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MEDICINAL PROPERTIES OF GILO (*TINOSPORA CORDIFOLIA*) - 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.

KEYWORDS: Gilo, antipyretic, antidiabetics, Unani Medicine.

INTRODUCTION

Gilo is a potential drug used in Unani medicine for various therapeutic purposes. The plant is a climbing shrub growing in deciduous and dry forest. It is widely distributed throughout India, China, North West, and parts of South-Africa, Pakistan, Malaysia, Indonesia, Vietnam, Philippines, Thailand, Myanmar, Bangladesh, and Sri-Lanka.[1] It requires fair moisture level and can be grown in a wide range of soil, from acid to alkaline.[2] ***Gilo*** was included in the Bengal pharmacopoeia of 1844 and the Indian pharmacopoeia of 1868.[3] It is used as immuno- stimulant, antioxidant, anticancer and antidiabetic drug.[4] In classical literature, it is described as a good antipyretic, anti-inflammatory and blood purifier. It has been used for the treatment of anaemia, Diarrhoea Cough and Dysuria.

Vernacular names

It is known by different vernacular in different parts of the world.

Hindi: Giloe[5,9,10,12,14,17], Gulancha[5,6,7,9,10,12,17], Gulbel[7], Gurch[13,14,18], Amrita[16]

Arabic: Gilo[6, 14, 15]

Urdu: Gilo[11,15]

Persian: Gulbel[6,14]

Sanskrit: Amritavalli or Amrita[5, 6, 7, 11, 12, 14, 17], Guduchi[9, 10, 11, 12, 13, 17], Guruchi[16, 18]

English: Gulancha / Indian tinospora or Heart leaf moonseed[8]

Telugu: Guduchi[6], Tippateege[5, 7, 12, 14, 17], Tippa-tige[9]

Table No.1.

Taxonomical Classification[19]	
Kingdom	Plantae
Division	Magnoliophyta
Class	Magnoliopsida
Order	Ranunculale
Family	Menispermeacea
Genus	*Tinospora*
Species	*cordifolia*

Morphological characteristics: ***Gilo*** 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.[6]

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.[6]

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.[6] **Stem:** The stem is grooved, corky and branches sending down slender pendulous fleshyroots, terete, striate, with tubercled pale.[6] Its taste is bitter.[13,25,26]

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.[6]

Habitat: It is found throughout tropical India, ascending to an altitude of 1000 feet.[20]

Parts Used: The whole plant as well as its different parts such as Stem[5,21,22,23] root[5, 21, 22], Bark[24] and Leaf[22] are being used in traditional medicine for the treatment of various ailments.

Temperament: Some Unani Physicians described its temperament as *Har*[1] *Yabis*[1][15,25,27] and some described it as *Har*[1] *Ratab*[1.2][25,15] but according to Hakim Sharif Khan, the temperament of this plant is described as *Murakkabul Quwa*[15,25,27] and Hakim Abdul Hakim has mentioned its temperament as *Barid Yabis*.[26,27]

Dosage: In classical literature the dosage of ***Gilo*** is 4-9 gms per day orally.[25] But according to Unani Pharmacopoeia its oral dosage is 5-10 gms per day.[14]

Adverse effects: As reported in classical literature, no side effects of this drug had been observed.[26,27]

Correctives: If any side effect occurs then it may be suppressed by using *Tabasheer and Dana Heel*.[13, 26, 27]

Substitute: Satte *Gilo* may be used as its substitute.[13, 26, 27]

Uses of different parts of *Tinospora cordifolia*

Stems: The stem of ***Gilo*** 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.[28] Stem also have anti- hyperglycaemic properties, anti-carcinogenic property and used in Respiratory tract infections and skin diseases.[20]

Roots: The root and stem of ***Gilo*** are prescribed in combination with other drugs as an anti-dote to snake bite and scorpion sting.[6,7] It also have anti-neoplastic property and anti-oxidant activity.[20]

Leaves: Juice or decoction of leaves is administered orally with honey in fever.[29]

Bark. ***Gilo*** has anti –spasmodic, anti-pyretic and anti-allergic, anti –leprotic properties. The aqueous extract of ***Gilo*** root has anti-oxidant property. It successfully experiments on diabetic male albino rats.[30,31]

Whole plant: ***Gilo*** as a whole plant is used in Diabetes. Rheumatoid arthritis, Gout, Cancer, high cholesterol content[32] and in analgesic and neuropharmacological activities[33] and also in Cardiac disorders.[34]

Pharmacological Actions

1. Dafi‘-i-Ḥummā (Antipyretic)[3,5,6,8,13,15,25,26,27]
2. Musakkin-i-Alam (Analgesic)[8]
3. Muqawwī-i-Bāh (Aphrodisiac)[3,8,10,13,15,25,26,27]
4. *Qābiḍ* (Astringent)[3,8,13,14,27]
5. Mudirr-i-Bawl (Diuretic),[3,6,8,14]
6. Dāfi‘-i-Su‘āl (Antitussive)[8,13,25,26]
7. Kāsir-i-Riyāḥ (Carminative)[8,25]
8. Dāfi‘-i-Ātshak (Antisyphilitic)[5,8,14,27]
9. Dāfi‘-i-Sozāk (Useful in Gonorrhoea)[9,13,15,25,27,35]
10. Muṣaffī-i-Dam (Blood purifier)[13,14,27]
11. Mushtahī (Appetizer)[6,25,26,36]
12. Muḥallil-i- Awrām (Anti-inflammatory)[8,14]
13. Muwallid-i-Manī (Spermatogouge)[15,25,36]
14. Mudirr-i-*Ḥayḍ* (Amenogouge)[37]
15. Naf-e-Ziabetus (Antidiabetic)[3,6,8,15]
16. Antispasmodic[7,8,38]
17. Hepatoprotective[8]
18. Mukhrij-i-Dīdān-i-Am‘ā (Vermifuge)[14,27]
19. Antioxidant[8]
20. Deobstruent[8]
21. Antibacterial[8]
22. Antiviral[8]
23. Lipolytic[8]

Therapeutic Uses

1. Tape Damwi (Fever)[25,26]
2. Tape Safrawi (Fever)[25,26,36]
3. Alam (pain)[8,26]
4. *Qāṭi‘-i-Bāh* (anaphrodisiac)[26,36]
5. Syphillis[8,13,27]
6. *Sozāk* (Gonorrhoea)[8,13,15,27,36]
7. Piles[3,6,8,26]
8. Jaundice[3,8,26,36]

9. Ḥarārat-i- Jigar (Hotness of Liver)[36]
10. Ghashi (Syncope)[26,36]
11. Shozishe Dil wa Jigar (Heart Burn)[15,25]
12. Gout[5,8]
13. *Ḍu'f al-Ishtihā'* (Anorexia)[3,7,8,9]
14. Diabetes mellitus[3, 6, 7, 8,21,23,38]
15. Anaemia[6,8]
16. Diarrhoea[13, 25, 26]
17. Cough[6, 7, 25, 26, 36]
18. Dysuria[8]
19. Inflammation[14,38]
20. Hypertension[3]
21. Snake bite[6,8]
22. Leucorrhoea[6]
23. Tuberculosis[8,13]
24. Spermatorrhoea[8]
25. Rheumatoid arthritis[8]
26. Qāṭi'-i- Balgham[26]
27. Cardiac Diseases[3]
28. *Khafaqān* (Palpitation) - Joshānda (Decoction) of this drug with Brahmi (*Bacopa monnieri* (Linn.) reduce the Khafaqān (Palpitation).[15]

Chemical constituents: Various chemical constituents have been found in different parts of the ***Gilo*** plant. They belongs to different classes such as alkaloids, diterpenoid, lactones, steroids, glycosides, aliphatic compounds, polysaccharides. These are as follows.[20, 24, 29, 39, 40]

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

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

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

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

Scientific Reports

Hypoglycaemic activity: The stem extract (both aqueous and alcoholic) of ***Gilo*** in dosages form (200 and 400mg/kg. body weight) in streptozocin diabetic albino rats has anti-hyperglycaemic action. It also increases the activity of the glycogen synthase in liver and also increase the storage of glucose in hepatocytes.[41] The root extract of ***Gilo*** is pancreatoprotective properties and hypoglycaemic action in nature.[42]

Anti- hyperlipidimic activity: The administration of the root extract of ***Gilo*** for six weeks in alloxan diabetic rats resulting in, significant reduction in tissue cholesterol, phospholipids and free fatty acids**.** The root extract of ***Gilo*** significantly decreases the level of cholesterol, TG, LDL, blood glucose and increase the level of the HDL cholesterol.[43]

Hepatoprotective: The leaf extract of ***Gilo*** shows a hepatoprotective effect against CCl4 induced hepatotoxicity in rats.[44] 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 ***Gilo*** 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.[28]

Antispasmodic: Dry barks of ***Gilo*** have antispasmodic activity.[45]

Anti-ulcer activity: An ethanolic extract of the roots of **G*ilo*** in combination with *centenella asiatica* afforded significant protective action against restraint stress induced ulcer formation.[46]

Anti-microbial activity: The crude extract of the ***Gilo*** stem showed activity against bacteria and fungi.[47]

Antipyretic: Studies have shown insignificant antipyretic effects in the hexane and chloroform soluble fractions of the stem of ***Gilo***.[31]

Osteoprotective Activity: Rats treated with ***Gilo*** showed an osteoprotective effect, as the bone loss in tibiae was slower than that in controls. This study demonstrates that extract of ***Gilo***

has the potential for being used as antiosteoporotic agent.[48]

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.[49]

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.[1,50]

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 infestation.[51]

CONCLUSION

Gilo is one of the best herbal plant which is used in USM and also other system as an anticancer, blood purifier, antidiabetic, anti-inflammatory, antipyretic, antibacterial, immune modulation, hepatoprotective, aphrodisiac, snake- bite and carminative properties. The present review highlights only some of its medicinal properties. Further research is needed in the field USM and other system, so that new herbal formulations can be prepared from the bioactive compounds of this important medicinal plant for the treatment of many fatal diseases.

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