

***Tinospora Cordifolia*: Pharmacognostical and Phytochemical Screening**

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Abstract

Giloy (*Tinospora cordifolia* family Menispermaceae) is an indigenous, common shrub found in the Himalayas, tropical regions of India and particularly abundant in the dense forests of Chhattisgarh. *Tinospora cordifolia* is a creeper with grayish stem and tubercles (small warts) on the surface. It is antipyretic, diuretic and anti-inflammatory. It is a constituent of several compound preparation. It is used in fever, urinary disorders, dyspepsia, secondary syphilis, rheumatism, constipation, tuberculosis, leprosy and general debility. It is also used in treatment of rheumatism and jaundice. It is a blood purifier and may be useful in AIDS and other immune disorders also. It is also being proposed for cancer patient before and after chemotherapy. The use of *Tinospora cordifolia* in the treatment of a variety of diseases is well documented. The present study included quantitative and qualitative evaluation of aerial part of *Tinospora cordifolia*. The quantitative evaluation parameter like moisture content, total ash value, acid insoluble ash, water soluble ash value, alcohol and aqueous extractive values were found to be 2.31%, 7.5%, 1.16%, 11.05%, 7.27% and 12.05% respectively. In qualitative evaluation, petroleum ether extract showed the presence of alkaloids, glycosides, carbohydrates, tannins, sterols, proteins and amino acids. The aqueous extract also showed the presence of alkaloids, glycosides, carbohydrates, tannins, proteins, and amino acids.

Key words: *Tinospora cordifolia*, total ash value, water soluble ash, acid insoluble ash, extractive value, moisture content.

Introduction

Giloy (Botanical Name - *Tinospora cordifolia*)

Common name: Giloy, Guduchi

Scientific name: *Tinospora cordifolia*

Family: Menispermaceae

Parts used: Stem

Giloy is an indigenous, common shrub found in the Himalayas, tropical regions of India and particularly abundant in the dense forests of Chhattisgarh. Giloy is a creeper with grayish stem and tubercles (small warts) on the surface. The leaves are broad and heart-shaped. The plant bears minute yellow flowers. It is known to have a range of medicinal benefits, chief among them being its ability to enhance the immune system. Modern research shows that Giloy is a strong immune-stimulant and immune-booster builder and has a potentially important role in building the immune system which in turn can help prevent the occurrence of diseases - from the common cold cough to fever, diabetes and cancer. It

is this unique ability of Giloy to work at the cellular level and enhance immunity that has earned it its exalted place in the traditional system of Indian system.^{1,2}

Literature review

Dr. Shirish S. Pingale *et al.* showed the present work is to examine acute toxicity studies for decoction of aerial parts (leaves and stem) as well as whole plant powder of *Tinospora cordifolia* in the form of aqueous slurry as per OECD guidelines in Swiss mice weighing 35 to 45gm. The dose of 3, 5, 7 and 9 ml per kg body weight of decoction and 2, 4, 6 and 8 gm/kg body weight of the whole plant powder were administered orally. All the groups of animals were almost continuously observed for mortality and behavioral changes during first 24 hrs and then daily for a fortnight. The decoction of fresh leaves and stem as well as whole plant powder have no any significant

toxic effect in Swiss mice and the plant material was found to be nontoxic. **Amit Sandhu1, Neha bhardwaj et al.** described that present study deals with the antimicrobial activity and phytochemical screening of the two Medicinal plants, *Tinospora cordifolia* and *Euphorbia hirta* those are commonly available in India. Results of Antimicrobial activity revealed that these medicinal plant extracts were very effective against *Serratia marcescens*, *E. coli*, *Streptococcus thermophilus*, *Fusarium oxysporium*, *Aspergillus niger* while these extracts showed very less inhibition against *Trichoderma reesei*.^{4,5}

Materials and method

Collection and authenticated of sample

The stem part of *Tinospora cordifolia* collected from local plant supplier and authenticated by Dr. Raj Singh Saini, HOD, Department of Biotechnology, IIMT College of Medical Sciences, Meerut.

Pharmacognostical evaluation

The stem part was subjected to proximate analysis. Quantitative standards like Moisture content, Total Ash value, Acid insoluble extractive values for aerial determined.

a) Moisture content

The moisture content of a drug should be determined. Moisture content of the aerial part determined by using Infrared moisture balance Model –(Bell India Pvt. Ltd.).

b) Ash value

1) Total ash value

When vegetable drugs are incinerated, they leave an organic ash in some plants. The total ash usually contains carbonates, phosphate, silicate, and silica.

Calculation

$$\text{Ash \%} = (B-C) \times 100 / A$$

Where, A is weight of sample in gram

B is weight of dish + content after drying (g)

C is weight of empty dish (g)

2) Acid insoluble ash

Total ash treated with dilute hydrochloric acid reacts with minerals to form soluble salts and the insoluble ash consists mainly of silica, as acid insoluble ash.

c) Extractive values

The determination of water and alcohol soluble extractive value was used as means of evaluating the quality and purity of the constituents. Extraction of the drug can be maceration with cold water or by continuous extraction procession a Soxhlet extractor.

1) Alcohol soluble extractive values

2) Water soluble extractive values

Calculation

The percentage of water soluble extractive values / alcohol soluble extractive values = $(B-A) \times 4 \times 100 / W$

Where, A= Empty weight of the dish (g)

B= Weight of dish + residue (g)

W= Weight of plant material taken (g)

Preparation of extraction

The stem part powder was subjected to systemic phytochemical screening by Extracting them with three solvents viz- petroleum ether and water. Then testing for the presence of chemical constituents.

Solvent extraction

The method is based on the extraction of active constituents present in the drug, using three solvents ranging from non-polar to polar. The solvents used petroleum ether & water. The extraction was done using soxhlet apparatus.

Procedure of Solvent Extraction

Extraction by soxhlet method: 200 g of powdered drug was subjected drug was subjected to soxhlet extraction with two solvents, viz- petroleum ether and water for 6 hrs. All the extracts were concentrated by using rotary vacuum evaporator at low temperature. They were then weighed and percentage of different extractive values was calculated with respect to air-dried substance.

Phytochemical evaluation

Extracts obtained were subjected to various chemical tests to detect the chemical constituents present in them.

Detection

Alkaloid

Extracts were dissolved individually in dilute hydrochloric acid and filtered. The filtrate was used to test for the presence of alkaloids.

a)Mayer’s test- Filtrates were treated with Mayer’s reagent(Potassium Mercuric iodide).

b) Wagener’s test- filtrates were treated with Wagener’s reagent (Iodine in potassium iodide).

c) Dragendroff’s test- filtrates were treated with dragendroff’s reagent (Potassium bismuth iodide).

d) Hager’s test- filtrates were treated with Hager’s reagent (Saturated picric acid solution).

Detection

Carbohydrates

- a). Molisch’s Test
- b). Benedict’s Test

Glycosides

- a). Borntrager’s Test
- b). Legal’s Test

Saponins

- a). Froth Test
- b). Foam Test

Phytosterols

- a). Salkowski’s Test
- b). Libermann Burchard’s Test

Fixed oils and Fats

Stain Test

Resins

Acetone – Water Test

Phenols

Ferric Chloride Test

Tannins

- a) Gelatin Test

Flavonoids

- a). Alkaline Reagent test
- b). Lead acetate

c). Zinc hcl reducing Test

Proteins and Amino acids

Xanthoproteic Test

The extracts were treated with few drops of concentration Nitric acid solution. Formation of yellow colour indicates the presence of proteins.

Ninhydrin Test

To the extracts, 0.25% nin hydrin reagent was added and boiled for few minutes. Formation of blue colour indicates the presence of amino acid.

Diterpenes -Copper acetate Test

Extracts were dissolved in water and treated with few drops of copper acetate solution. Formation of Emerald green colour indicates the presence of diterpenes.³

Result and discussion

Pharmacognostical evaluation

The aerial part are subjected to quantitative standard (proximate analysis) like moisture content, total Ash value ,acid insoluble ash, extractive value and water soluble extractive values for sample were determined.

a). Moisture Content

Results of estimation of moisture content are tabulated in table 1.

Analysis of the result is indicates that, in *Tinospora cordifolia* moisture content was maximum (2.31%)

b). Ash values

The total ash, acid insoluble ash and water-soluble ash values were determined for air dried samples using the procedure described in anonymous, quality methods for medicinal plant materials, WHO, Geneva. From the results, both the plant parts shows slight difference were tabulated in table 1.

Table 1: Data showing values of moisture content, total ash acid insoluble ash, and Water soluble ash in *Tinospora cordifolia*.

Sample Identify	Moisture content %	Std. value	Total ash %	Std. value	Acid insoluble ash%	Std. value	H ₂ O soluble ash %	Std. value
<i>Tinospora cordifolia</i>	2.31	NMT 5%	7.5	NMT 10%	1.16	NMT 3%	12.05	NMT 20%

Table 2: Data showing % Alcohol soluble extractive values and % water soluble extractive values in *Tinospora cordifolia* stem part.

Sample Identify	% of alcohol soluble extractive	Std. value	% of water soluble extractive	Std. value
<i>Tinospora cordifolia</i>	7.27	NMT 1.5%	12.05	NMT 9%

Table 3: Data showing successive extractive values and nature of extracts of the *Tinospora cordifolia* stem part.

Plant parts	Solvents	Colour	Nature of the extracts	solubility
Stem Part	Petroleum ether	Dark brown	Sticky	Chloroform, DMSO
	Water	Black brown	Sticky	Water, DMSO

Table 4: Qualitative chemical tests of the extract of *Tinospora cordifolia*.

Chemical constituent	Test	Petroleum ether	Water
Alkaloids	Mayers test	+	+
	Dragendroff's test	+	+
	Wagners test	+	+
	Hagers test	+	+
Carbohydrates	Mollisch's test	+	+
	Benedicts test	+	+
Glycosides	Modified Bortragers	+	+
	Legal test	+	+
	Killer killiani test	+	+
Saponins	Foam test	-	+
	Froth test	-	+
Phytosterols	Salkowski test	+	+
	Libbermann burchard test	+	+
Resins	Acetone water test	-	-
Phenols	Ferric chloride test	-	-
Tannins	Gelatin test	+	+
Flavanoids	Alkaline reagent	-	-
	Lead acetate test	-	-
	Shinoda test	-	-
Protiens	Ninhydrin test	-	-
	Xanyhopteic test	-	-
	Biurete test	-	-

Table 5: Data showing successive values of heavy metals of *Tinospora cordifolia*.

Sl. No.	Heavy metal	Result (PPM)
1.	Arsenic	Nil
2.	Lead	Less than 5 ppm
3.	Cadmium	Nil
4.	Mercury	Nil

Conclusion

Proximate analysis of *Tinospora cordifolia* showed wide variations but was in compliance to standard monographs. Qualitative analysis of *Tinospora cordifolia* extracts of stem part showed the presence of alkaloids, carbohydrates, glycosides, phytosterols, tannins, and saponin has found in watery extract. Qualitative analysis of *Tinospora cordifolia* extracts of stem part showed the presence of lead less than 5 ppm and arsenic, cadmium, mercury was not found in the extract of drug.

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