



# Comprehensive Pharmacology Review of *Guduchi* [*Tinospora cordifolia* (Willd.) Miers]

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## ABSTRACT

**Aim:** This review aims to explore various pharmacological studies carried out on *Tinospora cordifolia* and exploit the therapeutic utility to combat different diseases.

**Background:** *Guduchi* [*Tinospora cordifolia* (Willd.) Miers] is a precious medicinal plant in Ayurveda, the Indian system of medicine. The plant has long been used in Indian traditional medicine by the tribal and nontribal communities for treating a variety of diseases.

**Results:** Different pharmacology studies of *Guduchi* illustrated in this review show that this medicinal plant possesses antidiabetic, antioxidant, cognition, anti-inflammatory, analgesic, and wound-healing, anticancer, antimalarial, immunomodulatory, and hepatoprotective activities.

**Conclusion:** The present review confirms the effectiveness of *Guduchi* (*Tinospora cordifolia*) in the prevention and treatment of different health ailments. However, an extensive research and development work on the herb targeting drug characterization and exploring their mechanism of action is essential for validating its potential in preventing and treatment of diseases.

**Clinical significance:** *Tinospora cordifolia* showed excellent antihyperglycemic, hypoglycemic, anti-inflammatory, and hepatoprotective activity. It also has beneficial effects on immune modulation for diabetic foot ulcer healing.

**Keywords:** Analgesic, Anti-inflammatory, *Guduchi*, Medicinal properties.

**How to cite this article:** Upadhyay S, Bora M, Kawlni L, Mukherjee K, Hazra J. Comprehensive Pharmacology Review of *Guduchi* [*Tinospora cordifolia* (Willd.) Miers]. *J Drug Res Ayurvedic Sci* 2018;3(1):48-52.

**Source of support:** Nil

**Conflict of interest:** None

## BACKGROUND

"*Guduchi*," also commonly known as *Giloy* [*Tinospora cordifolia* (Willd.) Miers], is an important Ayurvedic herb

used as *Rasayana*. The herb is used for the treatment of various diseases like jaundice, urinary problems, rheumatoid arthritis, skin diseases, dyspepsia, dysentery, chronic diarrhea, and leprosy. The plant also possesses antistress and immunomodulatory properties. The medicinal uses of *Guduchi* are well documented in various classical texts, viz. *Charak Samhita*, *Sushrut Samhita*, and *Ashtang Hridaya*.<sup>1,2</sup>

## REVIEW RESULTS

### Antidiabetic Activity

*Guduchi* extracts showed *in vitro* glucose uptake stimulatory activity in Ehrlich ascites tumor cells model.<sup>3</sup> *Guduchi* at the dose of 200 µg/mL was similar to insulin and greater than standard drug pioglitazone.<sup>4</sup> Aldose reductase inhibition of aqueous extract of *Guduchi* stem was observed with an IC<sub>50</sub> of 103 µg/mL in rat lens *in vitro*.<sup>5</sup> Both alcoholic and aqueous extracts of *Guduchi* stem in the doses of 200 and 400 mg/kg body weight significantly reduced the fasting blood glucose levels after 10 and 30 days of treatment in streptozotocin-induced diabetic rats and had an efficacy of 40 to 80% compared with insulin.<sup>6</sup> Oral administration of *Guduchi* roots extract for 6 weeks showed significant reduction of glucose and lipids in serum in alloxan-induced diabetic rats.<sup>7</sup> The plant at 1 or 2% concentration as dietary supplements attenuated embryopathy in streptozotocin-induced diabetic pregnant rats and showed protection against maternal and fetal diabetes-induced oxidative stress.<sup>8</sup> Aqueous extract of *Guduchi* in the dose of 400 mg/kg per day after 3 and 15 weeks of treatment showed reduction of blood glucose in diabetic mice.<sup>9</sup> Oral dosing of alcoholic extract of *Guduchi* whole plant at 20 mg/kg body weight twice daily half an hour prior to feeding from day 2 to 30 significantly decreased blood sugar level in alloxan-induced diabetic rats.<sup>10</sup> Sedimental extract of *Guduchi* in the dose of 1000 mg/kg *per os* for 30 days showed decrease in blood glucose level in streptozotocin-induced type 2 diabetic rats.<sup>11</sup> Stem extract of *Guduchi* at 500 mg/kg body weight, orally for 15 days showed antidyslipidemic and antidiabetic activity in alloxan-induced diabetic rats.<sup>12</sup> Alcoholic extract of *Guduchi* roots in the oral dose of 400 mg/kg prevented alloxan-induced diabetic cataract in rats.<sup>13</sup> *Guduchi* plant extracts (200 mg/kg orally for 40 days) improved renal damage and prevented

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polyuria and renal hypertrophy in mice.<sup>14</sup> Administration of aqueous extract of *Guduchi* roots for 6 weeks in the doses of 2.5 and 5.0 gm/kg body weight showed significant antidyslipidemic activity in diabetic rats.<sup>15</sup> Alcoholic extract of *Guduchi* in the oral dose of 20 mL/kg of body weight, twice daily showed significant antihyperglycemic activity in diabetic animals.<sup>10</sup> Petroleum ether, methanol, and aqueous extracts of *Guduchi* administered at the dose of 400 mg/kg orally for 28 days significantly reduced blood glucose, triglyceride, and total cholesterol level in streptozotocin-induced diabetic rats.<sup>16</sup> Oral administration of aqueous extract of the plant at the dose of 42.34 mg/kg decreased the blood glucose level by 24.93% in diabetic rats.<sup>17</sup>

### Osteoprotective Activity

*Guduchi* extract in the dose of 10 mg/kg body weight showed osteoprotective effect in rats. Bone loss in the tibia of rats was slower as compared with controls, while serum osteocalcin and cross-lap levels were significantly reduced following extract treatment.<sup>18</sup>

### Anti-inflammatory and Analgesic Activity

Aqueous extracts of *Guduchi* significantly inhibited inflammation and pain on cotton pellet granuloma and formalin-induced arthritis models which was comparable to indomethacin.<sup>19</sup> Administration of leaf and leaf callus ethanolic extracts of *Guduchi* in the dose of 100 mg/kg body weight showed significant reduction in paw volume on carrageenan-induced hind paw edema in albino rats.<sup>20</sup>

### Hepatoprotective Activity

Aqueous extract of aerial parts of *Guduchi* orally up to 30 days demonstrated significant protection against carbon tetrachloride (CCl<sub>4</sub>)-induced hepatotoxicity in rats.<sup>21</sup> Oral administration of petroleum ether, ethanol and aqueous extracts of leaf, stem, and roots of *Guduchi* at the doses of 200 mg/kg body weight exerted significant hepatoprotective activity in Wistar rats.<sup>22</sup>

### Cognition Activity

Oral administration of alcoholic as well as aqueous extract of *Guduchi* whole plant at the doses of 200 and 100 mg/kg for 10 days decreased learning scores and retention memory in rats.<sup>23</sup>

### Antioxidant Activity

Methanolic extracts of *Guduchi* stem exhibited antioxidant activity and decreased the activity of superoxide dismutase and glutathione peroxidase in diabetic rats.<sup>7</sup>

*Guduchi* leaf extracts showed alpha-glucosidase inhibiting and hydroxyl radical scavenging activities.<sup>24</sup> It also produced protective effect against aflatoxin-induced nephrotoxicity.<sup>25</sup> The aqueous extract of *Guduchi* also showed radio protective activity in mice.<sup>26</sup> Ethanol and methanol extracts of *Guduchi* stem showed *in vitro* anti-oxidant activity in DPPH assay.<sup>27</sup>

### Antimicrobial Activity

*Guduchi* showed antimicrobial activity against different strains of bacteria.<sup>28</sup> *In vitro*, *Guduchi* inhibited the growth of *Escherichia coli*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Proteus vulgaris*, *Salmonella typhi*, *Shigella flexneri*, *Salmonella paratyphi*, *Salmonella typhimurium*, *Pseudomonas aeruginosa*, *Enterobacter aeruginosa*, and *Enterobacter aerogenes*.<sup>29,30</sup>

### Immunomodulatory Activity

*Guduchi* possesses immunomodulatory activity.<sup>31</sup> Various active compound or substances present in *Guduchi* are responsible for its excellent immunomodulatory activity.<sup>32</sup> Variety of compounds present in this plant enhanced phagocytic activity of macrophages<sup>33</sup> and increased production of reactive oxygen species (ROS) in human neutrophil cells.<sup>34</sup>

### Wound-healing Activity

Methanolic extract of *Guduchi* showed excellent wound-healing activity by increasing granulation tissue tensile strength, and decreasing epithelialization period in excision and incision wound model in mice.<sup>35</sup>

### Anticancer Activity

Alcoholic extract of *Guduchi* slowed down the tumor growth and increased the lifespan of Dalton's lymphoma-bearing mice and was also effective in Ehrlich ascites carcinoma in mice.<sup>36,37</sup>

## EFFECTS ON CENTRAL NERVOUS SYSTEM

Petroleum ether and ethanol extracts of leaf, stem, and *Guduchi* roots decreased the locomotor activity of mice after 2 hours of oral administration. Both aqueous and ethanol extracts of *Guduchi* reduced spontaneous locomotor activity in rats.<sup>38</sup> Ethanolic extract of *Guduchi* has been shown to have antipsychotic activity in amphetamine-challenged mice model.<sup>39</sup>

### Clinical Pharmacology

Aqueous leaf digest of *Guduchi* showed a significant ability to reduce blood sugar levels in human subject.<sup>40</sup>

*Guduchi* attenuated altered liver functions and the herb was found to be safe for therapeutic usage in the dose of 500 mg/day for 21 days.<sup>41</sup> *Guduchi* significantly decreased all symptoms of allergic rhinitis and demonstrated to have significant effect in wound healing on diabetic foot ulcers.<sup>42,43</sup>

## DOSE AND MODE OF ADMINISTRATION

Oral dose of *Guduchi* is 3 to 6 gm in powder form.<sup>44</sup>

## Safety and Toxicity

There was no change in body weight, food and water consumption, and no mortality recorded in Swiss mice following oral administration exposure of *Guduchi* aerial parts with a dose of 3, 5, 7, and 9 mL/kg decoction and 2, 4, 6, and 8 gm/kg body weight whole-plant powder.<sup>45</sup> Aqueous extract of *Guduchi* did not show toxicity administered orally up to 800 mg/kg to rats.<sup>21</sup> Single-dose oral administration of aqueous extract of *Guduchi* at a dose of 150 mg/kg body weight showed no sign of toxicity.<sup>46</sup> No adverse effect and no mortality were recorded in rats following administration of aqueous and alcoholic extract of *Guduchi* whole plant.<sup>23</sup>

## Herb–drug Interactions

Pretreatment with *Guduchi* could not produce any significant effect on pharmacokinetics of cyclophosphamide and methotrexate. *Guduchi* showed reversal of immune suppression associated with cyclophosphamide.<sup>47</sup> Berberine extracted from *Guduchi* enhanced the effects of metformin and 2,4-thiazolidinedione.<sup>48</sup> *Guduchi* showed an antagonist effect when combined with insulin indicating a possible plant–drug interaction.<sup>4</sup>

## CONCLUSION

Various preclinical and clinical pharmacological studies illustrated in the present review confirm the effectiveness of *Guduchi* (*Tinospora cordifolia*) in the prevention and treatment of different health ailments. However, an extensive research and development work on the plant targeting drug characterization and exploring its mechanism of action would help in exploring *Guduchi* for its potential in prevention and treatment of diseases.

## REFERENCES

1. Sinha K, Mishra NP, Singh J, Khanuja SP. *Tinospora cordifolia* (*Guduchi*), a reservoir plant for therapeutic applications: a review. *Indian J Tradit Know* 2004 Jul;3(3):257-270.
2. Sharma R, Amin H, Galib, Prajapati PK. Antidiabetic claims of *Tinospora cordifolia* (Willd.) Miers: critical appraisal and role in therapy. *Asian Pac J Trop Biomed* 2015 Jan;5(1):68-78.
3. Joladarashi D, Chilkunda ND, Salimath PV. Glucose uptake-stimulatory activity of *Tinospora cordifolia* stem extracts in Ehrlich ascites tumor cell model system. *J Food Sci Technol* 2014 Jan;51(1):178-182.
4. Kalekar SA, Munshi RP, Bhalerao SS, Thatte UM. Insulin sensitizing effect of 3 Indian medicinal plants: an *in vitro* study. *Indian J Pharmacol* 2013 Jan-Feb;45(1):30-33.
5. Nadig PD, Revanka RR, Deth SM, Narayanswamy SB, Aliyar MA. Effect of *Tinospora cordifolia* on experimental diabetic neuropathy. *Indian J Pharmacol* 2012 Sep-Oct;44(5):580-583.
6. Puranik N, Kammar KF, Devi S. Anti-diabetic activity of *Tinospora cordifolia* (Willd.) in streptozotocin diabetic rats; does it act like sulfonylureas? *Turk J Med Sci* 2010 Feb;40(2):265-270.
7. Stanely Mainzen Prince P, Menon VP. Hypoglycaemic and hypolipidaemic action of alcohol extract of *Tinospora cordifolia* roots in chemical induced diabetes in rats. *Phytother Res* 2003 Apr;17(4):410-413.
8. Shivananjappa MM, Muralidhara. Abrogation of maternal and fetal oxidative stress in the streptozotocin-induced diabetic rat by dietary supplements of *Tinospora cordifolia*. *Nutrition* 2012 May;28(5):581-587.
9. Grover JK, Vats V, Rathi SS. Anti-hyperglycemic effect of *Eugenia jambolana* and *Tinospora cordifolia* in experimental diabetes and their effects on key metabolic enzymes involved in carbohydrate metabolism. *J Ethnopharmacol* 2000 Dec;73(3):461-470.
10. Kinkar Sobha B, Gopal PK. Antidiabetic activity of *Tinospora cordifolia* (FAM: Menispermaceae) in alloxan treated albino rats. *J Appl Res* 2015 Jul;1(5):316-319.
11. Kannadhasan R, Venkataraman S. Antidiabetic and anti-hyperlipidaemic activity of sedimental extract of *Tinospora cordifolia* in streptozotocin induced type 2 diabetes. *Int J Pharm Pharm Sci* 2012 Jan;4(3):520-527.
12. Kumar V, Mahdi F, Chander R, Husain I, Khanna AK, Singh R, Saxena JK, Mahdi AA, Singh RK. *Tinospora cordifolia* regulates lipid metabolism in alloxan induced diabetes in rats. *Int J Pharm Life Sci* 2013 Oct;4(10):3010-3017.
13. Rathi SS, Grover JK, Vikrant V, Biswas NR. Prevention of experimental diabetic cataract by Indian Ayurvedic plant extracts. *Phytother Res* 2002 Dec;16(8):774-777.
14. Grover JK, Vats V, Rathi SS, Dawar R. Traditional Indian anti-diabetic plants attenuate progression of renal damage in streptozotocin induced diabetic mice. *J Ethnopharmacol* 2001 Aug;76(3):233-238.
15. Stanley Mainzen Prince P, Menon VP, Gunasekaran G. Hypolipidaemic action of *Tinospora cordifolia* roots in alloxan diabetic rats. *J Ethnopharmacol* 1999 Jan;64(1):53-57.
16. Khedekar SB, Ravishankar B, Prajapati PK. Anti-diabetic activity of dried extract of *Tinospora cordifolia* (*Guduchi* Ghana) and honey in streptozotocin induced diabetic rats. *Int J Green Pharm* 2015 Oct-Dec;9(4):S31-S38.
17. Saxena PK, Sharma DK, Srivastava A. Antidiabetic activity of aerial parts of *Tinospora cordifolia* (wild) against stz induced hyperglycemia. *Inventi Rapid* 2018 Jan-Mar;1(1):1-7.
18. Kapur P, Jarry H, Wuttke W, Pereira BM, Seidlova-Wuttke D. Evaluation of the antiosteoporotic potential of *Tinospora cordifolia* in female rats. *Maturitas* 2008 Apr;59(4):329-338.
19. Utpalendu J, Chattopadhyay RN, Badri PS. Preliminary studies on anti-inflammatory activity of *Zingiber officinale* Rosc., *Vitex negundo* Linn. and *Tinospora cordifolia* (Willd) Miers in albino rats. *Indian J Pharmacol* 1999;31(3):232-233.

20. Vellaiyappan S. Evaluation of anti-inflammatory activity of field grown plant and callus extract of *Tinospora cordifolia* (Wild) Hook.F.Thoms under *in vitro* conditions. *Int J Appl Pure Sci Agric* 2016 Feb;2(2):185-189.
21. Kumar V, Modi PK, Saxena KK. Exploration of hepatoprotective activity of aqueous extract of *Tinospora cordifolia*—an experimental study. *Asian J Pharm Clin Res* 2013 Jan;6(1):87-91.
22. Kavitha BT, Shruthi SD, Padmalatha Rai S, Ramachandra YL. Phytochemical analysis and hepatoprotective properties of *Tinospora cordifolia* against carbon tetrachloride-induced hepatic damage in rats. *J Basic Clin Pharm* 2011 Jun;2(3):139-142.
23. Agarwal A, Malini S, Bairy KL, Rao MS. Effect of *Tinospora cordifolia* on learning and memory in normal and memory deficit rats. *Indian J Pharmacol* 2002 Oct;34:339-349.
24. Diwanay S, Chitre D, Patwardhan B. Immunoprotection by botanical drug on experimental metastasis. *J Ethnopharmacol* 2004;90:223-237.
25. Gupta R, Sharma V. Ameliorative effects of *Tinospora cordifolia* root extract on histopathological and biochemical changes induced by aflatoxin-b (1) in mice kidney. *Toxicol Int* 2011 Jul;18(2):94-98.
26. Sharma V, Pandey D. Beneficial effects of *Tinospora cordifolia* on blood profiles in male mice exposed to lead. *Toxic Int* 2010 Jan;17(1):8-11.
27. Upadhyay N, Ganie SA, Agnihotri RK, Sharma R. Studies on antioxidant activity and total phenolic content of *Tinospora cordifolia* (Miers.) stem using *in vitro* models. *AJPCT* 2013;1(8):617-627.
28. Narayanan AS, Raja SS, Ponmurugan K, Kandekar SC, Natarajaseenivasan K, Maripandi A, Mandeel QA. Antibacterial activity of selected medicinal plant against multiple antibiotic resistant uropathogens: a study from Kolli Hills, Tamilnadu, India. *Benef Microbes* 2011 Sep;2(3):235-243.
29. Tambekar DH, Khante BS, Chandak BR, Titare AS, Baralkar SS, Aghadte SN. Screening of antibacterial potential of some medicinal plants from Melghat forest in India. *Afr J Tradit Complement Altern Med* 2009 May;6(3):228-232.
30. Sengupta S, Mukherjee A, Goswami R, Basu S. Hypoglycemic activity of the antioxidant saponarin, characterized as alpha-glucosidase inhibitor present in *Tinospora cordifolia*. *J Enzyme Inhib Med Chem* 2009 Jun;24(3):684-690.
31. Tripathi YB, Sharma M, Manickam. Rubiadin, a new antioxidant from rubiacordifolia. *Indian J Biochem Biophy* 1997 Jun;34(3):302-306.
32. Sharma P, Parmar J, Sharma P, Verma P, Goyal PK. Radiation-induced testicular injury and its amelioration by *T. cordifolia* (An Indian Medicinal plant) extract. *Evid Based Comp Altern Med* 2011;2011:643-847.
33. Upadhyaya R, Pandey RP, Sharma V, Anita KV. Assessment of the multifaceted immunomodulatory potential of the aqueous extract of *Tinospora cordifolia*. *Res J Chem Sci* 2011 Sep;1(6):71-79.
34. More P, Pai K. *In vitro* NADH-oxidase and myeloperoxidase activity of macrophages after *Tinospora cordifolia* (guduchi) treatment. *Immunopharmacol Immunotoxicol* 2012 Jun;34(3):368-372.
35. Nema A, Gupta N, Jain UK. Evaluation of Wound healing activity of *Tinospora cordifolia* Willd. *Der Pharmacia Sinica* 2012;3(1):126-130.
36. Singh N, Singh SM, Shrivastava P. Immunomodulatory and antitumor actions of medicinal plant *Tinospora cordifolia* are mediated through activation of tumor-associated macrophages. *Immunopharmacol Immunotoxicol* 2004 Feb;26(1):145-162.
37. Jagetia GC, Rao SK. Evaluation of the antineoplastic activity of guduchi (*Tinospora cordifolia*) in Ehrlich ascites carcinoma bearing mice. *Biol Pharm Bull* 2006 Mar;29(3):460-466.
38. Ashajyothi C, Ramachandra YL, Rai SP. Evaluation of central nervous system depressant activity of *Tinospora cordifolia* in rats. *Int J Pharm Chem Sci* 2012 Oct-Dec;1(4):1369-1373.
39. Jain BN, Jain VK, Shete A. Antipsychotic activity of aqueous ethanolic extract of *Tinospora Cordifolia* in amphetamine challenged mice model. *J Adv Pharm Technol Res* 2010 Jan;1(1):30-33.
40. Sai KS, Srividya N. Blood glucose lowering effect of the leaves of *Tinospora cordifolia* and *Sauropus androgynus* in diabetic subjects. *J Nat Remedies* 2002 Jan;2(1):28-32.
41. Sharma, R.; Shukla, VJ.; Ravishankar, B.; Prajapati, PK. The effect of two different dosage forms of *Guduchi i.e. Satva* and Ghana WSR antihyperglycemic effect on madhumeha (NIDDM) [dissertation]. Jamnagar: Gujarat Ayurveda University, IPGT and RA; 2012. pp. 132-133.
42. Karkal YR, Bairy LK. Safety of aqueous extract of *Tinospora cordifolia* (Tc) in healthy volunteers: a double blind randomised placebo controlled study. *Iran J Pharmacol Ther* 2007 Sep;6(1):59-61.
43. Purandare H, Supe A. Immunomodulatory role of *Tinospora cordifolia* as an adjuvant in surgical treatment of diabetic foot ulcers: a prospective randomized controlled study. *Indian J Med Sci* 2007 Jun;61(6):347-355.
44. Government of India, Ministry of Health and Family Welfare. Ayurvedic pharmacopoeia of India. Part I. Vol. 1. New Delhi: Government of India, Ministry of Health and Family Welfare, Department of AYUSH; 1990. pp. 41-42.
45. Pingale SS. Acute toxicity study for *Tinospora cordifolia*. *Int J Res Ayurveda Pharm* 2011 Sep;2(5):1571-1573.
46. Sengupta M, Sharma GD, Chakraborty B. Effect of aqueous extract of *Tinospora cordifolia* on function of peritoneal macrophages isolated from ccl4 intoxicated male albino mice. *BMC Complement Altern Med* 2011 Oct;11:102.
47. Patwardhan B. The quest for evidence-based Ayurveda: lessons learned. *Curr Sci* 2012 May;102(10):1406-1417.
48. Prabhakar PK, Doble M. Synergistic effect of phytochemicals in combination with hypoglycemic drugs on glucose uptake in myotubes. *Phytomedicine* 2009 Dec;16(12):1119-1126.

## हिन्दी सारंश

### गुडूची (*टिनोस्पोरा कॉर्डिफोलिया*) की विस्तृत भेषजगुण विज्ञानीय समीक्षा

**लक्ष्य:** यह समीक्षा गुडूची (*टिनोस्पोरा कॉर्डिफोलिया*) पर किए गए विभिन्न शोधों के निरीक्षण और रोगों से निपटने के लिए उसकी चिकित्सीय उपयोगिता का लाभ उठाने के लिए किया गया है।

**पृष्ठभूमि:** भारतीय चिकित्सा पद्धति, आयुर्वेद, में गुडूची (*टिनोस्पोरा कॉर्डिफोलिया*) एक बहुमूल्य औषधीय पादप है। देश के विभिन्न हिस्सों में *टिनोस्पोरा कॉर्डिफोलिया* व्यापक रूप से आदिवासी या लोक चिकित्सा में उपयोग किया जाता है।

**परिणामों की समीक्षा:** गुडूची के औषधीय गुणों पर विभिन्न समीक्षा के अध्ययन से पता चलता है कि यह औषधीय पादप मधुमेह रोधी, एंटीऑक्सिडेंट, अनुभूति (सीखने और स्मृति), शोधरोधी, दर्दनिवारक, व्रणरोपण, कैंसर रोधी, मलेरिया-रोधी, इम्यूनोमॉड्यूलेटरी और हिपेटोप्रोटेक्टिव चिकित्सीय गतिविधि से युक्त है।

**निष्कर्ष:** वर्तमान समीक्षा विभिन्न स्वास्थ्य संबंधित रोगों के उपचार में गुडूची (*टिनोस्पोरा कॉर्डिफोलिया*) के प्रभावकारिता की पुष्टि करता है। इसके अलावा एक व्यापक अनुसंधान और विकास कार्य किया जाना चाहिए ताकि रोगों को रोकने और उपचार करने में *टिनोस्पोरा कॉर्डिफोलिया* की क्षमता का पता लगाया जा सके।

**आतुरीय महत्व:** गुडूची में अतिशर्करारोधी, अल्पशर्करारोधी, शोधरोधी एवं यकृत सुरक्षा गतिविधि पाई गई। इसमें मधुमेह जन्य पादव्रणरोपण के लिए रोगप्रतिरोध क्षमतावर्धन में लाभदायक प्रभाव भी होता है।

**शब्द कुंजी:** गुडूची, एंटी इन्फ्लामेट्री, एनाल्जेसिक, औषधीय गुण।

