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Phytochemical Screening And Evaluation Of '*Tinospora Cordifolia*' Plant For Nutritional Supplement

Ingle Shruti Babarao*, Ingale Mukta Govind, Ingole Gajiram Balaji, Jadhav Aniket Amrut, Jadhav Dhanashri Ram, Gajanan N. Patingrao

D.K. Patil Institute of Pharmacy, Sayal Road, Loha.

ABSTRACT

Tinospora Cordifolia, also known as Gulvel or Guduchi, is a medicinal Ayurvedic plant noted for its Immune-modulating, antipyretic, anti-inflammatory, antioxidant and adaptogen properties. This Researchers attempted to create a stable, efficient formulation that would increase Gulvel's Pharmacological efficacy. The bioactive components of Gulvel stems, including as tannins, alkaloids, Glycosides and flavonoids, were extracted using hydroalcoholic methods. The extract was then transformed into dosage forms as pills, capsules and solutions utilizing appropriate pharmaceutical Excipients. The formulations were tested for antioxidant activity, microbiological stability, disintegration Profiles and physical qualities such as stability, moisture content, hardness and friability. Plants produce a diverse range of bioactive molecules, making them a rich source of different types of medicines. A regular and widespread use of herbs throughout the world has increased serious concern over their quality, safety and efficacy. Thus, a proper scientific evidence or assessment has become the criteria for acceptance of herbal health claims. In the present study, we examined the anti-oxidant effects of leaves of *Tinospora Cordifolia*. Dried and powered leaves of *T. Cordifolia* were extracted with hexane, chloroform, methanol, ethanol and water. Total phenolic and flavonoid contents of different solvent extracts were determined. Of the different solvent extracts, ethanol extract had the highest phenol and flavonoid content of 5.1±0.25 mg/g and 0.52±0.02 mg/g respectively. Antioxidant assays were carried out by using different *in vitro* models such as total reducing power, total antioxidant activity, lipid peroxidation inhibitory activity, DPPH radical scavenging activity and superoxide radical scavenging activity. Ethanol extract showed

the highest total antioxidant activity of 41.4±0.45 µM Fe (II)/g. The EC50 values of ethanol extract for lipid peroxidation inhibitory activity and DPPH radical scavenging activity was found to be 0.1 and 0.5 mg/ml respectively. The anti-oxidant activities of other solvent extracts were poor when compared to the ethanol extract. These results suggest that, the active antioxidant compounds are better extracted in ethanol and there is a direct correlation between the total polyphenols extracted and its anti-oxidant activity. The *in vitro* anti-oxidant activity of *T. Cordifolia* justifies the ethno medical use of this plant.

KEYWORDS: *Tinospora Cordifolia*, Pharmacological Activity, Active components, Nutritional Potential, Anti-inflammatory, Medicinal plant, Gulvel, Anti-oxidant.

INTRODUCTION

Tinospora Cordifolia:-

Commonly known Guduchi, Amrita, Gurach, and Tinospora. *Tinospora Cordifolia* also called Amrita, Gila, Guduchis widely used in Ayurveda system of medicine (1). It is widely distributed in India, Malasia, Indonesia and Thailand. The Hindi name of plant is Gila. In India the common medicinal herb is *Tinospora Cordifolia*. It is frequently used to treat conditions wound Infections , Rheumatism , Diabetes, Skin conditions , Wound infections, Tooth infection , Jaundice, Hypertension and common cold (2).

Gulvel's therapeutic benefit is attributed to its high phytochemical content, which contains alkaloids, flavonoids, terpenoids, polysaccharides and phenolics. These bioactive chemicals have a variety of pharmacological effects, including anti-inflammatory, antipyretic, antioxidant, antidiabetic, hepatoprotective and immunomodulatory capabilities. Another area in which Gulvel has showed potential is metabolic and lifestyle diseases. Its hypoglycemic effect helps to regulate blood sugar levels, making it an excellent herb for managing type II diabetes. Gulvel's adaptability extends even to its formulation. It has traditionally been used as a powder (churna), decoction (kadha), or fresh juice (swarasa). Modern pharmaceutical techniques have broadened its applications to include capsules, pills, syrups, ointments and even innovative delivery mechanisms such as nanoparticles and phytosomes. Scientific study on Gulvel has increased dramatically in recent years, owing to a worldwide interest in natural and plant based treatments. During the COVID-19 pandemic, the plant received a lot of attention due to its ability to boost immunity and relieve respiratory problems. Clinical investigations have shown that it is safe and effective, making it a good candidate for inclusion into mainstream treatment.

Parts used to treat disease

- **Leaves :-**

  Leaf powder and decoction is reported to help heal gout, ulcers, jaundice, fever, wounds, and blood sugar when combined with cow's milk.

- **Steam :-**

  Stem starch, also known as sativa, is used as a tonic for fever, skin disorders, and jaundice. Stem extract can be administered both alone and in combination with honey. The recommended remedy for a scorpion sting and snake bite is a mixture of root and stem.

- **Barks :-**

  In North Gujarat, India, milk is combined with the plant's stem and roots to treat cancer. Fruits Both jaundice and rheumatism are treated with them.

- **Roots :-**

  Aerial roots are thread-like, long, fill form, squairsh-shaped roots that grow downward from mature branches or clipped stem segments and occasionally reach the ground through continual growth(3).

- A Gulvel (*Tinospora Cordifolia*) plant project typically revolve around utilizing the plant's medicinal properties for various health benefits, promoting sustainable cultivation, and potentially developing new pharmaceutical applications. Specific objectives might include studying its immunomodulatory, antioxidant, anti-inflammatory, and anti-diabetic properties, as well as exploring its potential in treating respiratory illnesses and even cancer. Furthermore, projects might focus on improving cultivation techniques, developing value-added products, and raising awareness about its traditional uses and modern scientific validation (4).

- **Here's a more detailed breakdown of potential objectives:**

  1. Medicinal Properties and Drug Development:

- Investigating Therapeutic Applications:

  A primary objective is to thoroughly research and validate the medicinal properties of Gulvel, including its traditional uses and potential for treating various ailments.

- Developing Novel Therapies:

  This includes exploring the plant's potential in creating new drugs or therapies for diseases like diabetes, cancer, and immune disorders, potentially offering safer and more effective alternatives to conventional treatments.

- Understanding Mechanisms of Action:

Researching the specific ways in which Gulvel's bioactive compounds interact with the body to produce desired therapeutic effects.

2. Cultivation and Sustainability:

- Optimizing Cultivation Practices:

  Developing efficient and sustainable methods for cultivating Gulvel, including ideal soil conditions, irrigation, and pest management.
- Promoting Organic Cultivation:
- Focusing on organic farming practices to ensure the production of high-quality, chemical-free medicinal plants.
- Developing Disease-Resistant Varieties:

  Identifying and breeding strains of Gulvel that are more resistant to common diseases and pests, reducing the need for chemical interventions.

3. Value Addition and Economic Viability:

- Creating Value-Added Products:

  Developing various product forms of Gulvel, such as tablets, capsules, extracts, and teas, to cater to diverse consumer needs.
- Promoting Sustainable Livelihoods:

  Supporting local communities by providing them with opportunities for income generation through the cultivation and processing of Gulvel.
- Exploring Export Potential:

  Identifying opportunities for exporting Gulvel and its value-added products to international markets.
  - **Continued Exploration of Medicinal Properties:**

    Further research is expected to delve deeper into Gulvel's medicinal properties, potentially leading to the development of new drugs and therapies.
  - Standardized Formulations:

    One challenge with Gulvel is the lack of standardized formulations, which can lead to variations in effectiveness. Future research may focus on creating consistent and reliable products.
  - Increased Awareness and Acceptance:

    As research continues to validate Gulvel's health benefits, it is likely to gain wider recognition and acceptance in mainstream healthcare systems, not just in traditional medicine.
  - Potential for Disease Management:

Gulvel's potential in managing conditions like diabetes, liver disorders, and even certain types of cancer is being explored. Future research may lead to more effective and natural approaches to managing these diseases.

➢ Sustainable Cultivation:

With increasing demand for Gulvel, sustainable cultivation practices will become crucial to ensure its availability for future generations (5).

PLANT PROFILE

- **Synonym**

  Guduchi, Giloy, Gurbel, Amrita

- **Chemical constituents**

  Steroids, Aliphatic chemicals, Polysaccharides, Alkaloids, Diterpenoids, and lactones

- **Biological source**

  It is made out of developed, dried segments of Tinospora Cordifolia miers' stem.

  Family

  Menispermaceae.

- **Morphological characteristics**

  Gurcha is a glabrous, twiner plant that is gregarious.

  The bark on older stems is corky and can reach a diameter of up to 2 cm.

  White vertical lenticels are scattered throughout the stem and branches.

  Bark is easily peeled off and is warty, papery thin, and either creamy white or grey brown.

  Ovate, sharp leaf measure 5 to 15 centimeters.

  When young, they are membrane-bound, but as they get older, they become somewhat Leathery. [5]

- It can be grow in nearly every climate the plant refers a warm one and is extremely stiff.
- Planting is usually done during rainy season (6).

USES:-

- Treat Diabetes
- Treat Asthma
- Treat Chronic Fever
- Boost Immunity
- Reduce Gouty Arthritis
- Treat Eye Disorder
- Anti-allergic
- Anti-diabetic
- Anti-microbial
- Anti-cancer
- Anti-depressant

Fig.1. ***Tinospora Cordifolia***

Material / Ingredient

- Gulvel Sample, Empty capsule shell,
- Excipient (Starch, Lactose, Magnesium Stearate, Talc)

Collection of sample: From Local Market

Equipment used:-

- Tray dryer
- Weighing balance
- Capsule filling machine
- Hot air oven
- Disintegrater

EXPERIMENT

PHYTOCHEMICAL SCREENING

Qualitative analysis

Quantitative Analysis

1) Total phenol content (TP) determination

Folin–Ciocalteu reagent is main and standard chemical was used for the deciding the quantity of phenolic compounds in the dried sample. The extract approximately (50 mg) was combined with about 0.5 mL of Folin–Ciocalteu reagent and then mixed in distilled water (7.5 mL). After 10 minutes, 1.5 mL of 20 percent

sodium carbonate (w/v) was poured. The solution was steamed in a water bath for about at 40 degrees Celsius

Sr .no.	Chemicals	Procedure
1	**Flavonoids**	1) NaoH In this test added the high amount of NaoH standard solution in test extract of sample 2) sulphuric acid (H2SO4) Test added of H2SO4 in the extract
2	**Phenolic compound and tannins**	1) Ferric chloride (FeCl3) test in this test 2-3 ml of methanolic extract of sample and added ferric chloride (5%) solution 2) Gelatin test – in this test 2 -3 ml of methanolic exact and added gelatin solution 3) Lead acetate test - In this test 2-3 ml of methanolic extract and added acetic acid standard solution.
3	**Carbohydrates**	1) Fehling's test- Fehling (A and B) solutions were mixed (1 ml each) with each other than boiled for a minute. Then equal amount of extract of leaves was added 2) Molish's test- In this test 2-3 ml of leaves methanol extract was taken then added few (1-2) drops normal size of alpha-naphthol standard solution with alcohol, shaken and added the conc. H2SO4 from one side of tube.
4	**Proteins**	1) Biuret test- In this test about 3 ml of leaves extract, then 4% sodium hydroxide standard solution and 1% standard copper sulphates solution was added. Alkaloid test 2) Ninhydrin test- In this test about 3 ml of metallic extract of leaves solution was heated then 2-3drops of 5% Ninhydrin standard solution was added then boiled for 10 minutes.

for 20 minutes and chilled. A spectroscopy instrument was normally used to recording and determination of the absorbance at 755 nm. The calibration graph (curve) of Gallic acid was used to determine the quantity of

5	**Alkaloid test**	1) Mayer's test- In this test methanolic extract of leaves was evaporated then added dil. HCL standard, then shaken and filtered. Taken about 2-3 ml of filtered sample and added Mayer's reagent in few drops. 2) Dragendroff's test- - In this test methanolic extract of leaves was evaporated then added dil. HCL standard, then shaken and filtered. Taken about 2-3 ml of filtered sample and added Dragendroff reagent drop by drop.
6	**Fats and oils**	1) Oil globule test- In this test thick section of leaves extract was put on clear glass slide then added reagent which was Sudan Red in a drop, then slide was washed by using the alcohol (50%). After this this sample slide was deep in glycerin and observed under the microscope.

TPC (Total Phenolic Content) in the concentration range in between 10-100 µg/ ml. Gallic acid equivalents method (GAE) g/100 g were used to calculate the result (7).

2) Total flavonoid content (TF) determination

The extract sample in solvent methanol of umber plants (0.5 mL) was combined with 2.2 mL of filtered water as well as 5% NaNO2 standard solution (0.15 mL). After 6 minutes, 0.3 mL of 10% AlCl36H2O solution was inserted and the prepared mixture allowed to stand for 5 minutes. Then 1 mL of 1M standard NaOH was added. After whirling the mixture, the absorbance was taken with a spectrophotometer at 510 nm. The extract's flavonols were converted to Gallic acid equivalents. The calibration curve Graph was madewith Gallic acid (standard solutions of 6.25, 12.5, 25.0, 50.0, 80.0, and 100.0 µg/ ml in 80 percent ethanol (V/V)).

3) Total tannin content (TT) determination

Folin-Ciocalteu reagent method is one of the important method was also used to determination of all tannin content (TF). The sample of gulvel extract (dried) taken about 0.1 ml and insert into a flat volumetric flask which is about 10 ml, then 7.5 ml of deionizedwater, after this 0.5 ml of standard Folin-

Ciocalteu reagent which is important reagent to determine the TPC, then about 1 ml of standard sodium carbonates solution and diluted in10 ml with (deionized) distilled water. The mixture of prepared sample was shaken properlyand kept in the room at normal temperature for about 30 min. One set which prepared for the reference standard (5-6 concentration) solutions of tannic acid (6.25, 12.5, 25.0, 50.0, 80.0, and 100.0 µg/ ml) this concentrations were prepared by the same type as described.

ANTIOXIDANT ACTIVITY

The studied the in vitro antioxidant activity of *Tinospora Cordifolia*. It has been observed that Tinospora Cordifolia exhibited excellent antioxidant activity in methanol, ethanol and water extracts. The observed high antioxidant activities of the extracts indicate the potential of the stem
as a source of natural antioxidants or nutraceuticals to reduce oxidative stress with consequent health benefits. The Tinospora Cordifolia has potential application in food systems as an antioxidant and probably in biological systems as a nutraceutical. Methanolic, ethanolic and water extracts of Tinospora Cordifolia showed significant antioxidant potential compared to other solvents and also possess metal chelation and reducing power activity. VSiva kumar etal study Results suggest that Tinospora Cordifolia stem methanol extracts administered orally increased the erythrocytes membrane lipid peroxide and catalase activity. It also decreased the activities of superoxide dismutase, glutathione peroxidase in alloxan-induced diabetic rats. Tinospora Cordifolia has the ability to scavenge free radicals generated during aflatoxicosis. Tinospora Cordifolia showed protection against aflatoxin-induced nephrotoxicity due to the presence of alkaloids such as a choline, tinosporin, isocolumbin, palmatine, tetrahydropalmatine, and magnoflorine. Neha Upadhyay etal study results suggest that Tinospora Cordifolia bark ethanol extracts showed the highest free radical scavenging activity compared to the methanol extracts and also ethanol extracts had the highest phenolic content. The administration of ethanolic extract of Tinospora Cordifolia (EETC) in N-nitrosodiethylamine (DEN) induced liver cancer in male Wister albino rats reverted the lipid peroxidation (LPO) levels, enzymic and non-enzymic antioxidants to near normal. Essential oil isolated from sample of Tinospora Cordifolia (Willd.) was shown strong 2, 2- [23] (10).

- ***DPPH radical scavenging activity***

The free radical scavenging activity of the leaf extracts was assayed using a stable free radical, 1, 1-diphenyl-2 picryl hydrazyl (DPPH). The DPPH scavenging assay employed in the present study was a modification of the procedure of Moon & Terao (1998). 0.1 ml of test sample at different concentration (0.1 - 0.9 mg/ml) was mixed with 0.9 ml of Tris-HCl buffer (pH 7.4); then 1 ml of DPPH (500 µM in ethanol) was added. The mixture was shaken vigorously and left to stand for 30 min. The absorbance of the resulting solution was measured at 517 nm in a spectrophotometer and compared with that of BHA(11). The experiment was repeated thrice. The percentage of DPPH scavenging was calculated using the following formula:

% scavenging = [(A control – (A sample – A sample blank / A control] x 100.

PREFORMULATION STUDY :-

1. Bulk density
2. Tapped density
3. Carr's index
4. Hausner's ratio
5. Angle of repose

Bulk density

The bulk density of a powder is the ratio of the mass of an untapped powder sample and its volume including the contribution of the inter-particulate void volume.

$$\text{FORMULA: } \textbf{BULK DENSITY} = \frac{\textbf{MASS}}{\textbf{BULK VOLUME}}$$

Tapped density

The tapped density is an increased bulk density attained after mechanically tapping a container containing the powder sample.

$$\text{FORMULA: } \textbf{TAPPED DENSITY} = \frac{\textbf{MASS}}{\textbf{TAPPED VOLUME}}$$

Carr's index

Carr's Index of any solid is calculated for compressibility of a powder which is based on true density and bulk density.

$$\text{FORMULA: } \textbf{CARR'S INDEX} = \frac{\textbf{TAPPED DENSITY} - \textbf{BULK DENSITY}}{\textbf{TAPPED DENSITY}} \times \textbf{100}$$

Hausner's ratio

Hausner ratio is defined as the ratio of a powder's tapped bulk density to its poured (loose) bulk density

$$\text{FORMULA: } \textbf{HAUSNER'S RATIO} = \frac{\textbf{Tapped density}}{\textbf{Bulk density}}$$

Angle of repose

Angle of repose powder poured from a vessel forms a cone-like pile. The angle of repose- the angle between the slope of the pile and the horizontal correlates with the strength of particle- particle interactions and, therefore, is measured to infer flow ability.

FORMULA: $\emptyset = \tan^{-1}(h/r)$

Where,

- h : the height in cm
- r : the radius in cm
- ∅: the angle of repose

RESULT AND DISSCISSION

PHYTOCHEMICAL SCREENING

Qualitative analysis

By using the procedure which is given into the standard chart, the following identification *Tinospora Cordifolia* test was performed obtained results were given into the table No .1.

Table 1.1 Preliminary identification tests for phytochemicals In *Tinospora Cordifolia*

Sr.no	Constituent	Chloroform	Methanolic	Ethanolics
		Leaves	Leaves	Leaves
1	Alkaloids	-	+	-
2	Glycosides	-	+	+
3	Flavonoids	+	+	+
4	Phenolics	-	-	-
5	Amino acids	-	-	+
6	Carbohydrates	+	-	-
7	Proteins	-	-	+
8	Saponins	-	-	+

9	Diterpenoids	+	-	+

(Table No.1)

(+ = Present), (- = Absent)

Above charts shows that the flavonoids, phenolic compounds, tannins, carbohydrates, proteins, alkaloids, fat and oils are present into the gulvel sample.

Phytochemical Screening of given sample (Test And Result)

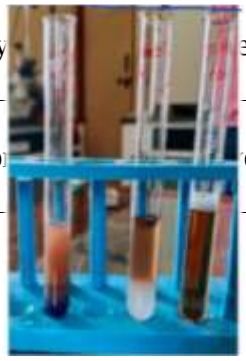
Test	Result
Alkaloids Dragendroff's Meyers Wagner's Hager's Murexoide test	 Orange red /brown ppt White ppt Reddish brown ppt Yellow ppt Purple colour observed
Glycosides Legel's test Baljet test Brontrager test	 Pink red colour Yellow or orange colour Layer showed pink, red or violet colour
Flavonoids Shinoda test Alkaline reagent test	 Redish pink or brown colour observed Yellow colour changed into colourless
Tannin test Test 1 Test 2 Test 3 Test 4	 Dark blue greenish black colour appear Deep red colour produce Yellow precipitate formed White precipitate formed
Carbohydrate test Molisch test	

Benedi	Reddish violet and purple ring at junction between two liquid.
Fehling's test	Solution appear green, yellow and red depending on amount of reducing sugar.
Monosaccha	First y ed precipitate is seen.
Barfoed's tes	Red p ed

PRELIMINARY TEST FOR IDENTIFICATION OF PHYTOCHEMICALS

Alkaloid test

Cardiac glycoside test



(Tannin Test) (**Alkaloids Test)**

Quantitative Analysis

1) Total phenolic content (TP) determination

Total phenolic content (TF) was determined by using Gallic acid equivalent method and also another some chemicals was used like Folin-Ciocalteu reagent, 20% sodium carbonateand the results were given into the table 1.1.

Observation table for determination of TPC:-

Sr. No.	Concentration (ug/ml)	Absorbance
1	20	0.932
2	40	1.538
3	60	2.514
4	80	3.162
5	100	3.854

(Table 1.1)

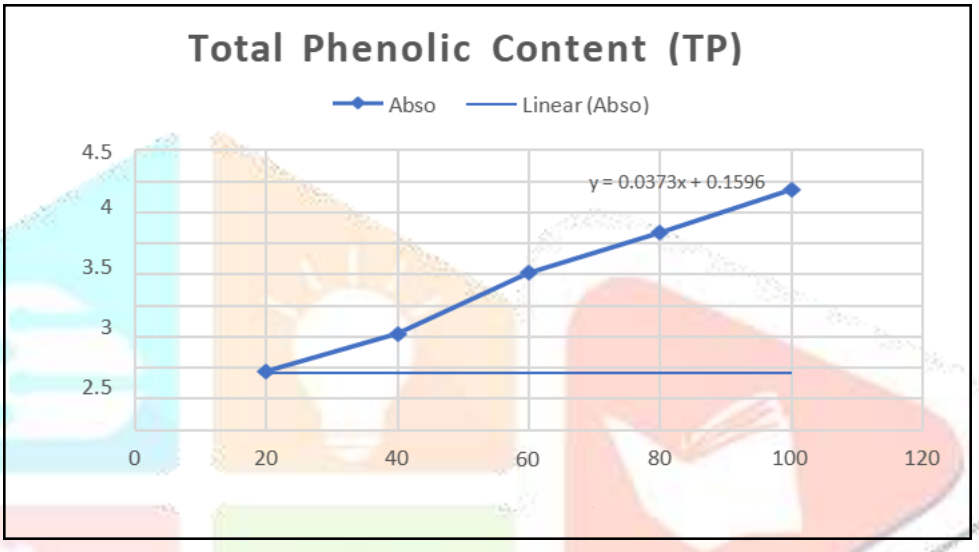


Fig. 1.1 Total phenolic content graph

Discussion - TPC= C_1 .V/N by using this formula we were founded the total phenolic content in the *Tinospora Cordifolia* of was 31.24mg/g.

2) Total flavonoid content (TF) determination

Total flavonoid content (TF) was determined by using Gallic acid equivalent method and also another some chemicals was used like 5% of $NaNO_2$ solution, 10% $AlCl_3 6H_2O$ solution, 1M NaOH and results were given into the table 1.2.

Observation table for determination of TFC:-

Sr. No.	Concentration (ug/ml)	Absorbance
1	0.025	0.512
2	12.5	0.856
3	25	1.1569
4	50	1.8632
5	80	2.3654
6	100	2.6892

(Table 1.2)

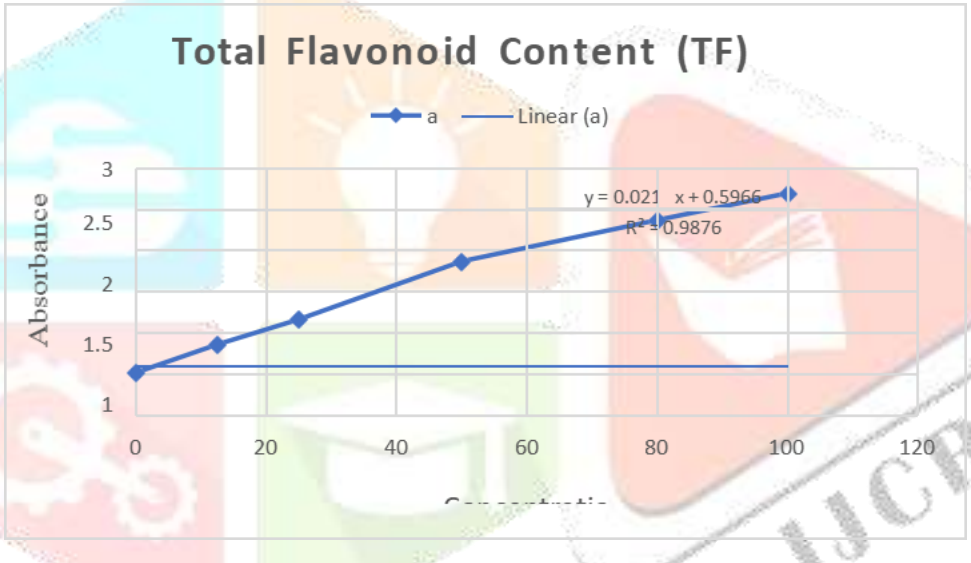


Fig 1.2 Total Flavonoid content graph

Discussion- TFC= C_1 .V/N by using this formula we were founded the total phenolic content in the leaves extract of *Tinospora Cordifolia* was 22.28mg/g.

3) Total tannin content (TT) determination

Total tannin content (TT) was determined by using gallic acid equivalent method and also another some chemicals was used like 5% of $NaNO_2$ solution, 10% $AlCl_36H_2O$ solution, 1M NaOH and results were given into the table 1.3.

Observation table for determination of TTC:-

Sr. No.	Concentration (ug/ml)	Absorbance
1	0.025	0.524
2	12.5	0.967
3	25	1.352
4	50	2.246
5	80	2.598
6	100	2.987

(Table 1.3)

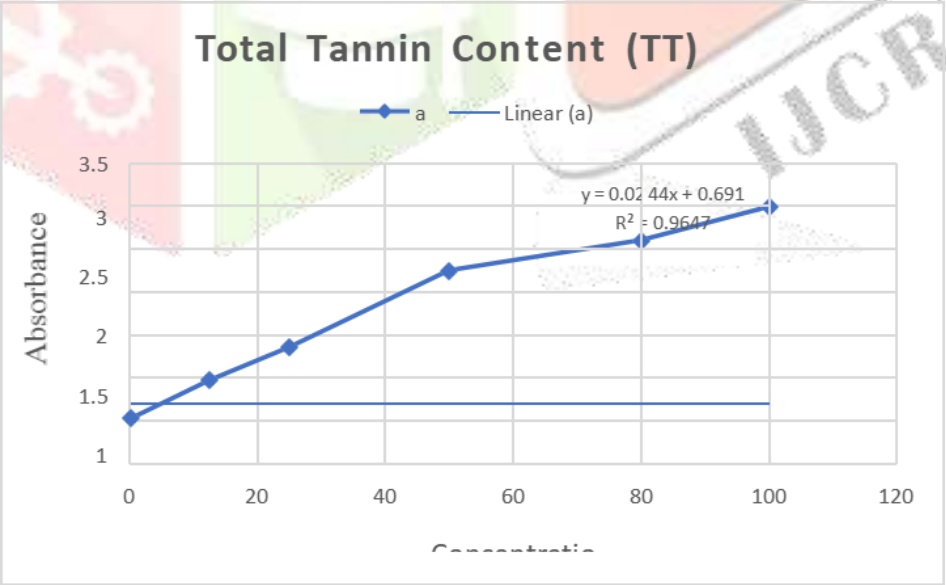


Fig. 1.3 Total Tannin content graph

Discussion- TFC= C_1 .V/N by using this formula we were founded the total tannin content in the leaves extract of *Tinospora Cordifolia* was 31.24mg/g.

ANTIOXIDANT STUDY

The ability of the plant extracts to reduce ferric ions was determined by FRAP assay (**Figure 1**). An anti-oxidant capable of donating a single electron to the ferric-TPTZ (Fe (II)-TPTZ) complex would cause the reduction of the complex into the blue ferrous TPTZ (Fe (II)-TPTZ) complex which absorbs strongly at 593 nm. The FRAP values for the extracts were lower than that of BHT (63±0.35 µm/g fw). Among the extracts tested, ethanol extract had a total anti-oxidant activity of 41.4±0.45 µm/g fw followed by methanol 33.9±0.49 µm/g fw. Aqueous extract had the least reducing ability of 4.8±0.30 µm/g fw.

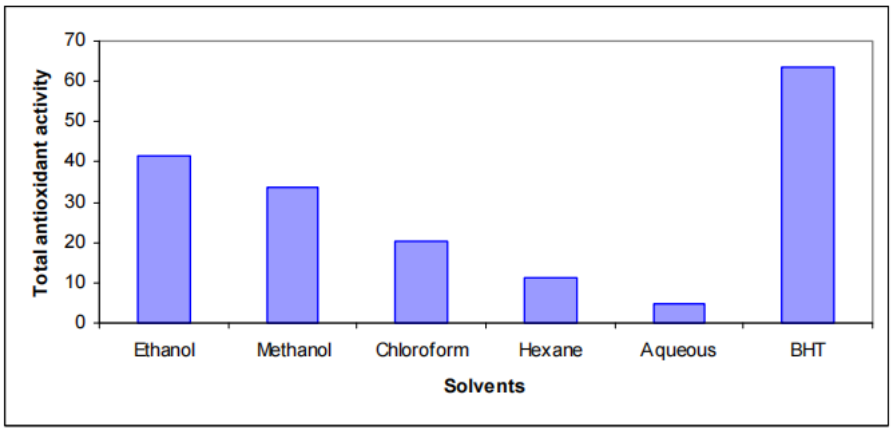


Figure 1: Total Antioxidant activity of *Tinospora Cordifolia* solvent extracts (µM Fe (II)/g)

- ***DPPH radical scavenging activity***

The DPPH radical scavenging activity of *T. Cordifolia* leaf extracts is shown in **Figure 2**. Among the extracts tested, ethanol extract had better scavenging activity (EC50 value of 0.5 mg/ml) followed by methanol (EC50 value of 0.9 mg/ml).

When compared to BHA which had an EC50 value of 5.3 µg/ml, the e EC50 value of ethanol was quite high.

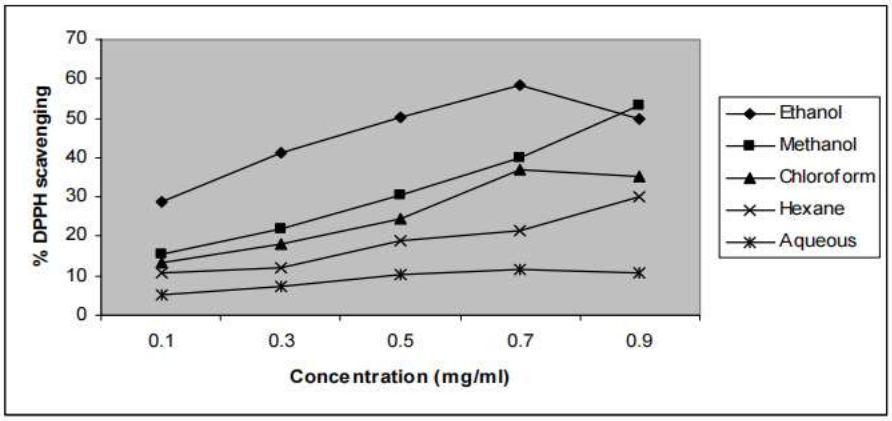


Figure 2: DPPH radical scavenging activity of *Tinospora Cordifolia* sample extract at different concentrations (mg/ml).

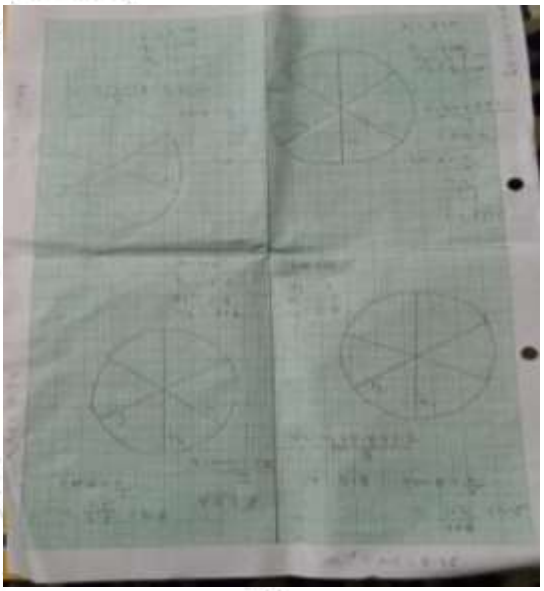
PREFORMULATION

Parameters	Result
1. Bulk density	0.58g/ml
2. Tapped density	0.25g/ml
3. Carr's index	53.6%
4. Hausner's ratio	2.15
5. Angle of repose	27'92ºc

Table no. 1: Pre formulation of Gulvel sample

1. Bulk Density

2. Tap Density



3. Angle of repose

FORMULATION

Formulation of A Granule Of gulvel Powder (300 Mg Capsule)

Formulation Gulvel capsule

Gulvel capsules are formed with Talc as a Glidant, Magnesium Stearate as a Lubricant, Lactose as a Filler (Binder), Sodium Starch Glycolate as a Disintegrant and *Tinospora Cordifolia* Power as the Active Ingredient.

Procedure

1. To ensure an even distribution, properly mix the all ingredients uniformaly (talc, magnesium stearate, lactose, sodium starch glycolate and *Tinospora Cordifolia* power) and make the proper granules with the help of sieve.
2. Then dry the granules with the help of try dryer.
3. Use a capsule-filling machine to fill empty capsules (size 0) with the made powder mixture (Granules).
4. Connect the two parts of the capsules together to ensure secure closure.
5. To keep the capsules dry and preserved, store them in blister packs or HDPE bottles containing desiccants.

Sr No	Composition	Quantity	Role/Use
1	Active Drug (Gulvel Powder)	250mg	Active Ingredient
2	Sodium Starch Glycolate	15 Mg	Disintegrant
3	Lactose	15 Mg	Binder/Filler
4	Magnesium Stearate	15 Mg	Lubricant
5	Talc	5 Mg	Glidant

(1. Granules formulation)

(2. capsule formulation)

Disintegration time of capsule

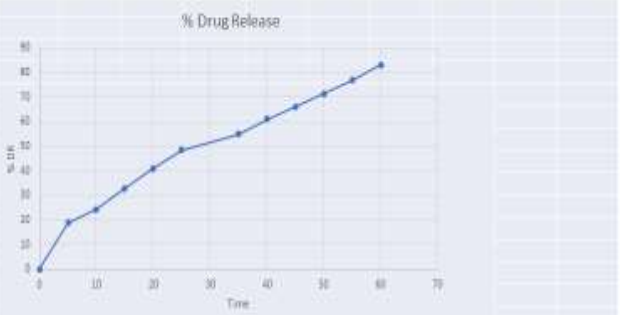
Capsule	1	2	3	4	5	6	**Mean**	**SD**	
Time (min)	9 min	7min	8min	10min	12 min	8min	9.40		±0.8

That state in which no residue of the capsule remains. On the screen of the apparatus or, if a residue remains, it consists of fragments of. Insoluble coating of the of capsule shells or is a soft mass with no palpable. 9.40 min.

Dissolution profile capsule

Dissolution profile of capsule

time	% DR
0	0
5	18.9
10	24.4
15	32.9
20	40.9
25	48.4
35	54.9
40	61.1
45	66.1
50	71.4
55	76.9
60	83.2



Stability of herbal Capsule (300 mg) at different Humidity with respect to different Temperature

Temperature And Humidity	30%	50%	70%	90%
30%	-	-	-	-
35%	-	-	-	-
55%	-	-	+	+
65%	-	-	+	+++

The stability testing of herbal products check the quality of herbal products which varies with the time under the influence of environmental factors, such as temperature, humidity, light, oxygen, moisture, other ingredient or excipient in the dosage form, particle size of drug, microbial contamination.

Discussion

Gulvel, derived from the plant *Tinospora cordifolia*, has demonstrated significant antioxidant properties through various studies. Its bioactive compounds, particularly alkaloids, flavonoids, and glycosides, are believed to play a key role in neutralizing free radicals and reducing oxidative stress. These properties make Gulvel a promising natural antioxidant that could contribute to overall health, potentially aiding in the prevention of chronic diseases associated with oxidative damage, such as cardiovascular diseases, diabetes, and neurodegenerative conditions. While promising, further clinical studies and trials are needed to validate its efficacy and safety for widespread use in antioxidant therapy. None the less, the existing evidence supports its inclusion as a valuable herbal remedy with not able antioxidant potential.

Conclusion

Giloy, a herb with several healing uses, has demonstrated assurance in the course of care a number of Diseases because of its immune-suppressive, anti-inflammatory, and antioxidant properties Research shows that it works well for diseases like cancer, diabetes, liver problems, and respiratory infections. It is a useful herb in both traditional and modern medicine due of its aptitude. In order to fortify the defense mechanism and support general health. To completely comprehend its mechanics and develop standardized medicinal uses, more research is required. In traditional medicine, especially in Ayurveda, gulvel, or *Tinospora cordifolia,* is highly esteemed. It is helpful in treating a variety of disorders since its active ingredients have

anti-inflammatory, anti-oxidant, and immunomodulatory qualities. Gullible aids in controlling blood sugar levels in diabetics Gulvel is also utilized in the treatment of liver conditions and the enhancement of general health. Because of its many therapeutic benefits, research suggests that it may be useful in controlling chronic illnesses. All things considered, gulvel is a useful supplement to integrative methods for treating a variety of illnesses, fostering both health and vigor. For its clinical applications to be optimized and its mechanisms completely understood, more research is required.

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