

MEDICINAL USES OF GILOY:A REVIEW

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ABSTRACT:-

Gilo (*Tinospora cordifolia*) is a plant medicine which is widely used in Unani system of medicine (USM) for various therapeutic purposes. It has antipyretic, analgesic, anti-inflammatory purpose and antidiabetic potential. This is a review paper based on published literature which discusses morphology, habitat, pharmacological actions and ethno-botanical therapeutic uses of this medicinal plants. It is concluded that, this is one of the best herbal medicine for pyrexia, diabetes mellitus and syphilis in USM.

INTRODUCTION :-

Tinospora cordifolia (Thunb.) Miers has long been a part of Ayurvedic medicine in India. This perennial, herbaceous vine belongs to the family Menispermaceae with many common names viz., Giloy, Guduchi, Gurcha, Amrita or heart-leaved moonseed. The species is common throughout tropical and subtropical zones at an altitude of 600 m. It is found in India, Bangladesh, Sri Lanka, Myanmar, China, Thailand, Philippines, Indonesia, Malaysia, Borneo, Vietnam, North Africa, and South Africa. Giloy is a large climbing shrub with elongated twining branches spreading extensively. A special feature is the presence of wiry aerial roots arising from the branches. Stems are rather succulent, creamy white to grey, deeply cleft, papery bark and rosette-like pores (lenticels). Leaves are simple, alternate, cordate-ovate, and very thin with long leaf stalks bulged at the base and apex. Inflorescence, called racemes is both axillary and terminal; flowers tiny, greenish yellow, unisexual dioecious. Fruits are of three shortly stalked subglobose drupes, scarlet coloured when ripe. The plant flowers during the summer and fruits during the winter. The plant is genetically diverse, containing different active components, including steroids, aliphatics, alkaloids, glycosides, and diterpenoid lactones. These active compounds are distributed over all parts of the plant, such as the root and stem.

The herb has a long history of being used in traditional system of medicines and by ayurveda practitioners in India to treat numerous disorders or diseases. Due to its recently reported medicinal properties, *Tinospora* has gained interest among researchers.

Morphological characteristics: Giloy is a large glabrous climber with succulent shrub.

Flowers: Male flowers are clustered in the axils of small subulate bracts. Female flowers are usually solitary and similar to male flower.

Sepals: The sepals are 6 in which 3 outer sepal are small, ovate –oblong, acute and 3 inner are larger, membranous, broadly elliptical, concave, 3-4mm, yellow.

Petals: The petals are 6 which is about 2mm. long, broadly spathulate, each closely embracing a stamen when young, claw cuneate, and lamina triquetrous or subtrilobed, reflexed at apex.

Stem: The stem is grooved, corky and branches sending down slender pendulous fleshy roots, terete, striate, with tubercled pale. Its taste is bitter.

Leaves: The leaves are membranous, 7-90 nerved, 5-10cm. or rarely 12 by 10cm, roundish or sub deltoid, cordate with broad sinus and large basal lobes, obtuse or more or less cuspidate, reticulately veined with microscopic glistening glands beneath.

Habitat: It is found throughout tropical India, ascending to an altitude of 1000 feet. Parts Used: The whole plant as well as its different parts such as Stem root , Bark and Leaf are being used in traditional medicine for the treatment of various ailment

Temperament: Some Unani Physicians described its temperament as Har1 Yabis and some described it as Har1 Ratab1.2 but according to Hakim Sharif Khan, the temperament of this plant is described as Murakkabul Quwa and Hakim Abdul Hakim has mentioned its temperament as Barid Yabis.

Dosage: In classical literature the dosage of Giloy is 4-9 gms per day orally. But according to Unani Pharmacopoeia its oral dosage is 5-10 gms per day.

Adverse effects: As reported in classical literature, no side effects of this drug had been observed. **Correctives:** If any side effect occurs then it may be suppressed by using Tabasheer and Dana Heel. **Substitute:** Sattu Giloy may be used as its substitute.

Uses of different parts of *Tinospora cordifolia* :-

Stems: The stem of Giloy is one of the constituents of several Ayurveda preparations used in general debility, dyspepsia, fever and urinary diseases. Stem is bitter, stomachic, diuretic stimulates bile secretion, causes constipation, allays thirst, burning sensation, vomiting, enriches the blood and cures jaundice. Stem also have anti- hyperglycaemic properties, anticarcinogenic property and used in Respiratory tract infections and skin diseases.

Roots: The root and stem of Giloy are prescribed in combination with other drugs as an antidote to snake bite and scorpion sting. It also have anti-neoplastic property and anti-oxidant activity.

Leaves: Juice or decoction of leaves is administered orally with honey in fever cordifolia

Bark. Giloy has anti –spasmodic, anti-pyretic and anti-allergic, anti –leprotic properties. The aqueous extract of Giloy root has anti-oxidant property. It successfully experiments on diabetic male albino rats.

Whole plant: Giloy as a whole plant is used in Diabetes. Rheumatoid arthritis, Gout, Cancer, high cholesterol content and in analgesic and neuropharmacological activities.

Chemical constituents: Various chemical constituents have been found in different parts of the Giloy plant. They belong to different classes such as alkaloids, diterpenoid, lactones, steroids, glycosides, aliphatic compounds, polysaccharides. These are as follows

Stem: Berberine, Palmatine, 18-norclerodane glucoside, Furanoid diterpene glucoside, Cordifolisides A to E

Bark: Berberine, Palmatine, 18-norclerodane glucoside, Furanoid diterpene glucoside, Cordifolisides A to E, Palmatosides C and F, Cordioside

Whole Plants: Furanolactone, Clerodanederivatives and Tinosporon, Tinosporides, Jateorine, Columbin, Octacosanol, Cordifol.

Root: Jatrorrhizine, Tetrahydropalmatine, Isocolumbin, Palmatine, Magnoflorine, Tembetarine.

Scientific Reports:-

Hypoglycaemic activity: The stem extract (both aqueous and alcoholic) of Giloy in dosage form (200 and 400mg/kg. body weight) in streptozocin diabetic albino rats has antihyperglycaemic action. It also increases the activity of the glycogen synthase in liver and also increases the storage of glucose in hepatocytes. The root extract of Giloy is pancreatoprotective properties and hypoglycaemic action in nature.

Hepatoprotective: The leaf extract of Giloy shows a hepatoprotective effect against CCl₄ induced hepatotoxicity in rats. The potential to minimise the effects of free radicals including the proxy radicals and its antioxidant activity in association with the inhibition of lipid peroxidation, thereby Giloy plant material can be considered as hepatoprotective agent by the combined synergistic effect of its constituents and micronutrients rather than any single factor through free radicals activity

Antispasmodic: Dry barks of Giloy have antispasmodic activity. [Anti-ulcer activity: An ethanolic extract of the roots of Giloy in combination with *Centella asiatica* afforded significant protective action against restraint stress induced ulcer formation.

Anti-microbial activity: The crude extract of the Giloy stem showed activity against bacteria and fungi.

Antipyretic: Studies have shown insignificant antipyretic effects in the hexane and chloroform soluble fractions of the stem of Giloy.

Anti- hyperlipidemic activity: The administration of the root extract of Giloy for six weeks in alloxan diabetic rats resulting in, significant reduction in tissue cholesterol, phospholipids and free fatty acids. The root extract of Giloy significantly decreases the level of cholesterol, TG, LDL, blood glucose and increases the level of the HDL cholesterol.

Immunomodulatory activity: Studies have shown that in rat groups, there is an enhancement in the bone marrow cellularity as well as α -esterase activity when treated with alcoholic extracts of Gilo. Thus it becomes evident that these drugs have immunomodulatory

Cardio protective activity: The prior administration of methanolic extract of Gilo attenuates isoprenaline-induced MI. The cardioprotective activity of *Tinospora cordifolia* probably related to its ability to strengthen the myocardial membrane by its membrane stabilizing activity.

Anti-scabies: The 50% Gilo lotion showed a significant decrease in all the parameters. It showed significant decrease in the degree of infestation, sites of predilection and global evaluation score while it demonstrated significant increase in the clinical improvement of the patients during clinical assessment. Although, a bitter sensation was noted when the lotion is applied topically, patients were asked to apply the lotion after dinner and to washed hands after application. Gilo lotion exhibited a comparable anti-scabies activity with Permethrin having the same cure rate [Gilo: 70%, 53.60 to 86.94%; Permethrin: 50%, 32.11 to 67.89%; P = 0.187] and clearance time of 23rd days, 20.47 to 25.53 days. Since the Gilo lotion is inexpensive compared to the commercially available drugs, it can be used as an alternative treatment to scabies

Pharmacological Use Of Giloy:-

1:- *Tinospora cordifolia* stem supplementation in diabetic dyslipidemia:

To study the impact of *tinospora cordifolia* stem supplementation on the glycemc and lipemic profile of subjects with diabetic dyslipidemia. Medicinal plants are powerful health promoting nutritional agents. Among the vast library of medicinal plants *Tinospora cordifolia* (Willd.) has been meagrely explored. It belongs to the family *Menispermaceae* and is a rich source of alkaloid and terpenes. It has hepatoprotective, antioxidant, immunostimulatory, hyperlipidemic, anticancer and antidiabetic properties. The stem contains berberine, palmatine, tembetarine, magnoflorine, tinosporin, tinocordifolin. The stem starch is highly nutritive and digestive. In modern medicine it is called the magical rejuvenating herb owing to its properties to cure many diseases. The stem contains higher alkaloid content than the leaves because of which it is approved for medicinal usage. With a host of phytochemical properties present in the stem, it may hold potential to manage dyslipidemia and dysglycemia, which otherwise has been proven only in pre-clinical studies. Medicinal plants are powerful health promoting nutritional agents. Among the vast library of medicinal plants *Tinospora cordifolia* (Willd.) has been meagrely explored. It belongs to the family *Menispermaceae* and is a rich source of alkaloid and terpenes. It has hepatoprotective, antioxidant, immunostimulatory, hyperlipidemic, anticancer and antidiabetic properties. The stem contains berberine, palmatine, tembetarine, magnoflorine, tinosporin, tinocordifolin. The stem starch is highly nutritive and digestive. In modern medicine it is called the magical rejuvenating herb owing to its properties to cure many diseases. The stem contains higher alkaloid content than the leaves because of which it is approved for medicinal usage. With a host of phytochemical properties present in the stem, it may hold potential to manage dyslipidemia and dysglycemia, which otherwise has been proven only in pre-clinical studies

2:-Antimutagenic extract from *Tinospora cordifolia* and its chemical composition:-

Chemical constituents of *Tinospora cordifolia* n-hexane extract were characterized by Gas Chromatography-Mass Spectrometry (GC-MS) and column chromatography. 14 constituents were characterised by GC-MS analysis and column chromatography led to the isolation of β -sitosterol. The immunomodulatory activity of the extract was investigated by polymorphonuclear leucocytes function test and antimutagenic activity by using Salmonellahistidine tester strain TA 98. The extract exhibited potent antimutagenic activity and the IC₅₀ value was found to be 1033.98 μ g/ 0.1 ml in co-incubation mode and 298.57 μ g/ 0.1 ml in pre-incubation mode.

3:-Antioxidant activity of *Tinospora cordifolia* roots in experimental diabetes:-

We made an attempt to study the antioxidant properties of *Tinospora cordifolia* roots, an indigenous plant used in Ayurvedic medicine in India in alloxan diabetic rats. Oral administration of an aqueous *T. cordifolia* root extract (TCREt) (2.5 and 5.0 g/kg) for 6 weeks resulted in a decrease in the levels of plasma thiobarbituric acid reactive substances, ceruloplasmin and α -tocopherol in alloxan diabetic rats. The root extract also causes an increase in the levels of glutathione and vitamin C in alloxan diabetes. The root extract at a dose of 5.0 g/kg showed the highest effect. The effect of TCREt was more effective than glibenclamide. Insulin restored all the parameters to near normal levels.

BOTANICAL DESCRIPTION :-

The plant family Menispermaceae consists of about 70 genus & 450 species that are found in tropical low land regions. *Tinospora cordifolia* is a perennial deciduous twiner with succulent stem. The bark is papery, creamy white to gray in appearance with large rosettelike lenticels. Leaves are simple, alternate or lobed, cordate, entire, 7-9 nerved; flowers are small cymose, yellow or greenish colour. Male and female flowers are formed on separate branches. Male flowers are clustered while female flowers are usually single [8]. Fruits are pea shaped, shiny, druping and become red when fully grown. Flowers grow during summer; and fruits, during winter. It is propagated by cuttings. The leaves afford a good fodder for cattle [9]. It has tubercles on the surface of grayish stem. Leaves are broad and heart shape,

Conclusion:-

The present study describes a quantitative and qualitative performance of the *Tinospora cordifolia* global research with a special focus on India over a period of 16 years using a Scopus international and multidisciplinary database. The global research output in the field of *Tinospora cordifolia* research output originated from 45 countries during 2001-2016, with top 10 countries contribution varying from 5 to 747 publications and their cumulative contribution together accounted for 100% global publication and citation share. Among top 10 countries, India registered the highest publication share (86.36%), followed by USA (5.66% share), Bangladesh, Pakistan, Malaysia and U.K. (from 1.04% to 1.97%), etc. Only 3 out of 10 countries registered relative citation index above the world average i.e. 1.02: U.K. (4.56), USA (2.11) and Bangladesh (1.25) during 2001-2016. The share of *Tinospora cordifolia* international collaborative research varied from 0.0% to 100.0%, with highest share coming from Saudi Arabia (100.0%), followed by U.K. (88.89%), Malaysia (60.0%), USA and Germany (57.14% each), Bangladesh (35.29%), Italy (33.33%), Pakistan (23.08%), India (7.50%) and Nigeria (0.0%) during 2001-2016.

REFERENCES:-

1. Abhimanyu Sharma, Asmitha Gupta, Sakshi Singh Amla Batra; *Tinospora cordifolia*(Willd.) Hook. F. & Thomson- A plant with immense economic potential; *J.Chem. Pharm. Res.*, 2010, 2(5):327-333.
2. AV Raghu, SP Geetha, G Martin, I Balachandran, PN Ravindran; *In vitro cell. Dev. Biol. – Plant*, 2006, 42, 584-588.
3. BV Shetty ; V Singh; *Flora of Rajasthan*. 1st edition, Merrut publishers and Distributors, Merrut. Vol 1: 2010;756-100.
4. BT Kavitha, SD Shruthi, S Padmalatha Rai, YL Ramachandra; Phytochemical analysis and hepatoprotective properties of *Tinospora cordifolia* against carbon tetrachlorideinduced hepatic damage in rats *Journal of Basic and ClinicalPharmacy*;2011
5. D Sarma, P Padma, RL Khosa; Constituents of *Tinospora cordifolia* root. *Fitoterapis*. 1998; 69:541-542.
6. D Sarma , RL Khosa, M Sahai ; Isolation of Jatrorrhizine from *Tinospora cordifolia* roots. *Planta Med*. 1995;61:98-99
7. JG Asthana, S Jain , A Mishra , MS Vijaykant ; Evaluation of antileprotic herbal drug combinations and their combination with Dapsone. *Indian Drugs*. 2001;38:82–6.
8. Gastro intestinal and anti-ulcer activity (PA Bafna et al., 2005) Anti-fertility activity (RS Gupta et al., 2003) Hepatoprotective activity (BT Kavitha et al., 2011) U. Spandana et.al/ A Review on *Tinospora...* *IJCPR*, May-July 2013; 4(2); 61-68 Page 67
9. J Singh , K Sinha , A Sharma , NP Mishra , SP Khanuja; Traditional uses of *Tinospora cordifolia* (Guduchi) *J Med Aromat Plant Sci*. 2003;25:748–51.
10. K Avnish Upadhyay, Kaushal Kumar, Arvind Kumar, and S Hari Mishra. *International Journal of Ayurveda Research*; 2010 Apr-Jun; 1(2): 112–121.
11. KC Gupta, R Viswanathan;Antituberculous substances from plants. *Antibiot Chemother*.1956;6:194–5.
12. KN Aiyer, M Kolammal; *Pharmacognosy of Ayuevedic Drugs*, Series 1. 1st ed. Trivendram: The central Research institute; 1963.
13. Dr. Naveen Nandal, Dr. Aarushi Kataria, Dr. Meenakshi Dhingra. (2020). *Measuring Innovation: Challenges and Best Practices*. *International Journal of Advanced Science and Technology*, 29(5s),
14. K Raghunathan, R Mitra; *Pharmacognosy of Indigenous Drugs*. New delhi; Central Council for Research in Ayurvedic and Siddha; 1982.