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COMPREHENSIVE REVIEW ON *TINOSPORA CORDIFOLIA* UNVEILING ITS HEALTH BENEFITS AND BIOLOGICAL POTENTIAL

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This study was undertaken to evaluate the performance of cut *Dendrobium* pink sunshine under various holding solutions at post graduate lab Department of Horticulture, Faculty of Agriculture, Annamalai University, Tamil Nadu, India, during February 2016. The treatments with three replications were carried out in completely randomized design with 3 spikes in each replication. Nine chemical preservative solutions were used for extending the vase life and the treatments are T₁ 8-HQC (200-ppm), T₂ Citric Acid (200-ppm), T₃ STS (200-ppm), T₄ GA (200-ppm), T₅ Al₂(SO₄)₃ (10-ppm), T₆ 8-HQC (200-ppm) + 5% sucrose, T₇ Citric Acid (200-ppm) + 5% sucrose, T₈ STS (200-ppm) + 5% sucrose, T₉ GA (200-ppm) + 5% sucrose, T₁₀ Al₂(SO₄)₃ (200-ppm) + 5% sucrose and T₁₁ Distilled water. Postharvest observations including bud open (%), flower drop (%), flower colour retention (days), flower diameter (cm), vase life and water uptake (ml). Among the treatments (T₁₀) Al₂(SO₄)₃ (200-ppm) + 5% sucrose recorded maximum performances in the postharvest studies followed by (T₈) STS (200-ppm) + 5% sucrose.

ABSTRACT

Tinospra cordifolia is a deciduous climbing shrub. It is also known as *Gulvel* or *Guduchi* and has a substantial usage because of varied properties. In Ayurvedic regime this plant is designated as Rasayana drug because of its significant therapeutic importance. The plant *Tinospora cordifolia* in the world of medicine helps in healing of many diseases. This climber plant grows in warm climate and with support of fast growing breed i.e. Moringa (*Moringa oleifera*), Neem (*Azadirachta indica*) and Jatropa (*Jatropa curcas*). Neem Giloy shows more therapeutic properties. This plant *Tinospora cordifolia* has such active compounds i.e. alkaloids, diterpenes, steroids, Diterpenoid lactones, glycosides, aliphatic compounds that plays an important role in curing many diseases. The present review focuses on health benefits of the plant as it has been used traditionally by tribal and ayurvedic regime as it has various properties for curing many diseases.

Keywords : *Tinospora cordifolia*, stems, leaves, medicinal plant, health benefits, Rasayana

INTRODUCTION

Tinospora cordifolia is a large crawling shrub which belongs to family of *Menispermaceae*. *Tinospora cordifolia* has fleshy stems with long thread like roots which arise from branches as shown in Fig. 1. Heart shaped leaves of this plant are membranous and juicy. Flowers of this plant blooms in summer season. This plant climbs over highest trees in the area wherever they are growing with the roots reaching the length of 10 metres (Sarangi and Soni, 2013).

This plant is more seen in tropical regions of India from konkan to Sri Lanka, Kumaon to Assam and Myanmar and Bihar (Sarangi and Soni, 2013). It has different names in different languages such as in Arabic (*Gilo*), Assamese (*Amarlata*), English (*Tinospora*), Chinese (*K'uan chu Hsing*), French (*Culancha*), Hindi (*Giloe*, *Gulbel*, *Gurcha*), Gujerati (*Galo*, *Gulo*), Nepali (*Garjo*), Punjabi and Kashmiri (*Gilo*), Sanskrit (*Amrita*, *Guduchi*) and Sikkim (*Gurjo*) (Choudhary *et al.*, 2013). Botanical Characteristics of each part of the plant is explained in Table-1.

Taxonomic Description of the plant is classified as Class-Magnoliopsida, Order-Ranunculaceae, Family-Menispermeaceae, Sub-kingdom-Tracheobionta, Super-Division-Spermatophyta, Tribe-Tinosporeae, Genus-Tinospora, Series-Thalaniflorae and Divison-Magnoliophyta (Jabiullah *et al.*, 2018). This plant is very beneficial in terms of active compounds present in it. *Tinospora cordifolia* is best source for alkaloids and terpenes. (Spandana *et al.*, 2013)

The composition of *Tinospora cordifolia* is made with various constituents such as diterpenoid lactones, alkaloids, steroids, glycosides, phenolics, aliphatic compounds and polysaccharides (Srivastava and Singh, 2021) and different nutrient compositions which are explained in Table-2 which makes it important in the field of medicine. *Tinospora cordifolia* is used in tribal or folk medicine. This plant is used in different forms in folk and tribal medicine such as whole plant, powdered form of root and stem bark, juice form of root, juice or paste form of leaves and extract form of roots and stem which helps to cure various health issues such as

fever, jaundice, asthma, skin diseases, eyes disorders etc. (Singh *et al.*, 2013)

Tinospora cordifolia can be used with other drugs as witnessed in the investigation as *Tinospora Cordifolia* had no impact on cytochrome catalysts in microsomes of liver which helps to metabolise xenobiotic compounds (Bahadur *et al.*, 2016). *Tinospora cordifolia* is fed not only because of its therapeutic properties but also because it is nutritionally useful as it has important mineral present i.e. copper, manganese, zinc, iron, phosphorus and calcium (Rahal *et al.*, 2014). This plant does not put any mutagenic impact in peripheral blood lymphocytes on bone marrow erythrocytes and DNA damage which means it has been tentatively demonstrated to be safe for living organisms (Chandrasekaran *et al.*, 2009).

***Tinospora Cordifolia* – In Ayurveda**

In Ayurveda this natural plant is used as “rasayana” which in Sanskrit means circulation of “rasa” which means circulation of nutrients. In Ayurveda, single unit is a term for treatment of entire body. Different synonyms had been given according to its properties in Ayurveda such as eaten by grazing animals (Vatsadini), destroying of bile (Pittaghni), to bring improvement in rasa which strengthens all tissues (Rasayana), its tastes bitter (Tikta), it is not harmful (Saumya), physician’s favourite (Bhishakpriya), property of antipyretic (Jawara), for preventing ageing (Vayastha) and for its appearance of wheel (Chakra-akshana) (Premila, 2006).

In Ayurveda, *Tinospora Cordifolia* has been explained in different dosages form i.e. Swaras (10-20ml/day of the juice from fresh stem), Churna (1-3 g/day of powdered dry stem), Kalka (10 g/day of the paste from fresh stem), Kwatha (20-30 ml of hot water three times a day is taken by extraction of ground dried stem), Fant (infusion has been done in hot water i.e. 10-20ml/day), Satwa (750 mg to 2 g/day of starchy extract from stem), Ghana (500 mg to 1 g three to four times a day of solidified aqueous extract etc. (Panchabhai *et al.*, 2008). This plant is acknowledged in Indian Pharmacopoeia and is used with various other formulations for ailment of weakness, fever, dyspepsia, dysentery, impotency, urinary diseases, leprosy, asthma and many others (Choudhary *et al.*, 2013).

Awareness

Tinospora cordifolia is utilized with full awareness by diabetic patients as it can bring down glucose levels. In the event that you are about to go through a medical procedure, quit devouring guduchi fourteen days previously, since it can meddle in between the medical procedure with glucose control. It is smarter to stay away from during pregnancy and breastfeeding (Sarangi and Soni, 2013). According to Ayurveda, if *Tinospora cordifolia* taken in high dose then it can lead to constipation, but there is no toxicity and side effect (Pande *et al.*, 2012).

Health Benefits of *Tinospora cordifolia*

This plant, *Tinospora cordifolia* is recognised as the ailment against various diseases. Its helpful strength lies in its restoring and fortifying properties (Pande *et al.*, 2012). A group of different active biological compounds have been separated from various parts of the *Tinospora cordifolia*. It has been reported that different compounds have different

health benefits (Jabiullah *et al.*, 2018). Different health benefits will be explained further:-

Infertility and other related problems are prevented by *Tinospora Cordifolia* in those men who undergo radiation therapy (Sharma *et al.*, 2011). Reduction in resistance against HIV has been shown by extract of the root. Decrease in eosinophil count, stimulation of macrophages, polymorphonuclear leucocytes, B lymphocytes and level of haemoglobin have shown the impact of anti HIV effect (Kalikar, *et al.*, 2008).

Blood glucose level is regulated by using the stem of the plant as it helps to fix diabetes. It has been accounted for to go about as anti-diabetic medication through informative oxidative pressure, advancing insulin emission by repressing gluconeogenesis and glycogenolysis (Sangeetha *et al.*, 2011). *Tinospora cordifolia* has been chosen as a drug for cancer as it contains active principles which enhances immunoglobulin and blood leukocyte levels and stimulates stem cell proliferation which strengthen the host immune system. Tumour mediated immunosuppression can also be prevented by these immunostimulating properties (Sarangi and Soni, 2013).

Tinospora cordifolia gave huge help from sniffing, nasal release, nasal block, and nasal pruritus. It has been known for its anti-allergic effect (Badar *et al.*, 2005). *Tinospora cordifolia* has been regarded as the best psychotropic drug. It helps in dealing with various mental disorders by using the whole plant and juice of the leaves (Sarangi and Soni, 2013). *Tinospora cordifolia* helps in reduction of body heat and thus helps in treating jaundice (Sangeetha *et al.*, 2013). Stem of *Tinospora cordifolia* is utilized in everyday weakness, dyspepsia, fever and urinary sicknesses (Singla and Singla, 2010).

Asthma can also be treated with *Tinospora cordifolia* by administering the juice of the stem orally (Sinha *et al.*, 2011). *Tinospora cordifolia* has significant injury mending advancing action i.e. promoting wound healing activity through methanolic extract by the expanded pace of wound constriction; decrease in the time of epithelialization, expansion in collagen deposition and expansion in elasticity in granulation tissue (Sarangi and Soni, 2013).

In Parkinson’s disease this *Tinospora cordifolia* is given with L-DOPA as during the formation of dopamine it produces free radicals. Thus *Tinospora cordifolia* acts as a neutralizer during the side effect of drug (Srivastava, 2011). *Tinospora cordifolia* is additionally utilized for mitigating aggravated and harmed mucous layers in the digestive tract. It ensures that stomach and duodenum is protected by expanding the creation of mucin (Mesram *et al.*, 2013). *Tinospora cordifolia* in various diseases such as obstructive jaundice, hepatic fibrosis, peritonitis and sepsis acts as immunomodulators (Mesram *et al.*, 2013).

Tinospora cordifolia incorporates ayurvedic properties such as sangrahi, arshahara, aruchinashaka, dipana, agnidipana, chardihara, trishnahara, trishnanashaka and hikkahara. *T. cordifolia* has been formulated for a treatment which appears to diminish ulcer index total acidity, with an expansion in the pH value of gastric liquid in pylorus-ligated rodents and in the ethanol-induced gastric mucosal injury in rodents (Bafna and Balaraman, 2005). *Medhya rasayana* which means learning and memory enhancer is another term

given to *Tinopora cordifolia* in Ayurveda. Children with behaviour disorders and mental deficits have noticed significant reaction with positive changes in IQ levels (Singh *et al.*, 2003).

Tinopora cordifolia has been used in the formulation for ailment of rheumatoid arthritis (DerMarderosian and Beutler, 2002). *Tinopora cordifolia* in the form of alcoholic extract has found to work as an anti inflammator in both models of acute and subacute inflammation (Wesley *et al.*, 2008). *Tinopora cordifolia* shows anti-osteoprotective effect by lowering the bone loss, serum osteocalcin and cross laps levels in rats treated with *Tinopora cordifolia* (Kapur *et al.*, 2008). *Tinopora cordifolia* water extract shows decrease in the levels of gamma-glutamyl tranferase, asparate transaminase, alanine transaminase, LDL, HDL and cholesterol once administered. They also show normal levels of liver function (Sharma and Dabur, 2016).

Tinopora cordifolia is used for ailment of dengue in ayurvedic treatment (Sarangi and Soni, 2013). This plant helps in coordinating the digestion of nutrients like carbohydrates and lipids towards right heading as found in fructose glut. In this manner plant will be able to manage metabolic issues like diabetes and other medical issues in a positive manner (Reddy *et al.*, 2009). *Tinopora cordifolia* helps in removing exogenous and endogenous toxins during snake or scorpion bite which makes it related to immunomodulation and antioxidant properties (Mutalik and Mutalik, 2011).

CONCLUSION

Tinopora cordifolia has immense importance in ayurvedic system as it provides various health benefits with different properties. It has been used in tribal or folk medicine because of its different properties. This plant has various phytoconstituents which increases its formulation for further researches. Leaving all other medicinal plant, *Tinopora cordifolia* has greater medicinal values and nutritional properties, so should be included as a potential dietary part which helps in preventing various diseases. The current paper explains about therapeutic applications and health benefits of *T. cordifolia* alongside countering many ailments, infections and problems for shielding different medical problems in people.

This particular review paper has focuses on various health benefits and varying properties antiperiodic, antispasmodic, anti-inflammatory, immunomodulatory or immunostimulatory, antituberculosis, gastrointestinal and hepatoprotection, anti-osteoporotic, antitumor, cognition, antineoplastic, antihyperglycemia, antihyperlipidemia, antioxidant, antiangiogenic, anti-malarial, anti-allergic and antipyretic properties on *Tinospora cordifolia*. Future perspective of this plant plays are very beneficial as this herbal plant can be used for making different medicines and products. People are more concern for their health nowadays so will be an attractive point for them to use because of its medicinal and therapeutic applications.

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