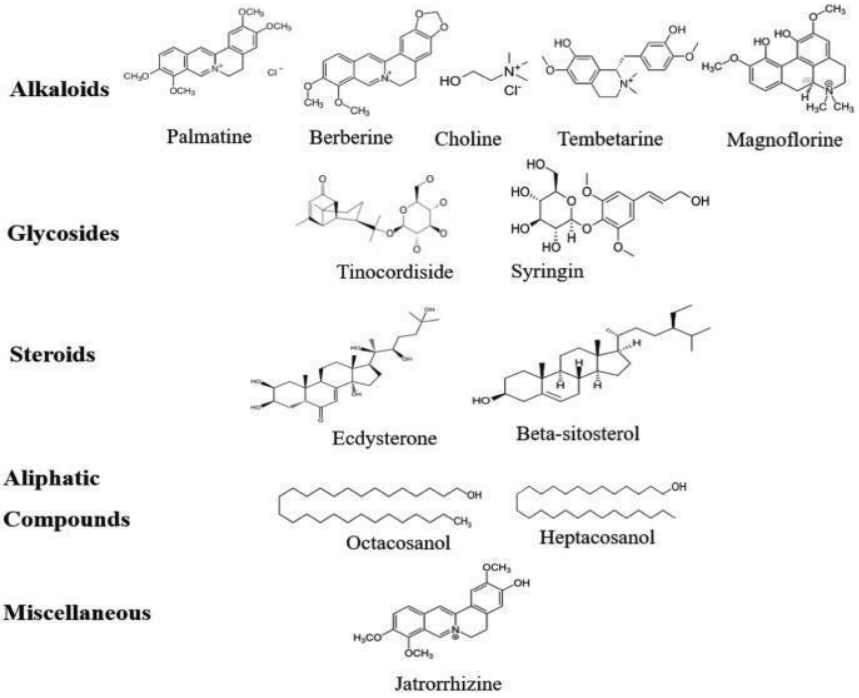
Octacosanol : a long-chain aliphatic alcohol, is isolated from the stem and is known for its antiangiogenic activity—effectively inhibiting tumor growth by suppressing VEGF gene expression through inhibition of NF-κB nuclear translocation.

This contributes not only to reduced tumor spread but also promotes apoptosis and cellular senescence in neuroblastoma models, suggesting therapeutic roles in cancer management Additionally, octacosanol modulates inflammatory pathways and cytokine levels, implying anti-inflammatory and protective roles in chemotherapy, reducing drug toxicity and enhancing patient response.

Heptacosanol, another long-chain alcohol present in T. cordifolia, has demonstrated anti-nociceptive and anti-inflammatory effects, supporting its potential in managing inflammatory and pain-related disorders. Both compounds are part of a broader group of aliphatic constituents that add to the immune-modulating, antioxidant, and cytotoxic properties observed in experimental research, underpinning the plant's value for drug development(. Emerging studies advocate further exploration of these compounds for integrative therapy in cancer, inflammation, and neurodegenerative conditions (22 , 23 Miscellaneous bioactive compound

Tinospora cordifolia, popularly known as Guduchi, is a medicinal plant rich in miscellaneous bioactive compounds, including alkaloids such as jatrorrhizine(24).

Jatrorrhizine is one of the principal sub-alkaloids identified in Tinospora cordifolia's stem and roots, contributing to its broad spectrum of pharmacological effects like antimicrobial, antioxidant, antidiabetic, and neuroprotective activities. Recent reviews highlight that jatrorrhizine, alongside berberine and palmatine, demonstrates pronounced hepatoprotective action by helping regulate oxidative stress and inhibit inflammatory processes within the liver, making Tinospora cordifolia extract valuable for managing hepatic disorders and detoxification. Furthermore, jatrorrhizine is noted for boosting immunity, supporting white blood cell function, and participating in glucose metabolism, which underpins its antidiabetic efficacy(25)



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BIOACTIVE COMPOUND	ACTIVE PRINCIPAL	PART OF PLANT	% PRESENCE	BIOLOGICAL ACTIVITY
Alkaloids	Berberine	Stem	50%	Anti-diabetic, anti-inflammatory, anti-cancer.
Alkaloids	Palmatine	Root	50%	Anti-diabetic, anti- viral, antiinflammatory.
Alkaloids	Magnoflorine	Stem	60%	Immunomodulator y, anti-inflammatory
Alkaloids	Tinosporin	Stem	40%	Anti-diabetic, anti-inflammatory
Alkaloid	Isocolumbin	Stem	30%	Antiinflammatory, anti-cancer
Alkaloid	Tetraahydropalmatine	Stem	40%	Central nervous system effects, anti-psychiatric
Alkaloid	Choline	Stem	50%	Neuroprotective, involved in acetylcholine synthesis
Glycosides	Tinocordiside	Stem	40%	Immunomodulator y
Glycosides	Syringin	Stem	40%	Immunomodulator y, anti-inflammatory
Steroids	Ecdysterone	Aerial parts	30%	Anabolic effects, muscle growth promotion
Steroids	Beta-sitosterol	Aerial parts	60%	Antiinflammatory, cholesterollowering
Aliphatic compound	Octacosanol	Whole plant	40%	Lipid metabolism support, energy booster
Aliphatic compound	Heptacosanol	Whole e plant	40%	Similar to octacosanol, metabolic effects
Miacellaneous compound	Jatrorrhizine	Whole plant	30%	Anti-bacterial, anti- malarial, antiinflammatory

Table Bioactive compound of tinospora cordifolia

BIOLOGICAL ACTIVITIES

Biological activity of Tinospora cordifolia includes a broad spectrum of pharmacological effects . Its notable activities are antioxidant, anti-diabetic, antiinflammatory, immunomodulatory, antimicrobial, anti-toxic, hepatoprotective, and adaptogenic properties.(28)

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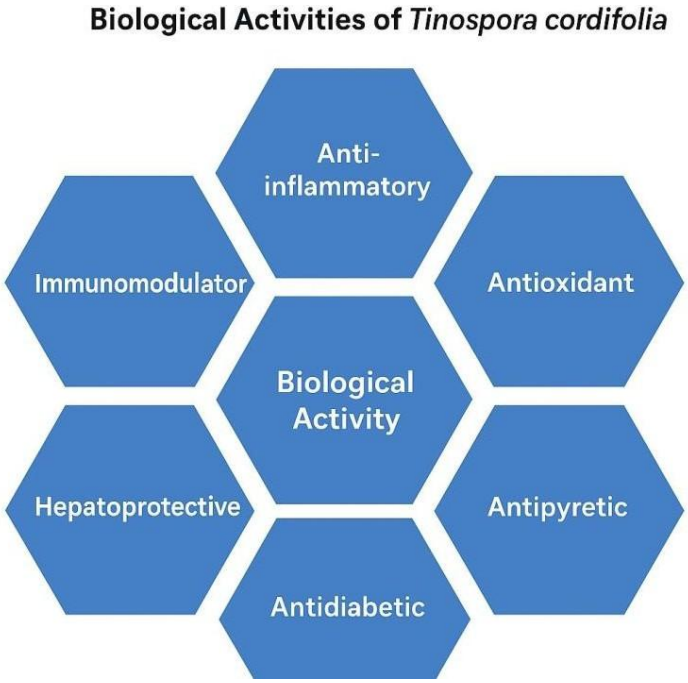

Anti-inflammatory

Tinospora cordifolia (T. cordifolia) exhibits robust anti-inflammatory properties primarily through the modulation of immune responses and suppression of proinflammatory cytokines such as TNF-α, IL-1β, IL-6, and IL-17. Its extracts inhibit key inflammatory enzymes including cyclooxygenase (COX) and lipoxygenase (LOX), which contributes to reducing inflammation. The bioactive phytoconstituents including alkaloids (e.g., tinosporin, tinosporide), flavonoids, and terpenoids are largely responsible for these effects Experimental studies reveal that T. cordifolia accelerates wound healing by reducing inflammatory cells at the wound site, enhancing collagen synthesis and re-epithelialization, thereby promoting tissue regeneration via its anti-inflammatory and antibacterial activities (29) At the molecular level, T. cordifolia down regulates inflammatory gene expression and nitric oxide (NO) production in immune cells such as RAW 264.7 macrophages, supporting its potent anti-inflammatory effects. Clinical and experimental evidence indicates immunomodulatory effects that further contribute to inflammation resolution, improving outcomes in inflammatory and autoimmune conditions (30) T. cordifolia demonstrates multi-targeted anti-inflammatory biological activity mediated by its diverse phytochemicals, enhancing immune function, inhibiting pro-inflammatory pathways, and promoting tissue repair. This makes it a valuable candidate for antiinflammatory drug development and therapeutic applications (31)

Antioxidant

Tinospora cordifolia is a well-known medicinal plant with strong antioxidant properties. These effects come from many natural compounds it contains, such as phenolics, flavonoids, alkaloids, tannins, and polysaccharides. These compounds help remove harmful molecules called free radicals and reactive oxygen species (ROS) that cause oxidative stress and lead to many chronic diseases. Studies show that different parts of the plant, especially the stem and leaves, have strong antioxidant power. (32)The water (aqueous) extract of the stem shows the best antioxidant effect, suggesting that water-soluble compounds play a major role. Inside the body, Tinospora cordifolia also helps increase natural antioxidants such as SOD, catalase, GPx, GSH, vitamin C, and vitamin E. These protect the body's cells from

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damage and improve the body's own defense system. Because of its antioxidant effects, Tinospora cordifolia also helps in many health conditions such as inflammation, diabetes, low immunity, and nerve-related diseases. By reducing oxidative stress, it may also help prevent or manage serious diseases like cancer, diabetes, and brain disorders.(33)

Antipyretic

Tinospora cordifolia is well known for its traditional use in reducing fever, and scientific studies have confirmed this property. The aqueous extract of the plant's stem effectively lowers body temperature. Its effect is dose-dependent and comparable to standard fever medicines like paracetamol. The antipyretic activity is mainly due to the presence of bioactive compounds such as alkaloids and flavonoids. These compounds help reduce fever by controlling inflammation and inhibiting the production of prostaglandins in the hypothalamus, which helps restore normal body temperature. Non-steroidal anti- inflammatory drugs (NSAIDs), Tinospora cordifolia does not cause side effects such as stomach irritation. Along with reducing fever, it also shows strong anti-inflammatory and pain-relieving (analgesic) properties. This combination makes it useful for treating fever, pain, and inflammation naturally. Scientific evidence suggests that the extract starts showing its effect within a few hours of administration, and higher doses result in a longer-lasting response. (34 35)

Antidiabetic

Tinospora cordifolia is a famous medicinal plant used in Ayurveda, especially known for its ability to control diabetes. The stem of this plant has important natural chemicals like alkaloids (berberine and palmatine) that help manage blood sugar levels by improving how the body uses insulin.

Studies on diabetic rats show that Tinospora cordifolia reduces fasting blood sugar, lowers triglycerides and cholesterol, and may also increase vitamin D levels, which can help in diabetes control. The active compounds in the plant help body cells take in more glucose by increasing certain proteins called Glut-4, which are important for insulin action. It also affects other proteins (PPARα and PPARγ) that control sugar and fat metabolism, making the body more sensitive to insulin. Apart from that, it can also help glucose enter cells even without insulin through GLUT1 and GLUT3 transporters. Besides controlling blood sugar, Tinospora cordifolia has antioxidant, immune- boosting, and anti-inflammatory properties. These help reduce stress and inflammation in the body, improve insulin function, and prevent diabetes-related damage.(36)

Hepatoprotective

Tinospora cordifolia is well-known for protecting the liver from damage caused by toxins and stress. Studies show that its extracts, especially the ethanolic ones, help lower harmful liver enzymes like ALT, AST, ALP, and bilirubin — which are signs of liver injury. The liver-protecting power of Tinospora cordifolia comes from its natural chemicals such as flavonoids, alkaloids, glycosides, terpenoids, steroids, and phenolic compounds. These act as antioxidants and reduce inflammation, helping the liver remove toxins and heal itself. It works by reducing oxidative stress (damage caused by free radicals), stopping fat damage in liver cells, and controlling inflammation. Compounds like berberine, one of its main alkaloids, block harmful inflammatory chemicals like TNF-α and reduce nitric oxide production, which helps prevent liver cell damage and supports new cell growth. In lab tests, especially in models where liver damage is caused by carbon tetrachloride (CCl_4), Tinospora cordifolia extract improved liver health, reduced tissue damage, and restored enzyme (37,38)

Immunomodulatory

The immunomodulatory effects (immune system–boosting actions) of Tinospora cordifolia mainly come from its stem and leaves, which contain several active compounds such as: Alkaloids (like palmatine and magnoflorine)Diterpenoid lactones (like tinosporon and columbin)Glycosides (like cordifolioside A and tinocordiside)Steroids (like beta-sitosterol)Polysaccharides (like RR1)

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These compounds help stimulate immune cells and control important immune processes such as cytokine production, macrophage activation, nitric oxide release, and inflammation regulation.

Studies show that Tinospora cordifolia activates macrophages (cells that destroy germs), increases their lysosomal activity, and enhances nitric oxide secretion — all of which help kill disease-causing microbes. It also increases interleukin-6 (IL-6) levels, which supports both inflammatory and adaptive immune responses.The RR1 polysaccharide in the plant helps boost innate immunity (the body's first defense) and promotes a Th1-type immune response, which is important for fighting infections. Tinospora cordifolia also helps control interleukin-17 (IL-17), a molecule involved in autoimmune inflammation, by affecting the JAK-STAT pathway — this helps balance the immune system and prevent overreaction. In addition, it shows antiinflammatory properties by blocking enzymes like cyclooxygenase (COX) and preventing protein damage, which protects tissues from swelling and pain.(39 40)

Mechanism of immunomodulatory

Magnoflorine (from Tinospora cordifolia).
↓
Interaction with immune cells (Macrophages, T-cells, B-cells, NK cells).
↓
Activation of macrophages (Increased phagocytic activity).
↓
Upregulation of cytokine production (IL-1β, IL-6, TNF-α, IFN-γ).
↓
Stimulation of T-helper (Th1 & Th2) cell responses.
↓
Enhanced antibody (IgG, IgM) production by B-cells.
↓
Increased natural killer (NK) cell cytotoxicity.
↓
Overall enhanced immune response (cell-mediated & humoral).
↓
Immunomodulation and protection against infections & inflammation.

Magnoflorine is a natural compound found in the plant Tinospora cordifolia (Giloy).It helps the body's immune system to work better. It mainly acts on important immune cells. These include macrophages, T-cells, B-cells, and natural killer (NK) cells.

Macrophages are cells that "eat up" germs and dead cells. Magnoflorine activates these macrophages to work more effectively. Activated macrophages destroy harmful bacteria and viruses faster.They also clean up damaged or dead cells in the body. When activated, macrophages release special chemical messengers called cytokines.These cytokines help immune cells communicate and coordinate actions.The main cytokines produced are IL-1β, IL-6, TNF-α, and IFN-γ.These cytokines signal the immune system to start fighting infections. They activate T-helper cells, which are special types of T- cells.There are two main types of T-helper cells – Th1 and Th2.Th1 cells help in cell- based immunity (fighting infected or cancerous cells).Th2 cells help in antibody-based immunity (fighting germs in blood and fluids)Magnoflorine helps balance both Th1 and Th2 responses .Activated T-helper cells send signals to B-cells.B-cells then produce antibodies to fight specific germs .The main antibodies formed are IgG and IgM.These antibodies recognize and neutralize bacteria and viruses. Magnoflorine also activates NK cells (Natural Killer cells).NK cells kill infected or cancerous cells directly. Magnoflorine increases the killing (cytotoxic) power of NK cells.This helps the body remove infected or abnormal cells faster.Together, these actions strengthen both cell mediated and humoral immunity. This means it boosts the body's total immune defense system.It not only helps fight infections but also reduces harmful inflammation.

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Market product :

Himalaya Guduchi immunity Wellness Capsule:

Fig 9 Himalaya guduchi wellness capsule

Himalaya Guduchi Immunity Wellness capsules are made from pure Guduchi (Giloy) extract known for its immune-boosting properties. The capsules help strengthen the immune system by enhancing the effectiveness of protective white blood cells to fight infections and support overall health.

Zandu Gily Immunity Booster Capsules:

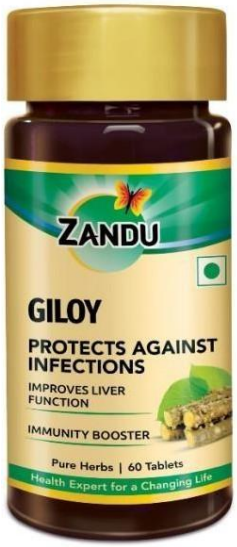

Fig 10 Zandu gily immunity booster capsules

Zandu Giloy Immunity Booster capsules are Ayurvedic supplements made from pure Giloy (Guduchi) extracts known for boosting immunity and protecting against infections. They also support liver health, detoxify the body, and help reduce stress and anxiety. These capsules have antioxidant properties and promote overall wellness without added sugars or preservatives.

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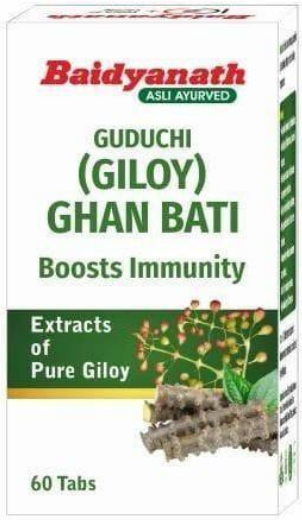
Baidyanath Guduchi (Giloy) Ghanbati tablets

They help improve digestion, maintain healthy blood sugar levels, and support liver and respiratory functions. These tablets have anti-inflammatory and antioxidant properties, making them beneficial for managing chronic fever, stress, and anxiety.

Regular use enhances immunity, reduces body temperature in fever, and helps in respiratory ailments like cough and asthma



(Fig 11 Baidyanath guduchi ghanbati tablets)

Patanjali Divya

Patanjali Divya Giloy Ghanvati is an ayurvedic tablet mainly made from Giloy (Tinospora cordifolia), known for boosting immunity and building strength and stamina. It helps in recovery from illness by reducing fever and alleviating symptoms like cough, cold, and fatigue. The tablets are also used for managing skin conditions, urinary problems, and improving appetite. Additionally, it supports platelet count improvement, detoxification, and maintaining healthy cholesterol levels.

(Fig 12 Patanjali divya)

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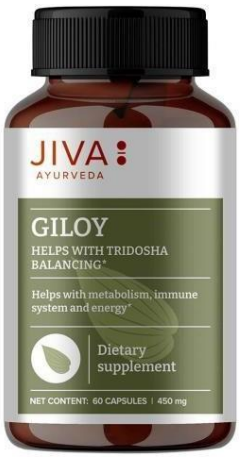
Jiiva Giloy:

They help reduce respiratory problems like cough and cold and have anti-inflammatory and antioxidant properties. Regular use supports digestion, skin health, and helps manage symptoms of common ailments. Giloy's natural compounds enhance immune function by stimulating white blood cells and reducing infections.



(Fig 13 jiva giloy)

Organic Giloy Stem Powder :

Organic Giloy (Guduchi) Stem Powder, available from brands like Carmel Organics and MY HERB, is widely appreciated for boosting immunity and reducing fever due to its anti- inflammatory and antipyretic properties. It supports liver health, enhances digestion, and helps fight respiratory issues such as cold and asthma. Giloy also acts as a natural detoxifier, promoting overall wellness by removing toxins from the body and improving energy levels. Regular use of this herb is linked with skin health benefits and cognitive enhancement, making it a popular Ayurvedic remedy for various health conditions. These benefits are supported by recent reviews highlighting its traditional and scientifically backed uses

(Fig 14 Organic giloy stem powder)

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II. CONCLUSION

Tinospora cordifolia is a highly valuable medicinal plant with a rich phytochemical profile responsible for its wide range of therapeutic activities. The presence of diverse bioactive compounds such as alkaloids, glycosides, and diterpenoid lactones contributes to its antioxidant, antidiabetic, hepatoprotective, immunomodulatory, and antimicrobial properties. Scientific research has validated many of its traditional uses, confirming its potential in preventing and managing various diseases. Therefore, Tinospora cordifolia holds great promise as a natural source for the development of novel herbal drugs and health-promoting formulations in modern medicine.

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