

# An Overview on Giloy (*Tinospora cordifolia*), Giloy Ghanvati with Emphasis on Hyperlipidemia, Immunity and Diabetes

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## ABSTRACT

*Tinospora cordifolia* is a strong and ancient remedy for a variety of ailments. To put it another way, we might assume that a single medication can treat a wide range of diseases. Amrita, which means divine nectar in Sanskrit, is the name given to this substance in honour of its ability to give the user youthfulness, stamina, and immortality. Giloy is identified in a broad sense in ayurvedic literature. Phosphorus, iron, copper, zinc, calcium, and manganese seem to be micronutrients, and proteins are abundant in this vine. It also includes terpenes, steroids, alkaloids, glycosides and flavonoids, all optional plant metabolites. In general, it aids in the treatment of all cases of fever, cough, skin diseases, low platelet count, dengue, chikungunya, malaria, mutra vikar, madhumeha, swasa, rasayan, deepan, tridoshashamak, hridya rog. The study contains an analysis of the plant's chemical structure and its pharmacological effect, properties, and therapeutic effectiveness of giloy-ghanvati in diabetes and hyperlipidemia.

**Keywords:** Chemical composition, Diabetes and hyperlipidemia, Giloy,, Giloy ghanvati, *Tinospora cordifolia*  
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## INTRODUCTION

*Tinospora cordifolia* is a common herbal plant that belongs to the *Menispermaceae* family. It is a large deciduous climbing bush with greenish-yellow common blossoms that grows to a height of around 20 feet.<sup>[1-3]</sup> Blossoms are unisexual, appearing in small numbers on isolated on axillary and terminal racemes. They are greenish-yellow when the plant is leafless. Male blossoms are usually in groups, although females are usually alone. The ones on the outside are smaller than the ones on the inside. Sepals six, free in two three-person configurations, have six obovate and membranous free petals, which are smaller than sepals. Shaded natural goods 1-3 ovoid smooth drupelets on the thick tail with red or orange sub terminal form scars.<sup>[4]</sup> Giloy is a Hindu fantastical idea that alludes to the magnificent care that has preserved celestial creatures from fading and living forever young.<sup>[5]</sup> Alkaloids, hormones, diterpenoid lactones, aliphatics, and glycosides, among other dynamic plant segments, have been extracted from many plant sections, such as the root, stem, and entire plant.<sup>[6]</sup> Giloy works as a hypoglycemic operator, assisting in the treatment of diabetes (particularly Type 2)". Giloy juice lowers blood glucose levels and does some amazing feats.

## Classification

Table 1: Classification of plant

Empire	Plantae/Plants
Alternate-empire	"Tracheobionta"
Division	"Magnoliophyta"
Order:	"Ranunculales"
Class:	"Magnoliopsida"
Family:	"Menispermaceae"
Genus:	"Tinospora"
Species:	"Cordifolia"

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## Synonyms

Table 2: Different synonyms of drug

Language	Name
Sanskrit	Amrtavalli, Amrta, Madhuparni, Guducika, Chinnobhava
Hindi	Giloe, Gurcha
Gujrati	Galac, Garo
English	Heart-Leaved Moonseed
Punjabi	Gilo
Oriya	Guluchi
Bengali	Gulanca
Urdu	Gilo
Tamil	Seendal, Seendilkodi
Kashmiri	Amrita, Gilo
Kannada	Amrutaballi
Marathi	Gulvel
Telugu	Thippateega

## Literature Review of Hyperlipidemia

- Hyperlipidemia, also termed hyperlipoproteinemia or dyslipidemia, is a serious heart disorder that indicates a high lipid level in the blood known as the serious cause of morbidity and mortality. Generally, it was the most common disorder in the US (United State), but now it spread widely throughout the world. Around 62 million patients have CAD (coronary artery disease) in India of which 23 million would be younger than 40 years, and National Commission reports the case on Macroeconomics and health (Government of India Undertaking) in 2015.
- The consequence of hyperlipidemia is to cause atherosclerosis which increases the risk of Heart attack and strokes. The risks of increasing lipid profile occur day by day due to improper food habits and lifestyle. Risk factor management can easily be done by improving food habits and lifestyle.
- Coronary Heart Disorder normally happens by accumulating cholesterol on the artery walls and creating plaque formulation that can narrow down artery places, reduce the blood flow through the artery, and restrict the blood flow to the heart, which is responsible for heart attack.<sup>[41,42]</sup>

## Types or Classification

Depending upon the importance of diagnosis hyperlipidemia is of two types<sup>[43]</sup>

### Primary Hyperlipidemia

Primary Hyperlipidemia is a genetically occurring disorder such as lipoprotein lipase deficiency, apolipoprotein-C-II deficiencies etc. it is further classified into further 5 types:<sup>[43,44]</sup>

- Type-I: Severe elevation of chylomicrons (CMs) which elevate Triglycerides.
- Type-II: Elevation of LDL-C.
- Type-III: Elevation of both VLDL and Triglycerides.
- Type-IV: It develops due to an imbalance of VLDL.
- Type-V: It is characterized by hyper triglycerides.

### Secondary Hyperlipidemia

In this hyperlipidemia many other factors like diabetes, obesity etc., can influence the level of Triglycerides.<sup>[45]</sup>

Various Causes of Secondary Hyperlipidemia are:

- Metabolic influences: Diabetes, hyperuricemia, obesity etc.
- Hormonal influences: Insulin, thyroxin, estrogen etc.
- Nutritional influences: Alcohol, high carbohydrate intake.
- Drugs: Diuretics, beta-blockers, glucocorticoids, estrogen replacement therapy.
- Disease states: Renal diseases, renal failure, nephritic syndrome.

## Morphological Characters

**Table 3:** Organoleptic Characters<sup>[3,7]</sup>

Plant Part	Character
Leafs	Leaves are simple, entire, glabrous, alternate, 7-9 nerved, cordate
Flower	Yellow racemes, generally single, in flexible racemes
Fruit	Drupes, in red color when they ripe
Stem	The stems surfaces are heavily studded with warty tubercles, and the surface tissue is longitudinally fissured. The dim greenish adhesive stem is visible after the surface skin is expelled
Taste	Bitter

## Ayurvedic Properties

**Table 5:** Rasa panchak of Giloy<sup>[3,9-11]</sup>

Rasa	Tikta, Kshaya
Guna	Laghu, Guru, Snigdha
Virya	Ushna
Vipak	Madhur
Prabhav	Vishghan
Karam	Rasayan, Sangrahi, Balya, Agnidipan, TridoshShamak, Trishnanashak, Vatahar, Shlesm-shonit-Prashaman, Vishghan, Jwar-bhootagni, Dipan, Grahi, Vrishya, Chakshusya, Vayah-sthapan, Medhya, Ayushyaprada, Hridya.

## Chemical Composition

**Table 4:** Chemical compounds obtained from different parts<sup>[8,38-40]</sup>

Plant part	Chemical	Active Principle
Stem and Root	Alkaloids	Palmatine, Tembetarine, Choline, Berberine, Isocolumbin, Palmatine, Tetrahydropalmatine, Magnoflorine, Magnoflorine, Tinosporin
Stem	Glycosides and Sesquiterpenoid	Cordifoliside A to E, 18-norclerodane & Furanoid diterpene glucoside, Palmatosides C & F, Tinocordifolin Tinocordiside & Tinocordifolioside, Cordioside, Cordifoliside A & B, Syringin & Syringin-apiosylglycoside
Whole Plant	Di-terpenoid lactones	Furanolactone, Clerodane derivatives and Tinosporon, Tinosporides, and Jateorine, Columbin.
Aerial Part and Stem	Steroids	$\beta$ & $\delta$ -sitosterol, Giloinsterol, Ecdysterone, 20 $\beta$ - Hydroxy ecdysone, Makisterone A
Whole Plant and Root	Aliphatic compound, Miscellaneous	3, (4-di hydroxy-3-methoxy-benzyl)-4-octacosanol, Nonacosan-15-one 3, Heptacosanol, (4-di hydroxy-3-methoxy-benzyl)-4-octacosanol, Heptacosanol, Nonacosan-15-one (4- Compounds hydroxy-3-methoxy-benzyl) -tetrahydrofuran is a kind of tetrahydrofuran. Jatrorrhizine is a drug used to treat Cordifol, jatrorrhizine Tinosporidine, Cordifellone, Giloin, Giloinin, Tinosporic acid, N-trans-feruloyl tyramine diacetate.

## Hyperlipidemia in Ayurveda

- As expressed before, Ayurveda underlines the significance of metabolic cycles in wellbeing advancement just as sickness the board. "AGNI", in a real sense, "fire", is the term utilized in Ayurveda for characterizing all the substantial metabolic activities altogether. Ayurveda orders AGNI into a few assortments: JatharAgni – situated in the wholesome lot and performing major metabolic cycles. Dhatu Agni – arranged at tissue levels and fit for handling metabolic necessities of individual tissues, and Bhota Agni – unobtrusive metabolic cycles that occur at the cell level.<sup>[46]</sup>
- Metabolic cycles keep up the ordinary amount, quality and capacity of the Dosha and Dhatu. When in strange states because of different causative components identifying with the body and the psyche, metabolites that are not absorbed by the body tissues will be delivered. The resultant result of such metabolic activity is called AAMA. It is the essential driver of all metabolic problems in Ayurveda. When shaped, it is equipped for hindering the metabolic pathways and causing infections. Cholesterol is considered an item that begins because of metabolic weakness in the wholesome plot and fat tissue (MEDA).
- There is no exact term for hyperlipidemia in the Ayurvedic works of art. Writing shows that researchers have attempted to utilize particular terminology for hyperlipidemia, e.g., Rasagata Sneha Vriddhi (increment in lipids in plasma), Rasa Raktagata Sneha Vriddhi (increment in the lipids in plasma and blood), Medovriddhi (summed up lipid increment), Medoroga or Medodosha (corpulence), AamaMedo Dhatu (strangely framed fat tissue). An itemized investigation of hyperlipidemia uncovers its comparability to AsthayiMedo Dhatu Vriddhi (irregular expansion in coursing lipids) concerning the pathophysiology. This exorbitantly expanded flowing lipid is Aama in nature, bringing about further complications.<sup>[47]</sup>

## Effect of Giloy in Hyperlipidemia

- Hyperlipidemia is a common term for blood fat (lipid) levels that are abnormally elevated. Fatty oils and cholesterol are the two main types of lipids present in the blood.<sup>[17]</sup>
- Fatty compounds form because the body does not use all of the calories it consumes for nutrition. They are also legally derived from foods like red meat and full-fat dairy. A diet heavy raises fatty oil levels in added sugar, fructose, and alcohol.<sup>[17]</sup>
- Cholesterol is generated naturally in the liver and is used by all body cells. Cholesterol can be used in fried foods like eggs, red meat, cheddar cheese, and fatty oils.<sup>[17]</sup>
- High cholesterol is the most common term for hyperlipidemia. Although high cholesterol may be hereditary, it is most often caused by poor lifestyle choices.<sup>[17]</sup>
- T. cordifolia* helps the body regulate high cholesterol levels by increasing absorption and removing poisons that cause high cholesterol levels. This is attributed to the qualities of Deepan (tidbit), Pachan (stomach-related), and Rasayana (reviving).<sup>[18]</sup>
- In diabetes, hyperglycemia and hyperlipidemia coexist. The use of watery root extracts for a month and a half results of serum and tissue cholesterol, phospholipids, and free unsaturated fats have decreased significantly.<sup>[35]</sup>

## Other Uses of *T. cordifolia*

### In Diabetes

- In traditional Indian people medicine, the stem of *T. cordifolia* is commonly used to treat diabetes by guiding blood glucose.<sup>[36]</sup>
- It is thought to intervene against its diabetic adversary by lowering oxidative pressure (operating system), increasing insulin production, and suppressing gluconeogenesis and glycogenolysis, thus controlling blood glucose levels.<sup>[12]</sup>
- T. cordifolia* has main Phyto-constituents, including alkaloids, tannins, cardiac glycosides, flavonoids, saponins, and steroids, have been identified as potential diabetic enemies.<sup>[13]</sup>
- Oral medication of root separates have been used to control blood glucose levels, boost insulin production, and suppress operating system indicators. In vitro studies looked at the initiation and regeneration of cell defense against oxidants such Turf, GPx, and GSH and the inhibition of glucose 6-phosphatase and fructose 1, 6-diphosphatase and the recovery of glycogen levels in the liver.<sup>[14]</sup>
- The isoquinoline alkaloid-rich section of the stem, which includes palmatine, jatrorrhizine, and magnoflorine, has been accounted for insulin-impersonating and insulin-delivering actions in vitro and in vivo.<sup>[14]</sup>
- T. cordifolia* unrefined Dichloromethane (DCM), chloroforms, and hexane concentrates are all derived from stem ethyl acetic acid inhibited salivary and pancreatic amylase and glucosidase, increasing post-prandial glucose levels, indicating a potential use in the treatment of diabetes mellitus.<sup>[15]</sup>
- T. cordifolia* root extract (TCE) increased lowering hepatic glucose-6-phosphatase, serum corrosive phosphatase (ACP), and antacid phosphatase while increasing body weight, total haemoglobin, and hepatic hexokinase (Snow-capped mountain), and LDH in diabetic rats, resulting in hypoglycemia.<sup>[16]</sup>

### Helps to Boost Immunity

- Giloy is a multi-purpose spice that aids in resistance. It is a power to be dealt with when it comes to cancer prevention agents combat free radicals keep the cells safe, and get rid of illnesses.<sup>[19]</sup>
- Giloy aids in the elimination of toxins, sanitizes blood, combats disease-causing microorganisms, and helps with liver and urinary tract problems.<sup>[19]</sup>
- Giloy is used by doctors to treat cardiac problems and has also been shown to be effective in treating infertility.<sup>[19]</sup>

### In Arthritis

- Giloy has relaxing and anti-ligament properties that aid in treating joint pain and has minimal side effects.<sup>[19]</sup>
- Giloy stem powder can be combined with milk to help alleviate joint discomfort.<sup>[19]</sup>
- 4It can also be given with adrak to treat rheumatoid arthritis inflammation.<sup>[19]</sup>

### In Asthmatic Conditions

- Asthma triggers chest tightness, windedness, hacking, wheezing, and other symptoms, making it difficult to control.<sup>[19]</sup>

- Asthma patients benefit from chewing giloy root or consuming giloy juice, which specialists often recommend.<sup>[19]</sup>

#### In allergic conditions

- According to Ayurvedic writings, *T. cordifolia* is used to treat kasa (cough) and swasa (asthma).<sup>[20]</sup>
- It is very good drug to treat asthma and its juice is helps to treat constant hacking coughs.<sup>[20]</sup>

#### Effect on Learning, Memory and Stress

- In Ayurveda, *T. cordifolia* is classified as a medhyarasayana.<sup>[21]</sup>
- It is also stated in various Ayurvedic texts as beneficial in treating bhrama (vertigo).<sup>[21]</sup>
- Children with intermediate levels of behavior issues and mental deficiency and improvement in intelligence levels have had a strong response.<sup>[21]</sup>
- The base of *T. cordifolia* is used due to its stress-relieving properties.<sup>[21]</sup>

#### Anti-oxidant Activity

- *T. cordifolia* is known in Ayurvedic texts as vishaghni, vishahara, and tridoshashamaka.<sup>[22]</sup>
- There was a substantial improvement in the grouping of thio-barbituric rats in diabetic rat's corrosive sensitive substances (Ski lifts) in the cerebrum and a decrease in the core.<sup>[22]</sup>
- Therapy with *T. cordifolia* reduced the centralizations of diabetic rat tissues, glutathione reductase, and superoxide dismutase, catalase, and glutathione peroxidase were measured.<sup>[22]</sup>

#### Hepato-protective Activity

- According to a scientific study, Guduchi plays a major role in standardizing modified liver capacities (ALT, AST).<sup>[23]</sup>
- *T. cordifolia* has been shown to have antihepatotoxic properties, Normalizing capacity of liver assessed by morphological, biochemical, and functional studies in CCl<sub>4</sub>-induced liver harm.<sup>[23]</sup>
- *T. cordifolia* was discovered to have hepatoprotective properties in goats.<sup>[23]</sup>

#### Diuretic Activity

- In Ayurveda, *T. cordifolia* has been depicted as useful in mutra kricha and as various descriptions.<sup>[24]</sup>
- *T. cordifolia* is shown to have diuretic effects in a logical report on rodents and human volunteers.<sup>[24]</sup>
- It was also shown to be effective in modifying morphology and the function of certain gluconeogenic chemicals in diabetic rat kidneys.<sup>[25]</sup>

#### Antileprotic Activity

It is used to treat leprotic patients due to its antileprotic activity and the common use of kandu and visarpa (skin problems), and has been seen to act against leprosy in a hybrid scheme.<sup>[26]</sup>

#### Improve Eye Vision

- Giloy plant is added to the eyes in a few parts of India to help support vision clarity.<sup>[19]</sup>
- Simply dissolve Giloy powder in water, allow to cool, and then apply to the eyelids.<sup>[19]</sup>

#### Anti-aging Properties

- The Giloy plant has anti-aging properties that aid in the reduction of dark spots, pimples, hardly discernible variations, and crumple.<sup>[19]</sup>
- It offers the flawless, gleaming desired skin.<sup>[19]</sup>

#### Gastrointestinal and Anti-ulcer Activity

- In Ayurveda it is used to treat sangrahi, arshohar, aruchinashak, dipna, agni-dipna, chardihaar, trishnahar, trishnanashak, and hikkahar.<sup>[27]</sup>
- Treatment with a detailing containing *T. cordifolia* was demonstrated to reduce ulcer record overall acidity in pylorus-ligated mice and enhance the pH of gastric fluids and ethanol-induced gastric mucosal damage.<sup>[27]</sup>

**Note:** Giloy is a plant which naturally grown in tropical regions. Use of giloy for longer period may induce obstruction and lower the glucose level. If a person consumes giloy or any preparation of giloy from a longer period, make sure to check your glucose levels regularly.<sup>[37]</sup>

#### Giloy Ghanvati

##### Ghanvati

- Decoction is made by continuously warming over low heat until the water parcel dissipates and the consistency thickens (semisolid-strong) with each additional heating period. Ghana or Rasa kriya is the name for the semisolid stuff. Ghanavati is the name given to the substance when it is given to vati and dried in concealment.<sup>[28]</sup>
- **Ingredients**<sup>[48]</sup>
  - Extract of Giloy stem - 500mg
  - Excipients - Q.S

##### Method of Preparation

- First, we will go into how GiloyGhanvati is made. Giloy's concentrate is used to make it. The concentrate is known as 'Ghan' in Ayurveda. Giloy extract is made from giloy stems before being used to make GiloyGhanVati.<sup>[29]</sup>
- Giloy stems are squashed after being sliced into smaller pieces. These are then submerged in water for a couple of hours.<sup>[29]</sup>
- After a couple of hours, the decoction is made. To remove the giloy, the decoction is sifted and warmed again.<sup>[29]</sup>
- It is taken out of the oven after it has thickened and baked in the sun.<sup>[29]</sup>
- Acacia gum or other tablet-restricting compounds may be used to make tablets (whenever required).<sup>[29]</sup>

► The antioxidant and adaptogen properties of GiloyGhanvati are well-known. This herbal medicine is said to be effective in the treatment of all kinds of fevers.<sup>[30]</sup>

► GiloyGhanVati is considered to benefit the customer in the following ways when used regularly:

- Gout<sup>[31]</sup>
- Fever<sup>[32]</sup>
- Dengue<sup>[33]</sup>
- Malaise<sup>[31]</sup>
- Swine flu<sup>[33]</sup>

- Boost energy<sup>[34]</sup>
- Skin disorder<sup>[32]</sup>
- Chicken guinea<sup>[32]</sup>
- Urinary disorder<sup>[34]</sup>
- Improves immunity<sup>[31]</sup>
- Generalized debility<sup>[34]</sup>
- Rheumatoid arthritis<sup>[34]</sup>
- Provides inner strengths<sup>[34]</sup>
- Safeguards the body from infections<sup>[34]</sup>

## Usage

**Table 6:** Way to use Giloyghanvati<sup>[30]</sup>

With	Take the tablet with Luke warm water, warm milk and honey.
When	30 minutes before the meal or also consumed after 1 to 2 hours after meals. This can repeated after 4 to 6 hours.
Duration	For Fever: at least 45 day to increase immunity.
Adjuvant	Give best result when consumed with parwalpshiti, santapshamak, and godantibhasam.

## Dosage

**Table 7:** Dose of Giloy ghanvati as per age wise category

Category	Dose	Frequency
Children's (Below 12 years)	Half tablet	2 times in a day.
Infants (0-12 months)	-	As per physician
All (above 12 years)	1 tablet	Twice in a day.

## DISCUSSION AND CONCLUSION

Diabetes and hyperlipidemia are very common conditions because people are usually less active, and lipids or fatty acids collect rapidly, causing serious problems for the heart and body. Giloy is a very old and powerful medicine that helps to heal a wide range of diseases in a small amount of time. It can be used to increase physical fitness in a busy day-to-day life. This herb is described as an adaptogen in Ayurvedic literature (anti-stress activity). Giloy raises insulin synthesis and aids in the lifelong cure of diabetes and lowers serum lipid levels in the case of hyperlipidemia. Giloy ghanvati is very useful formulation in any kind of disease.

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