WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Tinospora cordifolia (Giloy): A Comprehensive Review

Mr. Lokesh Rathod[1], MR. Abhishek Yadav[2], Dr. Sonali uppalwar[3]

Ideal institute of pharmacy, Wada.

Abstract:

Tinospora cordifolia (Willd.) Miers, commonly known as giloy or guduchi, is vital medicinal herb which is used across various system of medicine such as Ayurveda, Siddha, and folk system of medicine. Historically it was said as "amrita" (the medicine which makes person immortal), it holds a very vital place in immune responses , metabolic way to regulate , anti-inflammatory activity , and protection of liver . Modern Therapeutic studies and pharmacological studies has analysed many traditional uses, and also there are various regarding it controversies regarding its effect on the liver injury have leads to the scitetific debate . This 3000–4000 word review contains various topics such as morphology, phytochemistry, therapeutic benefits, traditional applications, consumer use, and safety considerations.

1. Introduction

Tinospora cordifolia is a deciduous shrub which belongs to the Menispermaceae family, and it is native to the India and also found in across tropical regions (Gupta A). Known as a Rasayana herb in Ayurveda, giloy is traditionally used to improve longevity, make stronger immunity and helps to detoxify the body of human (Verma M et al.). The name "amrita," is taken from the Sanskrit, symbolizes its vitality as a plant linked with vitality and resistance to the disease Modern scientific literature states its supports in modulating immune responses, antioxidant, antidiabetic, anti-microbial, and anti-inflammatory action (Verma M et al.). These effects are seen because of various phytochemicals including diterpenoids, alkaloids, glycosides, and polysaccharides (Gupta A). most widely used species *Guduchi (Tinosporacordifolia)* s in Ayurvedic medicine. 80% of residents mainly trust on traditional medicines according to World Health Organization (WHO).(Verma M et al.) it consists of bitterness, *cassia gum,berberine.*

2. Botanical Description and Morphology

Fig 1 Fruits of Giloy

Fig 2 Giloy Leaves

Tinospora cordifolia is a perennial shrub that has green young, slender to thick stems with corky bark as it ages (9). As the plant climbs host trees, long aerial roots emerge from the nodes (Saha et al.). The leaves have a distinctive reticulate venation pattern and are heart-shaped and simple (Wikipedia). Leaves range in length from 10 to 15 cm and can be ovate or cordate (Plants Journal).

Clusters of tiny greenish-yellow flowers are produced by the plant. Male and female flowers appear on different plants as a species (Saha et al.). The fruit is a pea-sized drupe that, as it ripens, changes from green to bright red to black (Plants Journal). Because they exhibit traits like lenticels, stems are frequently used in pharmacognostic identification (Flora Journal).

3. Traditional Uses

Giloy is highly valued in Ayurveda for treating fevers (including “jvara”), diabetes (“madhumeha”), liver disorders, digestive disturbances, and inflammatory conditions (EasyAyurveda). It is classified as tridosha-balancing, meaning it harmonizes the Vata, Pitta, and Kapha doshas (Sharma). In classical Ayurvedic texts such as Charaka Samhita, giloy is recommended for chronic fever and immune dysfunction (Gupta).

Ethnomedicinal reports indicate its use in tribal medicine for treating malaria, jaundice, snake bites, respiratory illnesses, and urinary infections (Biodiversity India). Powdered stem paste is used in some regions to manage ulcers and skin diseases (ResearchGate Traditional Uses).

4. Phytochemistry

Tinospora cordifolia contains over 60 isolated compounds, contributing to its pharmacological diversity. Major bioactive groups include diterpenoid furanolactones such as tinosporide, palmarin, and columbin, which contribute to anti-inflammatory and antioxidant activities (Sharma). Alkaloids such as berberine analogs exhibit antimicrobial effects (MDPI Molecules). Polysaccharides enhance immune activity by stimulating macrophages and cytokine production (Singh). Additional constituents include flavonoids, steroids, essential oils, and phenolics that support its broad-spectrum therapeutic profile (Saha et al.).

5. Consumer Utilisation

Commercial forms of giloy include stem powder (churna), decoction (kashaya), tablets, capsules, syrups, and standardized extracts like giloy satva (Pharmeasy). Convenience influences consumer preference, with tablets and extracts currently being the most popular forms (AYUSH Dossier). Although quality control is still a problem in the herbal industry, standardized extracts guarantee consistency in active compounds (Separation Science Plus). While scientific trials have used doses ranging from 500 mg to 3 grams per day, depending on extract concentration, traditional doses range from 3–6 grams of powder to 15–30 ml of decoction (MSJ Journal). When taking several supplements or medications at once, caution is advised.

6. Therapeutic Benefits

6.1 Immunomodulatory and Anti-Infective Properties

Giloy's polysaccharides stimulate immune cells, boosting the phagocytic activity of macrophages and modifying cytokines like IL-6 and IL-10 (Singh). Research shows that in animal models, there is an increased resistance to infections and an improved antibody response (Saha et al.). During the COVID-19 pandemic, giloy's immune-boosting qualities attracted a lot of attention, and studies looked into its potential as an adjuvant treatment (Verma et al).

6.2 Antidiabetic Effects

One important component, tinosporaside, increases the uptake of glucose in skeletal muscle through the PI3K/AKT and AMPK pathways (Mishra et al.). When giloy is used in conjunction with traditional diabetes medication, clinical trials have demonstrated lower fasting blood glucose, HbA1c levels, and improved lipid profiles (IJBPS). According to research on enzyme inhibition, giloy slows the metabolism of carbohydrates by blocking α-glucosidase and α-amylase (Talwar).

6.3 Hepatoprotective Activity

In CCl4 and paracetamol-induced toxicity models, giloy exhibits potent antioxidant effects, lowering liver inflammation and averting hepatocyte damage (Baskaran). It lowers lipid peroxidation, increases glutathione levels, and increases superoxide dismutase activity (Jh Clin Pharm). However, case reports of herb-induced liver injury (HILI) indicate that some people, particularly those with autoimmune predispositions, may experience idiosyncratic reactions (Kulkarni et al.). Pharmacovigilance must be maintained in order to weigh the advantages and disadvantages. (Nagral)

6.4 Anti-Inflammatory and Analgesic Properties

Giloy's analgesic and anti-arthritic properties are attributed to its reduction of pro-inflammatory cytokines, such as TNF-α and IL-1β (Sharma). It is frequently prescribed by Ayurvedic practitioners for gout, arthritis, and persistent fever. According to Rawat et al., diterpenoids are essential for regulating inflammatory pathways.

6.5 Antimicrobial Action

Extracts have demonstrated antimicrobial activity against Candida species, Escherichia coli, and Staphylococcus aureus (Agarwal). When giloy extract is used in conjunction with antibiotics, combination studies show synergistic effects (Frontiers Microbiology). The antimicrobial potential of nano-enhanced formulations is even higher.

6.6 Anticancer Properties

According to preclinical studies, giloy increases immune surveillance, modifies oxidative stress, and causes cancer cells to undergo apoptosis (Rawat et al.). Although there are currently no human clinical trials, studies on a variety of cancer cell lines show cytotoxic effects (IJBPAS).

6.7 Cardioprotective, Neuroprotective, Roles

Studies on animals show protective effects against myocardial infarction, which are probably caused by anti-inflammatory and antioxidant processes (Gupta). According to preliminary study, cholinesterase inhibition may have neuroprotective effects (Saha et al.). Additionally, in animal models, extracts lessen nephrotoxicity brought on by medications and heavy metals (MDPI).

7. Safety, Adverse Effects, and Drug Interactions

There have been instances of herb-induced liver damage, especially with the extensive use of giloy in COVID-19 self-medication (Kulkarni et al.). Researchers are investigating possible autoimmune triggers, even if the precise mechanism is still unknown (Nagral). Care must be taken since antidiabetic drug interactions can worsen hypoglycemia (MSJ Journal). Pregnant or lactating women should not use Pharmeasy due to insufficient safety information.

Contamination, adulteration, and mistaken identification with related organisms as Tinospora crispa may raise the risk of toxicity (AYUSH Dossier). There must be strict uniformity.

8. Conclusion

One of the most studied plants in Ayurveda is Tinospora cordifolia, which has a wide range of therapeutic benefits backed by both conventional knowledge and empirical data. However, disputes about liver damage emphasize the necessity of cautious dosage, superior sourcing, and therapeutic oversight. To completely determine the benefit-risk profile of giloy, future research must give priority to large-scale randomized trials, phytochemical standardization, and pharmacovigilance.

References:

1. Gupta A. Tinospora cordifolia (Giloy): An insight on the multifarious... (2024).

2. Morphology, Biological Activity, Chemical Composition... (AJChem-B review PDF).

3. Gupta A. Tinospora cordifolia (Giloy): An insight... — PMC full text.

4. Verma M et al., Adhatoda vasica and Tinospora cordifolia extracts ameliorate clinical and molecular markers in mild COVID-19 (2023).

5. Wikipedia: Tinospora cordifolia (botanical summary; includes citations).

6. EasyAyurveda: Guduchi – Giloy Uses, Dose, Research, Side Effects (practical/traditional uses).

7. Singh J. Immunomodulatory properties of Giloy (Tinospora ...) (2024 Heliyon/Cell review).

8. ResearchGate / Pharmacological review of Tinospora cordifolia(2025).

9. Vikaspedia — tinospora cordifolia morphology & agronomy.

10. International Journal piece: Potential role of tinospora cordifolia in management... (2022).

11. Siddiqui S. Medicinal importance of Tinospora cordifolia (Willd.) Miers... (2025 Springer).

12. Saha S. Tinospora cordifolia: One plant, many roles (2012 review, PMC).

13. Pharmeasy overview: Guduchi: Benefits, Uses, Side effects.

14. J. Singh review (2025 Heliyon / Cell) immunomodulatory properties.

15. Sharma P. The chemical constituents and diverse pharmacological importance of Tinospora cordifolia (2019).

16. Frontiers / Withania & Tinospora comparative immunomodulatory study (2023).

17. Plants journal morphology PDF (2014).

18. Raj Govt / India Biodiversity species page (Tinospora cordifolia).

19. Technical Dossier on Guduchi — Ministry of AYUSH (2019 / Govt of India).

20. ResearchGate: Tinospora Cordifolia — An immunomodulatory drug in Ayurveda for prevention and treatment of COVID-19 (2020/2021).

21. Review: Tinospora cordifolia — Medicinal and Beneficial Health Applications (HJHS).

22. PubMed: Intervention of Ayurvedic drug Tinospora cordifolia... (Shirolkar et al., 2020 trial).

23. Talwar / Antidiabetic claims review (2015).

24. Mishra A. Tinosporaside encourages skeletal muscle glucose transport (2023 PMC).

25. Kulkarni AV et al., Tinospora cordifolia (Giloy)–Induced Liver Injury During the COVID-19 Pandemic (Hepatology Communications, 2022).

26. PubMed entry for Kulkarni et al. (2022).

27. Nagral A. Herb-induced Liver Injury—A Guide to Approach (2022 review, PMC).

28. Cureus case review: Tinospora cordifolia (Giloy)–Induced Liver Injury (2023).

29. Analytical methods and quality assessment (Separation Science Plus, 2022).

30. MDPI Unveiling various facades of Tinospora cordifolia stem (2023).

31. IJBPS / Diabetes add-on therapy reports (various randomized/open trials).

32. MSJ Online — add-on diabetes therapy study (Indian journal).

33. IJPSR clinical trial (antidiabetic/antidyslipidemic antioxidant activities — 2016).

34. Systematic reviews / anticancer exploration (IJBPAS, 2024).

35. Agarwal S. Assessment of antimicrobial activity of different extracts (2019 PMC).

36. Patil S. Tinospora cordifolia inhibits oral... (2021 PMC).

37. Baskaran R. Tinospora extract prevents cadmium-induced hepatotoxicity (2018 PubMed).

38. Frontiers Microbiology: Nano-functionalization & antimicrobial evaluation (2023).

39. Jh Clin Pharm: hepatoprotective study CCl_4 (journal article).

40. ScienceDirect / novel roles in neutrophil regulation & cancer control (Rawat et al., 2023).

41. Analytical / pharmacognostical investigations (Flora Journal, 2017).

42. AYUSH press release / dossier summary: Giloy Takes the Global Stage (AYUSH materials).

43. DoAJ / Hepatology Communications multicenter study summary.

44. Response letters & scholarly debate re: HILI causality (Edamana SN reply, PMC 2022).

45. NCL Innovations herb briefs (TFORD/HERBALBRIEFS — Tinospora cordifolia brief, 2020).

46. Pharmacognostical & physicochemical studies (recent India journal).

47. ResearchGate: Traditional uses of Tinospora cordifolia (ethnobotanical compilation).

48. Systematic review: immunomodulatory and antioxidant roles (J Ethnopharmacol 2018 summary references).

49. MDPI / Molecules: Unveiling Various Facades of Tinospora cordifolia Stem in... (2023).

50. Springer / Exploring the anticancer potential of Tinospora cordifolia (2025).