

Development and Evaluation of Elixir Formulation from *TinosporaCordifoli*

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I. Introduction –

According to the World Health Organisation, 80% of the world's population mostly uses traditional medicines that involve plant extracts or their derivatives active ingredients. India's mega-biodiversity and knowledge of its extensive ancient traditional medical systems (Ayurveda, Siddha, Unani, Amchi, and local health traditions) provide a strong foundation for the use of many plants in general healthcare and the treatment of common human maladies[1]. *Tinospora Cordifolia*, also

known as Guduchi, Amrita, Gurach, and *Tinospora*, is a climbing shrub that is a member of the Menispermaceae family. A large, glabrous climbing shrub known as giloy. This plant has long, filiform, fleshy aerial roots that grow from the branches that are fairly succulent on the stems. Its bark is wet and gray-brown in tone. the membranous and cordate forms of the leaves. The flowers are tiny and yellowish green. In tropical Asia, *Tinospora cordifolia* can grow up to 300 metres in height[2].



Figure No. 1 – *TinosporaCordifolia* plant

There are roughly 70 genera and 450 species in the family *Tinospora cordifolia*, which is native to tropical areas. Which can also be found in

some areas of Sri Lanka, Bangladesh, and China, in addition to all of India? In Ayurveda, the plant *Tinospora cordifolia* is known as Rasayana and is

renowned for boosting the body's defences against specific infectious microorganisms[3] the cordifolioustinospora is a key medication in Indian medical systems and has been utilised in treatments for ages. The substance is popular Indian bitter is recommended for use in conditions like fevers, diabetes, dyspepsia, jaundice, urinary issues, skin conditions, chronic diarrhoea, and dysentery. Additionally, it has been suggested to be helpful in the treatment of helminthiasis, leprosy, and cardiac disease. The starch extracted from the stem is very nourishing and digestible, and it is used to treat numerous illnesses. [4]

Plant Description –

1. Stems - Fleshy

2. Roots - long thread like, aerial, arise from branches.

3. Bark - Thin, greyish or creamy white in colour, when peeled fleshy stem is exposed.

4. Leaves - Cordate (heart shaped), membranous, juicy.

5. Flowers - Bloom during summer

a) **Male flower** - Small, yellow or green coloured occur in clusters.

b) **Female flower** - Occur singly.

6. Fruits - Pea shaped, fleshy, shiny turn red when boiled. Occur in winter

7. Seeds - curved, pea sized.

8. Parts Used: Stems, Roots

9. Distribution: The plant occurs throughout tropical regions of India extending from Kumaon to Assam and Myanmar, Bihar, Konkan to Sri Lanka. It is a large climber which grows over the highest trees in the forests and throws out aerial roots which reach the length of 10 metres, though not thicker than packthread.

10. Cultivation: Soil And Climate: It grows well in almost any type of soils and under varying climatic conditions.

11. Nursery raising and planting: The plant is cultivated by stem cutting in the month of May-June. It requires some support preferably Neem and Mango trees, such plants are supposed to possess better medicinal values.

12. Weeding and Hoeing: Periodical hoeing is done, both in the nursery and field as per requirement.

13. Manures, Fertilisers and Pesticides: The medicinal plants have to be grown without chemical fertilizers and use of pesticides. Organic manures like, Farm Yard Manure (FYM), Vermi-Compost, Green Manure etc. may be used as per requirement of the species. To prevent diseases, bio-pesticides could be prepared (either single or mixture) from Neem (kernel, seeds & leaves), Chitrakmool, Dhatura, Cow's urine etc.

14. Irrigation: The field after plantation should be irrigated periodically as and when required.

15. Weekly or fortnightly

16. Harvesting/Post Harvesting Operation:

Mature plants are collected, cut into small pieces and dried in shade.

17. Yield: Approximately 8-10 q./ha.

18. Economics: The rate for a kg. of dried stem ranges from Rs. 15-20. (YEAR-2001)

19. Chemical Constituents: The plant mainly contains alkaloids, glycosides, steroids, sesquiterpenoid, aliphatic compound, essential oils, mixture of fatty acids and polysaccharides. The alkaloids include berberine, bitter gilonin, non-glycoside giloningilosterol

Tinosporine, tinosporide, tinosporaside, cordifolide, cordifol, heptacosanol, clerodane furano diterpene, diterpenoid furanolactonetinosporidine, columbin, and b-sitosterol are some of the main phytoconstituents in Tinospora cordifolia. Its stem has been reported to contain Berberine, Palmatine, Tembertarine, Magniflorine, Choline, and Tinosporin. [5]

Vernacular Names -

Telugu	Tippateege, Guricha
Sanskrit	Guduchi, Amrita
Hindi	Gulanicha,
Kannada	Amrutaballi, Madhuparni,
Malayalam	Amrytu, Chittamritam
Gujarati	Gulvel
Bengali	Golanicha
Oriya	Gulochi
Tamil	Amudam, Chindil
Urdu	Gilo, Satgilo.

Marathi

Gulvel



Figure No. 2 – Tinospora Cordifolia plant

Taxonomy -

Kingdom	Plantae – Plant
Subkingdom	Tracheobionta Vascular plant
Super division	Spermatophyta-Seed bearing plant
Division	Magnoliophyta Flowering
Class	Magnoliopsida – Dicotyledons
Sub-class	Polypetalae – Petals are free
Series	Thalamiflorae – Many stamens and flower hypogynous Order Ranales
Order	Ranales
Family	Menispermaceae;
Genus	Tinospora;
Species-	T.Cordifolia

GEOGRAPHICAL SOURCE –

This plant belongs to the Menispermaceae family and is a member of the Magnoliopsida and Ranunculales orders. The species is widely dispersed throughout India, reaching as far south as peninsular India from the Himalayas. Additionally, it can be found in close-by nations including Bangladesh, Pakistan, and Sri Lanka. In South East Asian nations including Malaysia, Indonesia, and Thailand, among others, reports of Tinospora

cordifolia have also been made. Tinosporacordifolia's habitat includes a wide range of soil types, from acidic to alkaline, and it requires a medium amount of soil moisture. It can be found in tropical India, rising to a height of a thousand feet. and throughout the rest of the world in Sri Lanka, Indonesia, the Philippines, Thailand, Myanmar, and China. From Kumaon through Assam and Myanmar, Bihar, Konkan, and Sri Lanka, the

plant can be found throughout India's tropical regions[2]

Pharmacological Activities of Tinospora Cordifolia -

Giloy has a highly positive effect on the reproductive system, blood, and fat in ayurvedic medicine. Despite having been utilised to Only a few of these uses—including those to cure illnesses ranging from gout to jaundice to tuberculosis—are currently backed by scientific research[6].

Inhibitory Effect of a Polysaccharide on Metastasis –

Tinospora cordifolia polysaccharide fraction administration was found to be very efficient in lowering the possibility for skin cancer cells. When the medication was given in addition to a tumour challenge, the production of metastases in the lungs of syngeneic mice was 72% inhibited. When compared to the untreated control animals, biochemical indices that are indicators of the formation of tumours, such as lung collagen hydroxyproline, hexosamines, and uronic acids, were much lower in the treated animals. Comparing the treated animals to the control ones, the therapy may also lower serum levels of sialic acid and glutamyltranspeptidase[7]

Against AIDS –

Giloy might also be advantageous for those who have HIV and other autoimmune diseases. The historical usage of giloy as an immunological stimulant led to Researchers will investigate its impact on HIV-positive people. According to a research in the "Indian Journal of Pharmacology," 60% of HIV patients who had giloy medication reported fewer symptoms connected to their illness, compared to only 20% of those who received placebo treatment. According to this study, giloy may strengthen the immune systems of people with HIV and other immunological illnesses while also reducing their usual negative effect[8].

Anti Diabetic Activity –

Streptozotocin's T. cordifolia stem extract improves the abnormalities in lipid metabolism brought on by diabetes mellitus. Diabetes was produced in rats[9]. The oral ingestion of different T. cordifolia stem extracts, including hexane, ethyl acetate, and methanol, was found to significantly lowering blood sugar levels in streptozotocin-induced diabetic rats at a dosage of 250 mg/kg, had substantial anti-diabetic properties[10]. The eight various herbs included in the polyherbal preparation Dihar, including Momordica charantia, Syzygiumcumini,

In streptozotocin-induced diabetic rats, the use of Emblicaofficinalis, Gymnemasylvestre, Enicostemma littorale, Azadirachtaindica, T. cordifolia, and Curcuma longa considerably lowers the amount of lipid peroxidation and boosts the activity of antioxidant enzymes[11] T. cordifolia's ethanol extract has androgenic properties. Saponarin that was isolated from T.20 to 80 mg/kg of cordifolia showed hypoglycemic action[12].

Boosts immunity –

This herb activated the immune system of our body and increase vitality in a person. Include Giloy juice or kadha in your diet twice a day can improve your immunity. It is full of antioxidants and helps to release toxins from the body. Giloy juice also detoxifies your skin and improves your skin. Giloy is also used for liver diseases, urinary tract infections, and heart-related issues [5].

Anti- Allergic Activity–

With continuous improvements on evaluation of the nasal smears and nasal mucosa, research on the anti-allergic effects of tinospora cordifolia revealed that it significantly relieved sneezing, nasal discharge, nasal obstruction, and nasal pruritus when compared to a placebo[13].

Anti-ulcer Activity –

Similar to diazepam, ethanol root extract of T. cordifolia was found to have a notable protective effect against restraining stress-induced ulcerization[14].

Anti-stress Activity –

When compared to diazepam at a dose of 2.5 mg/kg, T. cordifolia's ethanol extract at 100 mg/kg significantly reduced stress.

Anti-inflammatory Activity –

The researchers Siddalingappa C. M. et al. did a study. There has been a noticeable increase in Tinospora cordifolia after 30, 60, and 90 minutes of treatment, the reaction time (pain threshold) at dosages of 100 mg/kg, 200 mg/kg, and 100 mg/kg with 5 mg/kg of diclofenac was measured.

Tinospora cordifolia is widely known for its ability to modulate the immune system. According to reports, the active substances 11-hydroxymustakone, N-methyl-2-pyrrolidone, Nformylannonain, cordifolioside A, magnoflorine, tinocordiside, and syringin may have cytotoxic and immunomodulatory effects. According to a study by Vaibhav Aher et al, Tinospora cordifolia ethanolic extract (100 mg/Kg/p.o.) stem has immunomodulatory properties by altering the levels of antioxidant enzymes, increasing T and B cells

and antibodies, which are important for immunity, increasing the concentration of melatonin in the pineal gland, and increasing the level of cytokines like IL-2, IL-10, and TNF [13].

Boosts immunity –

This herb boosted a person's vitality and stimulated their immune system. Adding kadha or giloy juice to your diet twice a day might boost your immunity. Antioxidants abound in it, and it aids in the body's detoxification process. Additionally, giloy juice improves and detoxifies the skin. Additionally, liver problems, urinary tract infections, and heart-related conditions are treated with giloy[15].

Anti - microbial activity –

T. cordifolia's methanolic extract has been shown to be effective against microbial infection. *Escherichia coli*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Proteus vulgaris*, *Salmonella typhi*, *Shigella flexneri*, *Salmonella paratyphi*, *Salmonella typhimurium*, *Pseudomonas aeruginosa*, *Enterobacter aeruginosa*, and *Enterobacter aerogenes* have all been tested for the anti-bacterial activity of *T. cordifolia* extract[16].

Antioxidant Activity –

Tinosporacordifolia's in-vitro antioxidant activity has been investigated by Anilakumar K R et al. In methanol, ethanol, and water extracts, *Tinospora cordifolia* was found to have good antioxidant activity. The stem's potential as a source of natural antioxidants or nutraceuticals to minimize oxidative stress and reap subsequent health benefits is suggested by the extracts' high reported antioxidant activity[17].

Antineoplastic activity –

Tinosporacordifolia's alcoholic extract has been shown to stimulate macrophage functions such as phagocytosis, antigen-presenting capacity, and secretion of interleukin-1 (IL-1), tumour necrosis factor (TNF), and reference nutrient intake (RNI), as well as slow tumour growth and lengthen the lifespan of the tumor-bearing host, in Dalton's lymphoma (DL) bearing mice [18]

Anti-fertility activity –

Tinospora cordifolia stem extract administered orally to male rats at a dose level of 100 mg/d for 60 days did not result in body weight loss but significantly reduced the weight of the testes, epididymis, seminal vesicle, and ventral prostate[19]

Anti- leprotic activity –

Along with being widely used for *Kandu* and *visarpa* (types of skin problems), *Tinospora cordifolia* is used for its *kushtahara* (anti-leprotic) characteristics. It has also been demonstrated to exert anti-leprotic efficacy in a combination formulation[20]

Qualitative analysis of phytochemical constituents present in *Tinospora cordifolia*-

Detection of total alkaloids –

Plant extract was dissolved in mild HCl, filtered and the filtrate was tested for alkaloids. The alkaloids test was performed by various tests like Mayer's test, Wagner's test, Dragendorff's test, Hager's test.

Detection of flavonoids -

The extract was treated with a few drops of sodium hydroxide solution. It initially produces a deep yellow colour which becomes colourless when dilute acid is added to it, this colour change represents the presence of flavonoid.

Detection of glycosides -

Plant extracts were hydrolysed with dilute hydrochloric acid and then tested for glycosides by different tests like modified Borntrager's test and Legal's test.

Detection of phenol -

Plant extract was treated with a few drops of ferric chloride solution. Bluish colour formation indicates the presence of phenols.

Detection of saponin-

For the saponin identification the Froth test was done. Plant extract was diluted with distilled water to 20 ml and was shaken for 10-15 min. Formation of foam of height of 1 cm represents the presence of saponin.[21]



Figure no 3 – phytochemical constituents present in *Tinospora cordifolia*-

Elixirs can be prepared more easily than syrups they contain less amount of ingredients that are to be dissolved. If water soluble and alcohol soluble ingredients are present in formulation then the following procedure is followed. All the water soluble ingredients are added to water and dissolved. Now sucrose should be mixed and let it dissolve completely all the alcohol soluble ingredients were taken and dissolved in alcohol. Then the first solution was added to second solution. To make the elixir clear it is filtered. The

final volume is made up with water. Sucrose will enhance the viscosity and reduces the solubility of water. To make the elixir clear which is compulsory, talc or siliceous earth are used. Syrup is the best choice when taste is the main consideration. To make use of reliable, safer and economical natural coloring agents in the preparation of pediatric paracetamol elixir and compare it with the marketed product to evaluate the stability of the color used.

II. Literature Review –

Sr. No.	Author	Title of Research	Study
1	Mr.M.Samuel, V. Yamini Seshasri, A. Uma Sai Naga Lakshmi, CH. Uday Bhaskar, P. Naga Vasudha, Dr.J.N. Sureshkumar.	Preparation and Evaluation of Herbal Formulation GuduchiLehya .	Biological source, Family, Scientificclassification, geographical distribution where studied.
2	Vaibhav KakdePrapti Kamble.	Evaluation and Formulation of Gilloy Tablet	Pharmacognosy of TinosporaCordifolia, Chemical constituent where studied.
3	Raina Mehra, Tanveer Naved*, ABSTRACT Mahek Arora, Swati Madan	Standardization and Evaluation of Formulation Parameters of Tinospora Cordifolia Tablet	Material and method, Microscopic character where studied.

III. Aim and Objectives :

Aim : Development and Evaluation of Elixir preparation from *Tinospora cordifolia* .

Objective :

- To prepare extracts of *Tinospora cordifolia* using percolation extraction technique and

getting extracts use for Elixir formulation and evaluation .

- To study stability of optimized formulation .
- To study various evaluating parameters such as Organoleptic characters, pH , Viscosity , Density , Refractive index , Physical stability etc.

IV. Plan of work

4.1 Literature survey.

4.2 Selection of Drug and Excipients .

4.3 Procurement studies of drug and excipients .

4.4 Preformulation

4.4.1. Organoleptic properties

4.4.1.1. Colour

4.4.1.2. Odour

4.4.1.3. Taste

4.5 Extraction of *Tinospora cordifolia* by percolation process .

4.6 Preparation of Elixir Formulation.

4.7 Characterization Elixir Formulation .

V. Materials and Equipments

Sr. No	Ingredients	Institute Name
1	Extract of <i>Tinospora cordifolia</i>	SMBT college of pharmacy ,Dhamangaon
2	Orange spirit	SMBT college of pharmacy ,Dhamangaon
3	Ethanol	SMBT college of pharmacy ,Dhamangaon
4	Sucrose	SMBT college of pharmacy ,Dhamangaon
5	Amaranth red	SMBT college of pharmacy ,Dhamangaon
6	Propyl paraben	SMBT college of pharmacy ,Dhamangaon
7	Talc	SMBT college of pharmacy ,Dhamangaon
8	Propylene glycol	SMBT college of pharmacy ,Dhamangaon

Table no. 1- Materials

Sr. No	Name of Instruments	Model	Make
1	UV-visible Double beam spectrometer	1800 series	Shimadzu corporation kyoco , Japan.
2	Ostwald Viscometer	-	SMBT college of pharmacy

Table no. 2 Equipments

VI. Experimental Work-

6.1.1.Organoleptic Properties –

The Extract from *Tinospora Cordifolia* was evaluated for its organoleptic properties such as appearance, colour and odour .

6.2 Excipients study:

Sr no.	Ingredient	Uses
1	Extract of <i>Tinospora Cordifolia</i>	Phytoconstituent
2	Orange spirit	Flavoring agent
3	Ethanol	Solubilizer
4	Sucrose	Sweetning agent
5	Amaranth red	Coloring agent
6	Propyl paraben	Preservatives
7	Talc	Antiturbidant
8	Propylene glycol	Vehicle

Table No. 3 – Ingredient use

6.3 Method of Extraction-percolation method –

6.3.1 Method of preparation of extract.

The drug was accurately weighed.



The solvent ethanol was taken in beaker.



Then drug was added in solvent and kept for 4 to 6 days.



After 4 to 6 days this solvent and drug mixture was added in separating funnel consisting of cotton at bottom.-the mixture was filtered.



Filtrate was collected in beaker

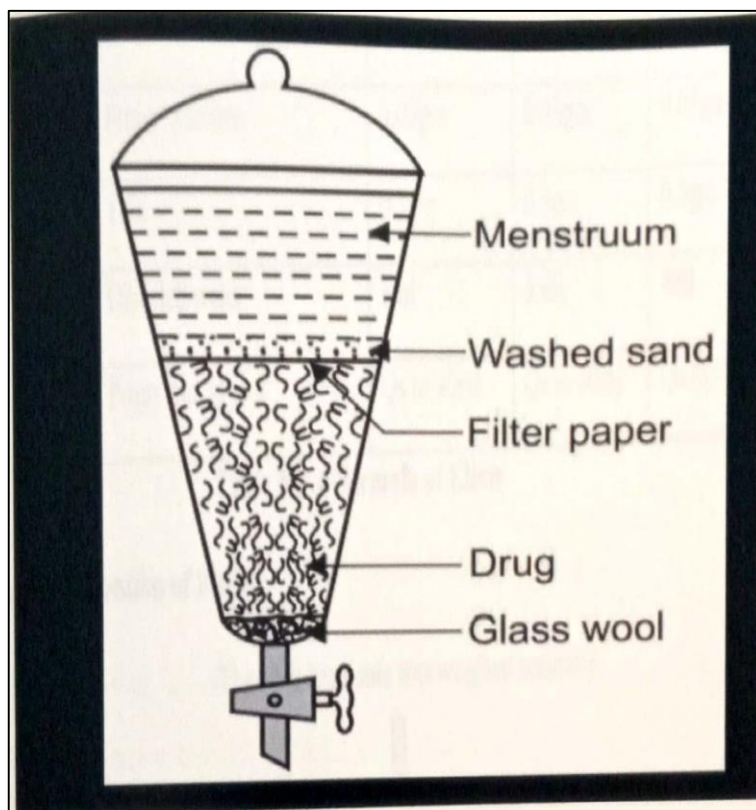


Figure No. 4 Percolater.

6.4 Formulation and Development of Elixir –

Sr No.	Ingredients	F1	F2	F3
1	Extract of Tinospora Cordifolia	10 ml	10 ml	10ml
2	Orange spirit	3 ml	2ml	2.5ml
3	Ethanol	4ml	4ml	3.5ml
4	Sucrose	4gm	4.5gm	5gm
5	Amaranth red	0.01gm	0.01gm	0.01gm
6	Propyl paraben	0.05gm	0.03gm	0.04gm
7	Talc	0.5gm	0.5gm	0.5gm
8	Distilled water	3 ml	5ml	4ml
9	Propylene glycol	Qs to make 40 ml	Qs to make 40 ml	Qs to make 40 ml

Table No. 4 Formula of Elixir

Method of preparation of Elixir –

The all ingredients was weighed accurately.



The two beaker was taken



In first beaker the extract of Tinospora Cordifolia was taken with orange spirit.



Talc was added to remove turbidity from beaker one.



In another beaker the sucrose , propyl paraben , and amaranth red was added in ethanol.



Two beaker was mixed together.



Lastly by using vehicle propylene glycol volume was makeup upto 40 ml.



Figure No.5 Formulation of elixir

6.5 Evaluation of Elixir Formulation

6.5.1 Determination of pH-

pH of formulation was determined by using pH paper. The paper was dipped in formulation and this process was repeated 3 times.

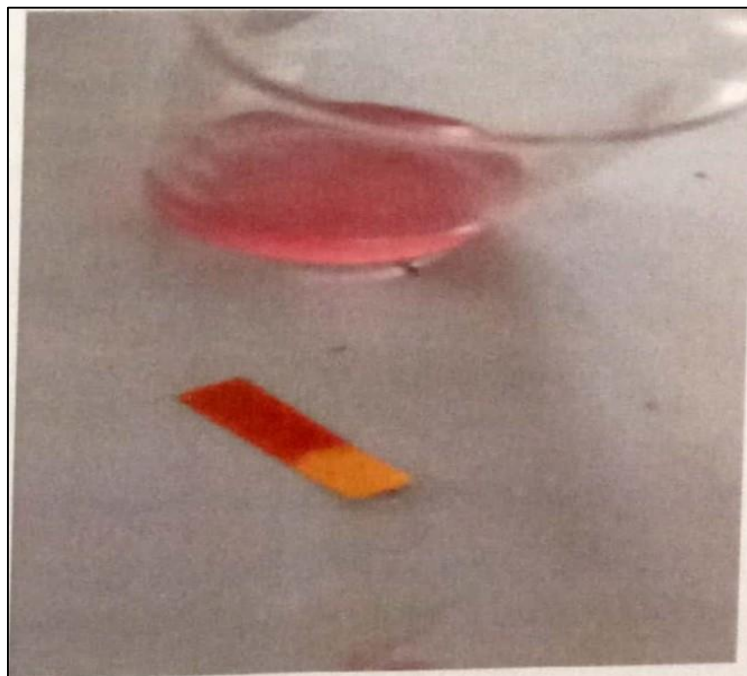


Figure No.6- pH determination.

6.5.2 Measurement of viscosity-

The viscosity of formulated batches was determined using Ostwald viscometer. Using Ostwald viscometer was calculated in repeated 3 times.



Figure No. 7 Ostwald viscometer.

6.5.3- Density-

The Density of a substances is its mass per unit volume

Density of Elixir was determined by using specific gravity bottle. The Density was calculated by specific gravity formula.



Figure No.8 Specific gravity bottle.

6 .5.4 Physical stability-

The physical stability was determined by using UV spectrophotometer.

Physical stability of Elixir was evaluated by using UV spectrophotometer.

6.5.5.- Refractive index – Refractive index (index of Refraction) is a value calculated from the ratio of the speed of light in a vacuum to that in a second medium of greater density. Refractive index of elixir was evaluated by using Abbes refractometer. Refractive index was repeated 3 times.



Figure No. 9 Abbes Refractometer

6.5.6. Organoleptic properties –

The Colour, odour and Consistency, appearance was determined by organoleptic characters. The organoleptic characters of elixir was evaluated.

VII. Result and Discussion –

7.1.1-Organoleptic properties – *Tinospora cordifolia* was studied for its organoleptic such as Appearance, Colour, Odour. The result shows the detailed of organoleptic properties of *Tinospora cordifolia* was found to be similar as per literature.

Sr. No.	Properties	Observed result
1	Appearance	Crystalline powder
2	Colour	Yellowish
3	Odour	Slightly Odour

Table No.5- Organoleptic properties of *Tinospora Cordifolia*.

7.2 Evaluation of Elixir –

7.2.1 – Determination of Ph – pH of various elixir in following table which found to be range of 6. Ph of elixir indicates the suitability of elixir for oral use.

Sr. No.	Formulation	pH
1	F1	6
2	F2	6
3	F3	6

Table No.6- pH observation.

7.2.3. Measurement of Viscosity- The viscosity was found to be and states that it is more viscous than water and less viscous than syrup

Sr. No.	Formulation	Viscosity
1	F1	0.0536
2	F2	0.078
3	F3	0.079

Table No. 7 – Viscosity

Density- Density was calculated and it was found to be 0.025 to 0.032g/ml it was suitable for result.

Sr. No.	Formulation	Density in gm/ml
1	F1	0.025
2	F2	0.031

3	F3	0.022
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Table No.8- Density observation table .

7.2.4 – Physical stability – The physical stability was determined by using UV spectrophotometer. Physical stability of Elixir was evaluated by using UV spectrophotometer the peak was observed by UV and it shows similar wavelength and peak i.e 277.5 nm which shows Elixir is stable .

Sr. No.	Formulation	Wavelength	Absorbance
1	F1	277.5	-0.021
2	F2	277.5	-0.069
3	F3	277.5	-0.069

Table No.9- Observation for physical stability.

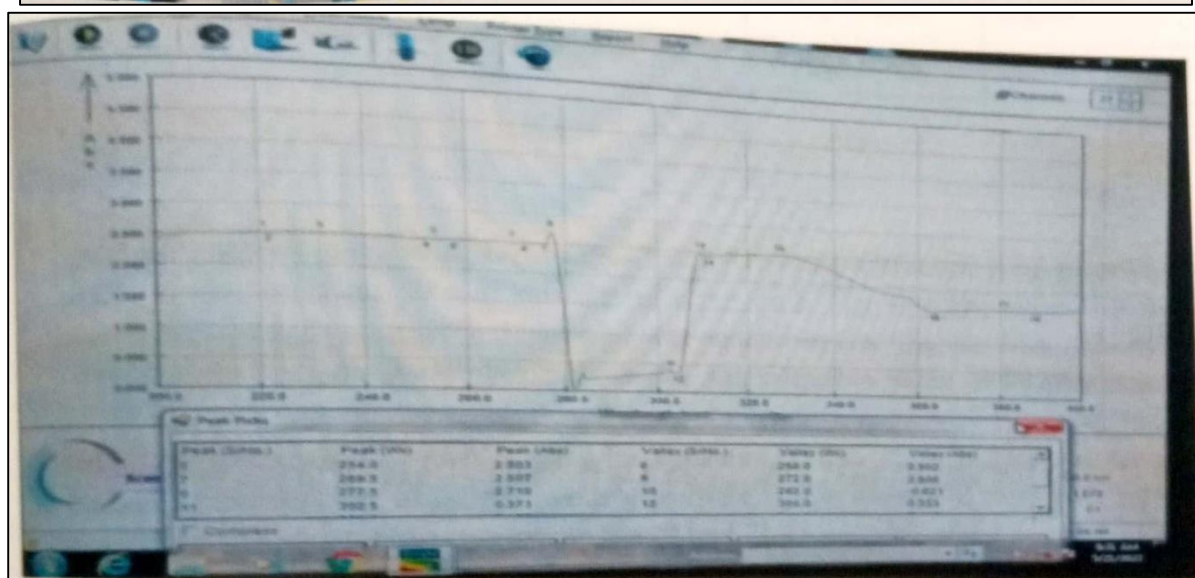
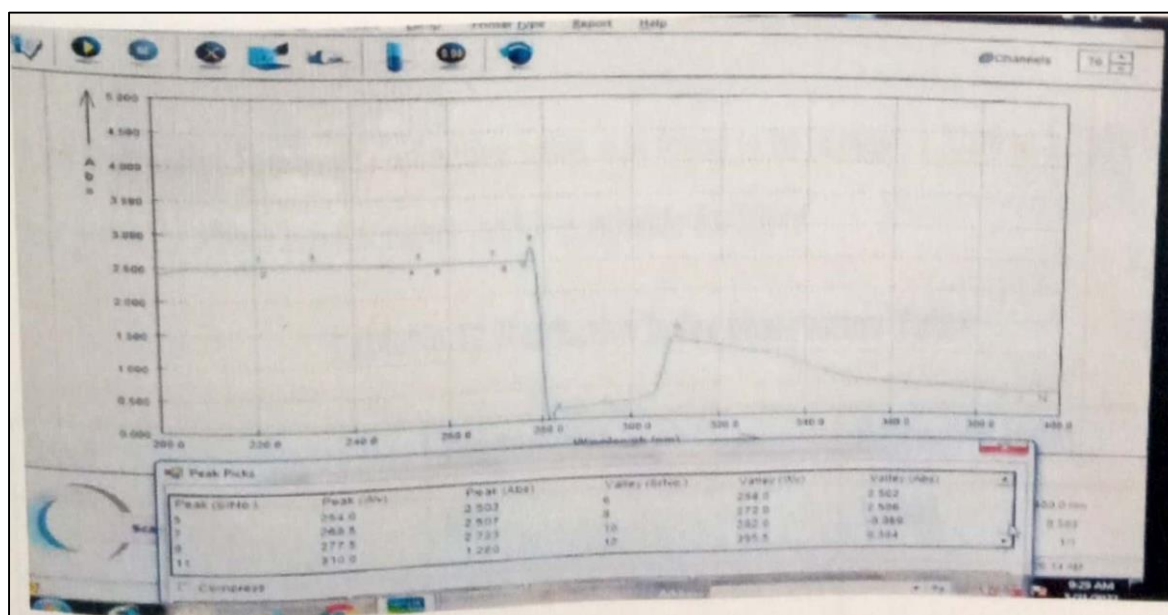


Figure No. 10 – Graph of UV spectrophotometer.

7.2.5 Refractive Index – The refractive index was found to be in range 1.3308 to 1.3501 which was given by Abbes refractometer and it is suitable for Elixir.

Sr. No.	Formulation	Refractive Index
1	F1	1.3308
2	F2	1.3501
3	F3	1.3415

Table No. 10 – Refractive index observation table.

7.2.6- Organoleptic properties- Organoleptic properties was evaluated and its Appearance, Odour and consistency suitable for Elixir.

Sr. No.	Formulation	Colour	Odour	Consistency
1	F1	Red	Orange smell	Liquid
2	F2	Red	Orange smell	Liquid
3	F3	Red	Orange smell	Liquid

Table No. 11- Organoleptic characters.

Discussion – The above results states that the formulation batch F1 is very useful and good according to its results. In this batch the pH was suitable for Elixir i.e 6. The viscosity states that it is less viscous than syrup. The density is 0.015 g/ml was suitable to Elixir. The physical stability results shows that the formulation is physically stable. The refractive index of F1 was found to be 1.3308 it is good for Elixir preparation .The organoleptic properties of F1 shows red colour and orange smell odour .which is good for appearance and odourpumose. The formulation consist of more amount of propyl paraben so there is less chance of microbial growth and also consist low amount of sugar other than f2 and B formulation which is good for diabetic patients. Hence above discussion states that F1 is suitable Elixir for oral use.

VIII. Conclusion

- ❖ The filtrate from *Tinospora Cordifolia* steam formulation may be useful for fever.
- ❖ In the present research, an attempt has been made on the formulation and evaluate Elixir, for Oral purpose.
- ❖ Compatibility studies between excipients and extracts will be helpful in optimizing the formulation.

IX. Future Scope –

- ❖ The Elixir preparation of *Tinospora Cordifolia* may used in future for treatment of fever.
- ❖ This preparation increase the scope of semisynthetic drug in Global market.
- ❖ In future various preparation of *Tinospora Cordifolia* was formulated and evaluated due to its various medicinal use.

- ❖ The *Tinospora Cordifolia* use for various activity such as Antipyretic, Anti-inflammantory, Antioxidant etc.

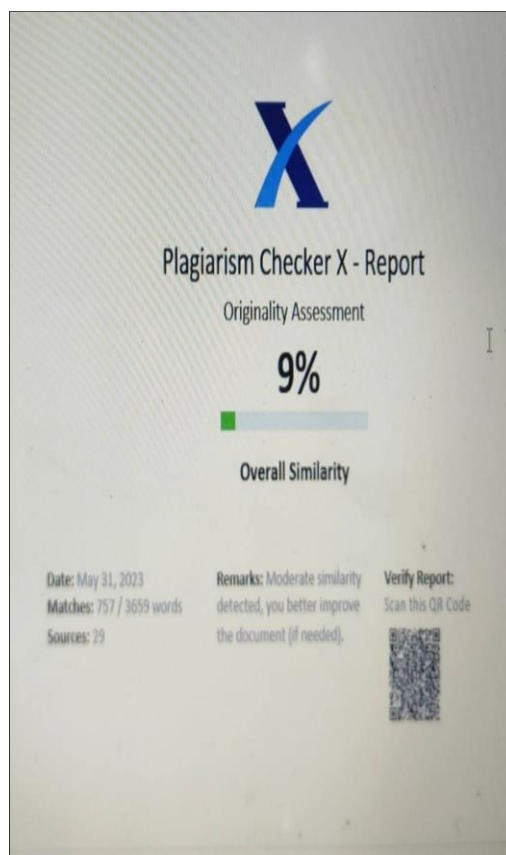
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Annexure-



Errata:

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