Phytochemical Analysis And Antifungal Activity Of Ipomoea Cairica (L.)Sweet And Hypericum Oblongi Folium Choisy Against Cladosporium Cladosprioides (Fresenius) De Vries.

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ABSTRACT

Ipomea cairica and Hypericum oblongifolium are being evaluated for its therapeutic efficacies. Survey was carried out at Sarkaghat region North Western Himalayas and both the plant species were collected from there. Plant species were observed morphologically, anatomically and identified at preliminary stage at Career Point University Hamirpur with the help of authentic keys and POWO guidelines. For final authentication plant samples were send to Himalayan Forest Research Institute Shimla and were identified there under the identification report number: 1(FE&CC-2) Res. (Plant ID)/HFRI/VOl-1/5 on dated 8/05/2023. For phytochemical screening both qualitative and quantitative methods were used. In qualitative analysis Fehling`s test, Biuret test, Alkaline reagent test and Salkowski test were performed, which shows the presence of carbohydrates, proteins, flavonoids and terpenoids respectively in both the plants. Further Gas Chromatography Mass Spectrometry (GC-MS) analysis was performed for quantitative analysis. Antifungal activity of ethanol extracts of both the plants were performed by food poisoning method against *Cladosporium cladosprioides* (Fresenius) de Vries. Both the plants show good antifungal activities against this pathogen. Further short points are as below:

***Ipomoea cairica* (L.)Sweet (Sample A):** It grows on roadsides, forest margins, distributed areas and waste areas. This plant is hairless slim climber with bulbous roots and a lignescented base. Leaves are stalked with petioles and the leaf blade is ovate to circular, 3-10cm long and6-9cm wide. Flowers are violet color flower crown is funnel shaped and 4-6cm long. Fruits are spherical capsules about 1cm in diameter and contain 1-2 hairy seeds. Its native ranges are Tropical and South Africa, Western Indian Ocean, Arabian Peninsula to East India. It belongs to family Convolvulaceae.

***Hypericum oblongifolium* Choisy (Sample B):** This plant grows in hilly areas at the elevation of 800-1200 meters above the sea level. It is an herbaceous perennial plant with extensive and creeping rhizomes. Stems are branched, erect, reddish in the upper section and grow up to 1 meter high. Leaves are stalkless and opposite, oblong or narrow in shape and 1-2centimeters in length. Flowers have five petals and sepals, and are yellow in colour with black dots. Its native range is North Pakistan to Central Nepal and North West India. It belongs to family Hypericaceae.

Anatomy of *Ipomoea cairica* (L.) Sweet: Vascular Bundles are set up in a ring like manner and open collateral or conjoint. Xylem is found in the interior side of vascular bundles and it conducts minerals and water. Thecambium is present between phloem and xylem. Cells are rectangular in shape and having thin cell walls. Pollen Grains are pantoporate, spherical, 59-79µm wide.

Anatomy of *Hypericum oblongifolium* Choisy: Externally epidermis is mono-stratified and contains more or less rounded cells. The cortical parenchyma is thin with numerous lacunae which are numerous below the two smallwings. The xylem is robust and rings porous. Ovary is 4-7 × 3-5.5mm. Ovoid pyramidal to broadly ovoid.

Phytochemical Analysis of sample A: In the plant *Ipomea cairica* total 16 elements are present. Out of sixteen elements Compound name Cyclononasiloxane octadecamethyl with molecular formula ($C_{18}H_{54}O_9Si_9$), molecular weight (667.4g/mol), RT (min) 47.357 have maximum Area % 13.15. And Cyclohexasiloxane, dodecamethyl with ($C_{12}H_{36}O_6Si_6$), molecular weight (444.92g/mol), RT (min) 17.758 have minimum Area % 1.81.

Phytochemical Analysis of sample B: In the plant *Hypericum oblongifolium* total 14 elements are present. Out of sixteen elements Compound name Cyclononasiloxane octadecamethyl with molecular formula ($C_{18}H_{54}O_9Si_9$), molecular weight (667.4g/mol), RT (min) 47.357 have maximum Area% 14.35 And Cyclohexasiloxane, dodecamethyl with ($C_{12}H_{36}O_6Si_6$), molecular weight (444.92g/mol), RT (min) 30.025 have minimum Area% 1.74.

Antifungal Activity of *Ipomoea cairica* (L.) Sweet and *Hypericum oblongifolium* Choisy: Both the plants have good antifungal potential against *Cladosporium cladosprioides* (Fresenius) de Vries. Methanol extract of *Hypericum oblongifolium* shows maximum antifungal property and i.e 24 mm followed by methanol extract of *Ipomoea cairica* and ethanol extract of *Hypericum oblongifolium* i.e. 22 mm. The minimum antifungal property was shown by aqueous extract of *Ipomoea cairica i.e.* 6 mm.

Keywords: Antifungal, Anatomy, GC-MS, North Western Himalaya and Phytochemical Analysis.

Introduction

Ipomea cairica (L.)Sweet is being evaluated for its therapeutic efficacies. Among different species of *Ipomea*, *Ipomea cairica* is of great economic importance and exist in liana form. *Ipomea cairica* is known as Morning Glory in Brazil, popularly called Jetrina, Jitirama in Nepal and India. It exists as an invasive species in India, China and other countries (Geng *et al. 2*016). The plants are glabrous perennial, erect, and usually woody at the base. This plant flowers throughout the year and shows anti-RSV (respiratory syncytial virus) activity *in vitro* (Ma et al., 2002). It also showed an antiseptic effect (Ferreira et al., 2006). *Hypericum oblongifolium* Choisy is a small shrub whose flowers are profuse, arranged in branched cymes which bloom from June until September (Hobbs,1998). Ornamental plants are grown usually for the purpose of beauty for their fascinating foliage, flowers and their pleasant fragrance (Swarup, 1998). They vary greatly in composition and density in marked contrast wild domesticated plants (Raju, 1998). The plants are glabrous perennial, erect and usually woody at the base. The flowers are profuse, arranged in branched cymes which bloom from June until September (Hobbs, 1998).

Hypericum oblongifolium Choisy plant is used traditionally for treating depression, anxiety, insomnia also menstrual disorders for healing woundcuts and burns. Most recent interest in *H. oblongifolium* has focused on its antidepressant effects (Butterweck et al., 2000; Kumar *et al*., 2000; Cervo *et al*., 2002); however, the herb has shown other activities including- healing wonds (Fedorchuk,1964; Rao *et al.,* 1991) antifungal (Ranic *et al*., 2005; Milosevic *et al*., 2007). This plant is a member of the genus Hypericum of which there are 400 species worldwide (Mabberely, 1987). In present study the wild plants of *Ipomoea cairica* (L.)Sweet and *Hypericum oblongifolium*Choisy were surveyed and collected from Sarkaghat region of North Western Himalaya and identified on the basis of morphological and anatomical features. Further Phytochemical screening of both the plants were performed with the help of qualitative and quantitative analysis. Finally ethanol extract of the *Ipomoea cairica* (L.) Sweet and *Hypericum oblongifolium* Choisy were screened against *Cladosporium cladosprioides* (Fresenius) de Vries.

METHODOLOGY

Survey and Collection: Survey was conducted at different areas of Sarkaghat tehsil of Mandi District at North Western Himalayas from February 2022- June 2023.Survey was conducted by questioner method as well as by direct interviews of villagers. Mostly aged people and vaids were asked during the interview. For selecting these categories of informants a preliminary survey was carried out. Final informants were selected on the basis of pilot survey. Wild plants were collected randomly from the forest areas. (Sharma and Chander 2020, 2021).

Study of Morphological and Anatomical Features of plants: Morphological features of the plants like flower, leaf, stem and roots were observed in detail. In flower sepals, petals, androcium, gynocium, their number, arrangement, position and inflorescence etc were examined. In leaf, venation, arrangement of leaves on stem, position and type of stomata etc were examined in detail. In similar way stem and roots were examined and verified with the taxonomic keys of Flora of Himachal Pradesh **(** Chowdhery and Wadhwa, 1984)

Anatomical features of the plant are: shape of epidermal cells, Size of Embryo, pollen grains, type and arrangement of vascular bundles etc were observed in detail. Cross section of plant parts like Stem, root and flower were sectioned with automatic microtome (Johansen, 1940). By using light microscope, anatomical characters of plant were observed. Microphotographs were obtained by using the Nikon Camera. In different group of flowering plants, anatomical properties of plant part are the source of taxonomic inferences (Edeoga *et al*., 2007; Guimaraes *et al*., 2007; Kaplan *et al*., 2007; Keshavarzi and Zare, 2006).

Identification: Preliminary identification was done with the help of herbarium of Career Point University Hamirpur and by (TheNomenclature as per POWO (2023). i.e., **"**Plants of the World Online**".** POWO is facilitated by the Royal Botanical Gardens, Kew. Published on the Internet as a link: http://www.plantsoftheworldonline.org/.The finally plants were authenticated by Himalayan Forest Research Institute Shimla having report number 1(FE&CC-2) Res. (Plant ID)/HFRI/Vol-1/5 on dated 8/05/2023.

Phytochemical Analysis:

Preparation of plant material: For extraction the leaves of plants specimen were dried at room temperature or crushed in to powder form. The powder was mixed with distilled water and permits to stand for 48h at room temperature. The mixture of the leaves and distilled water was filtered by the help of Whatman No.1 filter paper and the filtrate was concentrated by applying a rotary evaporator to obtain a brownish black semi solid extract. Solvent partitioning of

distilled water extract was usedby the protocol directed by Kupchan and Tsou and modified version of Wagenen et al. Extract (20g) was weighed or dissolved in 250ml of distilled water for the formation of n hexane was added to solution of filtered in to a separating funnel. The mixture was stand for 20 minutes for proper separation or the higher part was collected in a beaker. The distilled water part was washedwith n hexane after which the different n ethyl acetate. After this ethyl acetate fractions werecollected or concentrated. Finally ethanol extracts of crude sample were prepared and used for preliminary screening (Olivia, et al., 2011).

Quantitative and Qualitative screening Both quantitative and qualitative screening was performed for the leaf extracts of *Ipomoea cairica* (L.) Sweet and *Hypericum oblongifolium* Choisy. Among qualitative Analysis tests for Carbohydrates i.e. Fehling`s test (Yadav, et al., 2011), Proteins i.e. Biuret test (Pant, et al., 2017), Flavonoids i.e. Alkaline reagent test (Pant, et al., 2017) and for Terpenoids i.e. Salkowski test (Pant, et al., 2017) tests were performed. Quantitative Analysis was performed by Gas Chromatography Mass Spectrometry (GC-MS).

Antifungal activity: Isolation of fungal pathogen:

On potato dextrose agar (PDA) media, fungi pathogens were isolated from *Coccinia grandis* L.Pure cultures of each fungus were created individually on PDA slants using isolated identified fungal cultures. We used these pure cultures of *Cladosporium cladosprioides* (Fresenius) de Vries. (Accession number, 9862.20 provided by National Institute of Fungal Taxonomy, New Delhi).

Preparation of plant powder

Fresh Leaves of *Ipomoea cairica* (L.) Sweet and *Hypericum oblongifolium* Choisy plants were gathered from Sarkaghat region . Both sterile distilled water and tap water were used to properly wash and rinse the obtained plant material. Leaves were shade-dried and ground in an electric mixer. Glass bottles with tight lids were used to store the powder substance. Further extracts were prepared byusing this stock powder (Sharma et al, 2023).

Preparation of extracts

Different solvent systems, such as distilled water, alcohol, methanol and chloroform, were used to create the extracts. 100 ml of the above-mentioned solvent system was used to dissolve 100gm of powder. It was filtered using the three-layered filter paper. From this stock solution, several concentrations (25 %, 50 %, 75%, and 100 %) were prepared. The solvent system in use served as the control. These various concentrations were applied as a biocide to the fungus-causing pathogen. The bioefficacy of the extract was evaluated *in vitro* by the poisoned food method (Jaiswal and Sharma, 2023).

Antifungal activity of both the plant extracts i.e. *Ipomoea cairica* (L.) Sweet and *Hypericum oblongifolium* Choisy was assayed using the poisoned food method (Adjou et.al, 2012; Sharma et.al, 2023; Jaiswal and Sharma,2023). Separate specific percent concentrations (25, 50, 75 and 100 per 10 μL/mL) were prepared by adding extract of *Ipomoea cairica* (L.) Sweet and *Hypericum oblongifolium* Choisy, 0.5% (v/v) of Tween 80 to cooled molten PDA which is followed by rotation in a sterile flask for appropriate mixing. 20 ml of the medium was poured into sterile Petri dishes. The medium was remained undisturbed for about one hour to solidify at room temperature. Agar discs of 6mm were cut from 7-day-old pure culture of *Cladosporium cladosprioides* (Fresenius) de Vries using a sterile cork borer and inoculated at the center of fresh media containing Petri plate. Control plates had also the same procedure but were without plant extracts. The experiment was performed in the triplicates. Readings were taken after 7 days of inoculation. The % inhibition of the mycelia growth of *Cladosporium cladosprioides* (Fresenius) de Vries the by plant extracts was calculated using formula given below (Philippe et al.)

$$\text{Inhibition of mycelia growth (\%)} = \frac{dc - dt}{dc} \times 100$$

Here *dc* = mean diameter of colony in the control sample, *dt* = mean diameter of colony in the treated sample

RESULTS AND DISCUSSION

A total of 2 wild ornamental plants belonging to 2 different families were explored in present study. The *Ipomoea cairica* and *Hypericum oblongifolium*plants belong to Convolvulaceae and Hypericaceae family respectively.

Table 1. List of Wild Ornamental Plants with details

Sample No.	Scientific Name	Family Name	Common Name	Remarks
Sample A	*Ipomoea cairica* (L.)Sweet	Convolvulaceae	Miles-a-minutevie, Messina creeper, Railroad creeper. Nili bel.	Native range is Tropical & S. Africa, W. Indian Ocean, Arabian Peninsula to E. Asia. Climbingtuberous, grows primarily in seasonally drytropical biome.
Sample B	*Hypericum oblongifolium* Choisy	Hypericaceae	Pendant St John's wort, Basant.	Native range is N. Pakistan to Central Nepal & NW. India. Shrub that grows Primarily in the temperature biome.

The native range of *Ipomoea cairica is* Tropics & South Africa, Western Indian Ocean, Arabian Peninsula to East Asia. It grows as climbing tuberous plant and primarily in seasonally dry tropical biome. The native range of *Hypericum oblongifolium* is North Pakistan to Central Nepal & North Western India. It grows as shrub aand primarily in temperate biome.

Description of *Ipomoea cairica* (L.)Sweet:

Table2. General Information and Classification of *Ipomoea cairica* (L.)Sweet			
Sr No	**GeneralInformation**	**ClassificationasperUSDADtabase**	
1	Botanical name : *Ipomoea cairica* (L.) Sweet	Kingdom	: Plantae
2	Local name : Nili bel	Class	:Magnoliopsida-Dicotyledons
	Common name : Railway creeper	Order	: Solanales
3	Type of Plant : Herb	Family	: Convolvulaceae
4	Area of Collection: Sarkaghat	Genus	: *Ipomoea*
5	Date of collection: 17/04/23	Species	: *cairica*

Morphology:
It grows on roadsides, forest margins and waste areas. It is a hairless slim climber with bulbous roots having lignescented base. Leaves are stalked with petioles and the leaf blade is ovate to circular, 3-10cm long and6-9 cm wide. Flowers are of violet color having funneled shaped crown and 4-6cm long. Flowers are numerous in lax dichasia, pedicles 12-30 mm long sepals are ovate and 4-6.5mm long, peduncles 5-80mmm, margins scarious, corolla purple, bluish purple, capsules are brown (Figure 1). Fruits are spherical capsules about 1cm in diameter and contain 1-2 hairy seeds. Seeds are black densely short-tomentose, sub-globose to ovoid 4-6mm long, and sometimeswith silky and long hairs.

Anatomical Features:
T.S of Stem (Figure 3.)
The outer most layer of the stem is epidermis; it is a single layered and covered with cuticle. Justbelow the epidermis cortex is located. It consists following reasons- Hypodermis, Endodermis, General cortex (Parenchyma). Hypodermis- It is located below the epidermis and consist 4-5 layers of collenchymatous cells. Endodermis- The cells of endodermis are densely arranged and barrel shaped. General cortex (Parenchyma)- It is located under the hypodermis; it consists several layers of cellsPericycle is located between the vascular bundles and endodermis and has patches of parenchyma and sclerenchyma and patches of sclerenchyma are linked with hard blast fires. Medullary rays are present in the gap between in vascular bundles. The gap finds parenchymatous cells which are radially arranged in 4-5 rows and thin walled. Vascular Bundles are set up in a ring like manner and open collateral or conjoint. It comprisesxylem phloem, cambium. Phloem is located below the pericycle and it consist of thin cell wallspossessing sieve tube, companion cells and phloem parenchyma.it conducts food material Xylem is found in the interior side of vascular bundles and it conducts minerals and water. Thecambium is present between phloem and xylem. Cells are rectangular in shape and having thincell walls. It consists meristematic tissue and form new cells. Pith forms the middle region of the stem and consist large number of parenchymatous cells.

Pollen grains (Figure 4.)
Grains pantoporate, spherical, 59-79µm wide. Pores diameter 3.5-4.8 µm, operculum finely granulate Nexine 1.6µm thick; sexine 1-1.3 µm thick. Tectum with spines the spines 6-10µm long. And at the base generally bulbous and broad. Withthe less acute tip and a faint constricted neck tapering towards the apex.
At the base of the spine the downward basal projections of the spines and bacula forming acompact convex tuft Lumina is very small. The bacula is larger than the other part of the grains surface.

Phytochemical Analysis by Qualitative Method :
Carbohydrates test for *Ipomea cairica* (Figure 5.)
Fehling`s test:
Take 2ml of plant extract solution in a dry test tube, add 2ml of Fehling solution A and Fehling solution B and heated in water bath for 10 minutes. The formation of red precipitate confirms thepresence of carbohydrates (Yadav, et al., 2011) as shown in table 3.

Protein test for *Ipomea cairica* (Figure 6.)
Biuret test:
Take a clean and dry test tube and add 2 ml of plant extract solution in it, add 2ml of sodium hydroxide in same test tube. Add 5-6 drops of copper sulphate. Formation of bluish violet colourconfirms the presence of protein (Pant, et al., 2017) as shown in table 3.

Flavonoids test for *Ipomea cairica* (Figure 7.)
Alkaline reagent test:
Take a dry and clean test tube add 2ml of plant extract solution in same test tube and add 2-3 drops of sodium hydroxide were added to 2ml of plant extract solution, dark yellow colour appeared but it gradually become colourless by adding few drops of dilute HCL, it indicates flavonoids were present (Pant, et al., 2017) as shown in table 3.

Terpenoids test for *Ipomea cairica* (Figure 8.)
Salkowski test: Take a clean and dry test tube and add 2ml of plant extract solution and mixed with 1.5ml chloroform and 1ml of concentrated sulphuric acid was carefully added to form a layer. A reddish-brown coloration of the interface was formed to show positive result for the presenceofterpenoids (Pant, et. al., 2017) as shown in table 3.

Table 3: Results of Qualitative Analysis

Sr. No.	Compounds	Present
	Carbohydrates	+
	Protein	+
	Flavonoids	+
	Terpenoids	+

Phytochemical Analysis by Quantitative Method:

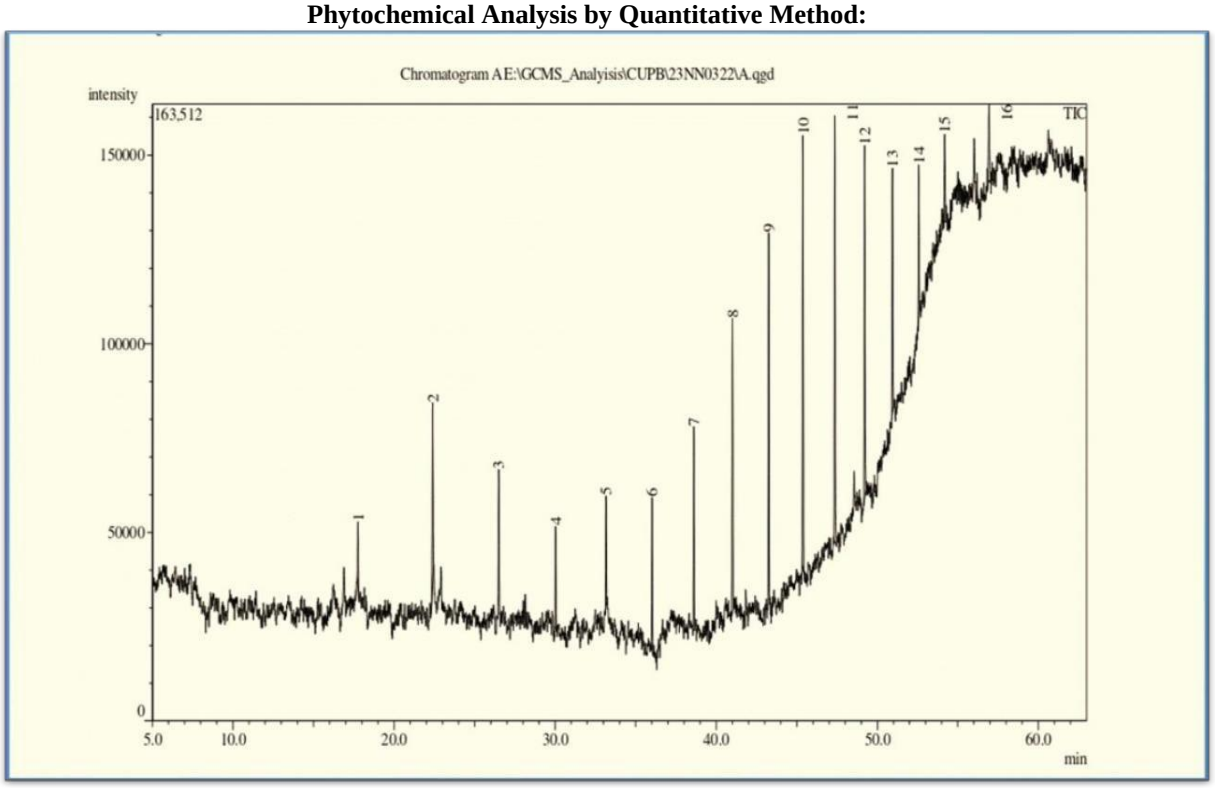


Figure 17 showing the chromatography A E:\GCMS_Analysis\CUPB\23NN0322\A.qgd.*Ipomeacairica* (L.) Sweet.

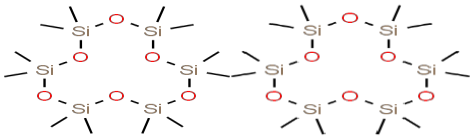
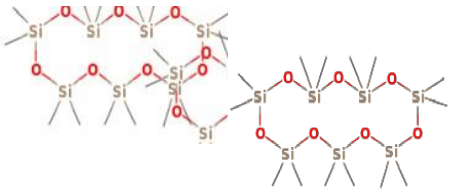
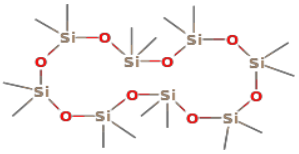
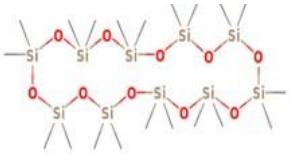
Table 4: Molecular formula & weight of compounds of *Ipomea cairica*

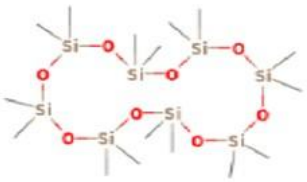
Sr.No	RT (min)	Name of Compounds	MolecularFormula	MolecularWeight	Area
1.	17.758	Cyclohexasiloxane,dodecamethyl-	$C_{12}H_{36}O_6Si_6$	444.92g/mol	1.81
2.	22.397	Cycloheptasiloxane,tetradecamethyl-	$C_{14}H_{42}O_7Si_7$	519.07g/mol	6.00
3.	26.499	Cyclooctasiloxane,hexadecamethyl-	$C_6H_{48}O_8Si_6$	593.23g/mol	4.16
4.	30.026	Cyclohexasiloxane,dodecamethyl-	$C_{12}H_{36}O_6Si_6$	444.92g/mol	2.65
5.	33.160	Cyclodecasiloxane, eicosamethyl-	$C_{20}H_{60}O_{10}Si_{10}$	741.5g/mol	3.16
6.	36.019	Cyclooctasiloxane,hexadecamethyl-	$C_6H_{48}O_8Si_8$	593.23g/mol	4.08

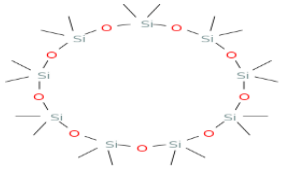
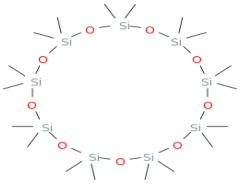
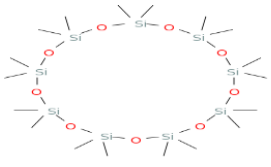
7.	38.610	Cyclononasiloxane,octadecamethyl-	$C_{18}H_{54}O_9Si_9$	667.4g/mol	5.35
8.	41.003	Cyclononasiloxane,octadecamethyl-	$C_{18}H_{54}O_9Si_9$	667.4g/mol	8.62
9.	43.256	Cyclononasiloxane,octadecamethyl-	$C_{18}H_{54}O_9Si_9$	667.4g/mol	10.35
10.	45.377	Cyclononasiloxane,octadecamethyl-	$C_{18}H_{54}O_9Si_9$	667.4g/mol	11.99
11.	47.357	Cyclononasiloxane,octadecamethyl-	$C_{18}H_{54}O_9Si_9$	667.4g/mol	13.15
12.	49.208	Cyclononasiloxane,octadecamethyl-	$C_{18}H_{54}O_9Si_9$	667.4g/mol	11.31
13.	50.940	Cyclononasiloxane,octadecamethyl-	$C_{18}H_{54}O_9Si_9$	667.4g/mol	7.04
14.	52.568	Cyclononasiloxane,octadecamethyl-	$C_{18}H_{54}O_9Si_9$	667.4g/mol	4.24
15.	54.182	Cyclodecasiloxane, eicosamethyl-	$C_{20}H_{60}O_{10}Si_{10}$	741.5g/mol	2.90
16.	56.939	Phenol, 2,4-bis(1,1-dimethylethyl)-, p	$C_{17}H_{30}OSi$	278.5g/mol	3.21

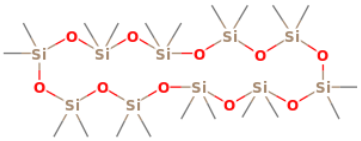
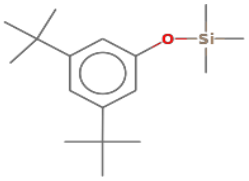
According to chromatogram of figure 17 and table 4 in the plant *Ipomea cairica* total 16 elements are present. Out of sixteen elements Compound name Cyclononasiloxane octadecamethyl with molecular formula ($C_{18}H_{54}O_9Si_9$), molecular weight (667.4g/mol), RT (min) 47.357 have maximum Area% 13.15. And Cyclohexasiloxane, dodecamethyl with ($C_{12}H_{36}O_6Si_6$), molecular weight (444.92g/mol), RT (min) 17.758 have minimum Area% 1.81.

Table 5. Compound structure and uses of phytochemical of *Ipomea cairica*

Sr. No.	Name of Compounds	Structure of Compounds	Uses of Compounds
1.	Cyclohexasiloxane, dodecamethyl-		This compound is used for skinand hair care, antifungal, antibacterial and deodorants (Mebude, & Adeniyi., 2017).
2.	Cycloheptasiloxane Tetradecamethyl-		This compound is used in textile, leathers and fibers as a softeningand brightening agents These chemical compounds have antifungal properties (Moustafa, et al., 2013).
3.	Cyclooctasiloxane, hexadecamethyl-		It is used as biological resistanceand it have antifungal properties.It is useful for the detection of post-harvest fungi in grains (Barkat, et al., 2017)
4.	Cyclohexasiloxane, dodecamethyl-		This compound is used for skinand hair care, antifungal, antibacterial and deodorants. (Mebude, & Adeniyi., 2017).
5.	Cyclodecasiloxane, Eicosamethyl-		This compound is used to identifythe anti-Qs activity of natural resources as a marker strain (Musthafa, et al., 2017).

6.	Cyclooctasiloxane, hexadecamethyl-		It is used as biological resistanceand it have antifungal properties.It is useful for the detection of post-harvest fungi in grains (Barkat, et al., 2017)
7.	Cyclononasiloxane, octadecamethyl-		This compound has a good antifungal properties (Syed, et al.,2022)

8.	Cyclononasiloxane, octadecamethyl-		This compound has a good antifungal properties (Syed, et al.,2022)
9.	Cyclononasiloxane, octadecamethyl-		This compound has a good antifungal properties (Syed, et al.,2022)
10.	Cyclononasiloxane, octadecamethyl-		This compound has a good antifungal properties (Syed, et al.,2022)
11.	Cyclononasiloxane, octadecamethyl-		This compound has a good antifungal properties (Syed, et al.,2022)
12.	Cyclononasiloxane, octadecamethyl-		This compound has good antifungal properties (Syed, et al.,2022)
13.	Cyclononasiloxane, octadecamethyl-		This compound has a good antifungal properties (Syed, et al.,2022)
14.	Cyclononasiloxane, octadecamethyl-		This compound has a good antifungal properties (Syed, et al.,2022)

15.	Cyclodecasiloxane, Eicosamethyl-		This compound is used to identifythe anti-Qs activity of natural resources as a marker strain (Musthafa, et al., 2017).
16.	Phenol,2,4-bis (1,1-dimethyl ethyl),-p		It is reported for antibacterial activity (Yogeswari, et al., 2012)

In table 5 we will study about the structure of compounds and their uses. The name of the first compound is Cyclohexasiloxane, dodecamethyl- and it is used for hair care and skin care, the second compound is Cycloheptasiloxane Tetradecamethyl- and it is used in textile, leathers and fibres as a softening and brightening agents, these compound have antifungal properties, third compound name is Cyclooctasiloxane, hexadecamethyl- it is used a biological resistance and it have antifungal properties, it is also useful for the detection of Post-harvest fungi in grains, fourth compound is Cyclohexasiloxane, dodecamethyl- it is used for skin and hair care, antifungal, antibacterial and deodorants, the name of fifth compound is Cyclodecasiloxane, Eicosamethyl- and this compound is used to identify the anti-Qs activity of natural resources as a marker stain, sixth compound name is Cyclooctasiloxane, hexadecamethyl and this compound is used as biological resistance from compound seven to fourteen the name and uses of compounds are sameas mention in table. The name of fifteen compound is Cyclodecasiloxane, Eicosamethyl- and it isused to identify the anti-Qs activity of natural resources as a marker strain and the name of last compound is Phenol, 2,4-bis (1,1-dimethyl ethyl), -p and it is reported for antibacterial activities.

Antifungal Activity of *Ipomoea cairica* (L.)Sweet (Figure 15) :

At a concentration of 100%, the leaf methanolic extract recorded a maximum of 22 mm inhibition for *Cladosporium cladosprioides* (Fresenius) de Vries. while it for ethanol extract was 21mm andaqueous extras was a minimum of 06 mm. The minimum inhibition by the extract was recorded at 2 mm for *Cladosporium cladosprioides* (Fresenius) de Vries at 25% aqueous extract (Table 1).

Among the extracts assayed, the methanolic extract showed maximum activity (22 mm) at 100% concentration; while minimum activity was observed with aqueous extract a t 25% concentration against the fungi *Cladosporium cladosprioides* (Fresenius) de Vries. (6 mm) under investigation. Results showed that radial growth in all the test organisms was impaired by the addition of the extracts in the culture medium used. The test organisms differed in their reaction to the different extracts but on the whole, growth inhibition increased with the concentration of each extract (Table 6 and 7).

Table 6 Activity of *Ipomoea cairica* extracts against plant pathogenic fungi *Cladosporium cladosprioides* (Fresenius) de Vries.

Sr.No.	**Solvent**	***Cladosporium cladosprioides* (Fresenius) de Vries.** Inhibition* (mm) by extract			
		25 %	50 %	75 %	100 %
1	**Methanol**	**12**	**15**	**18**	**22**
2	**Ethanol**	**10**	**12**	**17**	**21**
2	**Chloroform**	**07**	**10**	**13**	**17**
4	**Aqueous**	**06**	**10**	**16**	**18**

Note: * - values given are mean values of triplicates; Aqueous- Distilled water

Table 7 Minimum Inhibitory concentration (MIC) of *Ipomoea cairica* against *Cladosporium cladosprioides* (Fresenius) de Vries.

Sr. No.	**MIC against(mg/ml)**	**Water extract**	**Chloroform extract**	**Ethanolic extract**	**Methanolicextract**
1.	***Cladosporium cladosprioides***	60	55	45	35

	(Fresenius) de Vries.				

Description of *Hypericum oblongifolium* Choisy:

Table 8. GeneralInformationandClassificationof *Hypericum oblongifolium* Choisy		
Sr No	**GeneralInformation**	**Classificationasper USDADtabase**
1	Botanical name: *Hypericum oblongifolium* Choisy	Kingdom : Plantae
2	Local name : Basant	Class :Magnoliopsida-Dicotyledons
	Common name : Pendant St. John's wort	Order : Theales
3	Type of Plant : Herb	Family : Hypericaceae
4	Area of Collection: Cholthara	Genus : *Hypericum*
5	Date of collection: 12/04/23	Species : *oblongifolium*

DESCRIPTION

Morphology: It grows in hilly areas at the elevation of 800-1200 meters above the sea level. (Shady, moist places, and open areas). *Hypericum oblongifolium* is an herbaceous perennial plant with extensive and creeping rhizomes. Stems are branched, erect, reddish in the upper section and grow up to 1 meter high. The stems are woody and jointed from leaf scars. Branches are clustered typically. Leaves are stalkless and opposite, oblong or narrow in shape and 1-2centimeters in length. Leaves are borne on the branches subtend the shortened branchlets. Colour of leaves is yellow and green with scattered translucent dots of glandular tissue. Flowers have five petals and sepals, and are yellow in colour with black dots (Figure 2). At the end of the upperbranches flower appear in broad helicoid cymes in between late spring and early to mid-summer.Sepals have black glandular dots. At the base stamens are united in to three bundles. Pollen grains are ellipsoidal. The lustrous and black seeds are rough with coarse grooves; It is a perennial plant with a horizontal spreading root system.

ANATOMICAL DESCRIPTION

T.S. of Stem:

In the stem epidermis is outer mono–stratified. Cells become smaller and increase thethickness of outer tangential walls through the development of cutin. Chlorenchyma is thin but preserved while the cortex is enriched with reserve parenchyma mixedwith the stanniferous cells. The cortex is bounded by a closed endodermal sheath and stick to t h e pericycle with certain sclerenchymatous elements and the stele consists of phloem and numerous or scattered type. *H. oblongifolium* has a wider medulla with a slightly elliptical profile and is rich in reserve parenchyma.Externally epidermis is mono-stratified and contains more or less rounded cells. The cortical parenchyma is thin with numerous lacunae which are numerous below the two smallwings. The xylem is robust and rings porous.

T.S of Root (Figure 9)

The T.S of Root show the circular or wavy outline. Single layered epidermis with elliptical cells. Cortical cells are parenchymatous or undifferentiated and endodermis is also undifferentiated. Secondary phloem is narrow and primary phloem is broad. Pith is composed of thin walled anisodiametric, parenchymatous cells without intercellular spaces.
T.S of Root shows secondary xylem. And broad view of root section shows parenchymatous pithdisintegrated towards the centre.
It also shows three types of rays (Uniseriate, biseriate, multiseriate).

T.S of Ovary (Figure 10.)

Ovary is 4-7 × 3-5.5mm. Ovoid pyramidal to broadly ovoid.

Phytochemical Analysis:

Qualitative test for plants (Table 14):

Carbohydrates test for *Hypericum oblongifolium* choisy (Figure 11.)

Fehling`s test:

Take 2ml of plant extract solution in a dry test tube, add 2ml of Fehling solution A and Fehling solution B and heated in water bath for 10 minutes. The formation of red precipitate confirms thepresence of carbohydrates (Yadav, et al., 2011).

Protein test for *Hypericum oblongifolium* choisy (Figure 12.)

Biuret test:

Take a clean and dry test tube and add 2ml of plant extract solution in it, add 2ml of sodium hydroxide in same test tube. Add 5-6 drops of copper sulphate. Formation of bluish violet colourconfirms the presence of protein (Pant, et al., 2017).

Flavonoids test for *Hypericum oblongifolium* choisy (Figure 13.)

Alkaline reagent test:

Take a dry and clean test tube add 2ml of plant extract solution in same test tube and add 2-3 drops of sodium hydroxide were added to 2ml of plant extract solution, dark yellow colour appeared but it gradually become colourless by adding few drops of dilute HCL, it indicates flavonoids were present (Pant, et al., 2017).

Terpenoids test for *Hypericum oblongifolium* choisy (Figure 14.)

Salkowski test:

Take a clean and dry test tube and add 2ml of plant extract solution and mixed with 1.5ml chloroform and 1ml of concentrated sulphuric acid was carefully add to form a layer. Formationof reddish-brown colour confirms the presence of terpenoids (Pant, et al., 2017).

Table 9: Results of Qualitative Analysis

Sr. No.	Compounds	Present
	Carbohydrates	+
	Protein	+
	Flavonoids	+
	Terpenoids	+

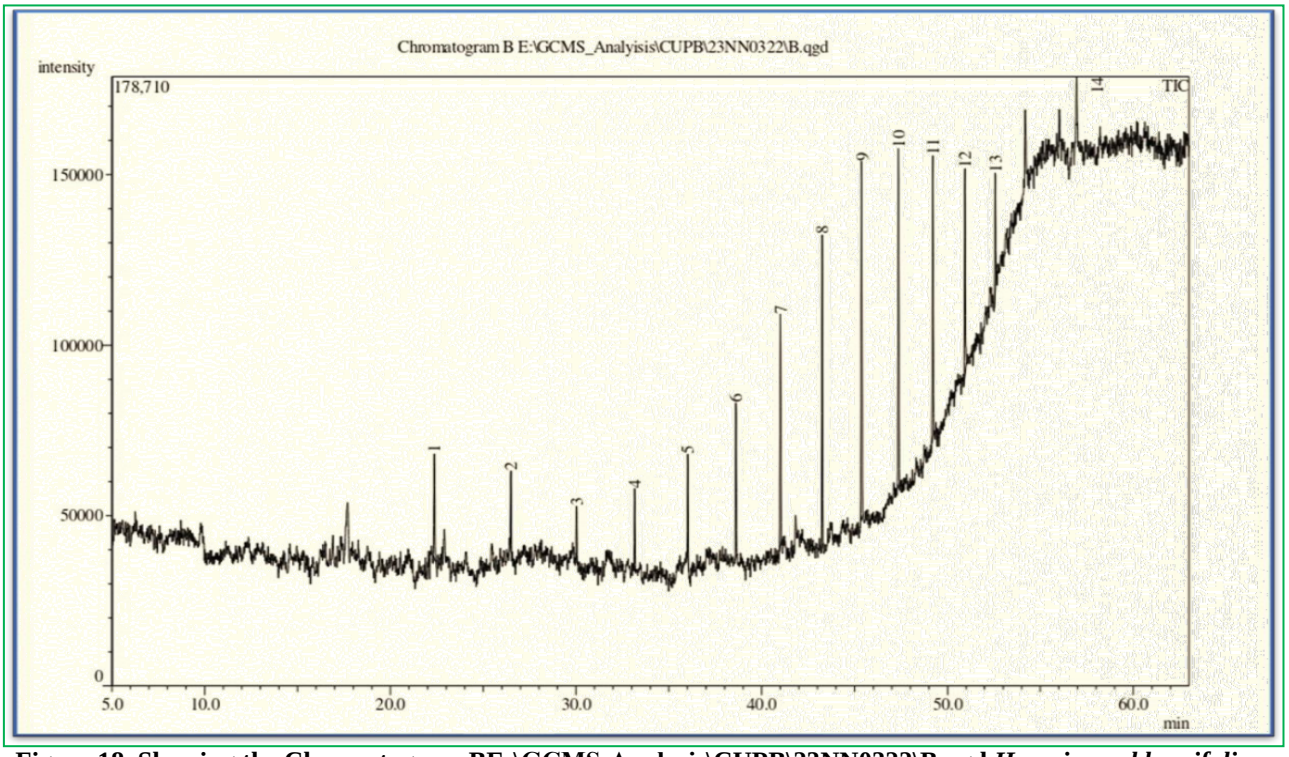


Figure 18. Showing the Chromatogram BE:\GCMS_Analysis\CUPB\23NN0322\B.qgd *Hypericumoblongifolium* Choisy.

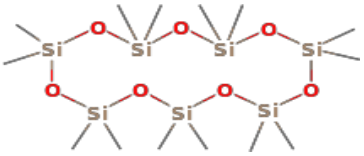
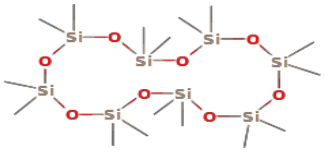
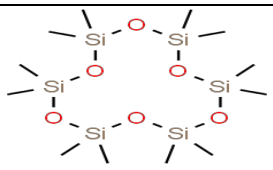
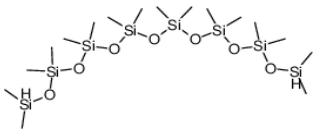
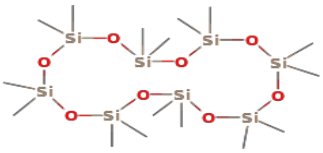
Table 10. Molecular formula& weight of compounds of *Hypericum oblongifolium.*

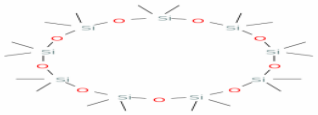
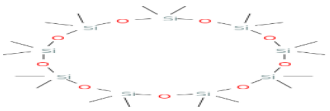
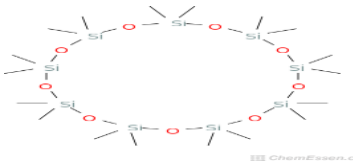
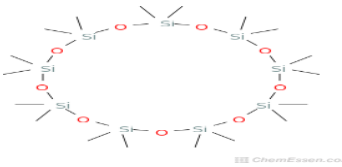
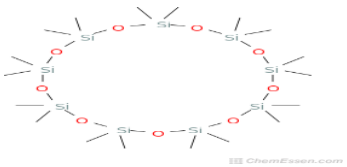
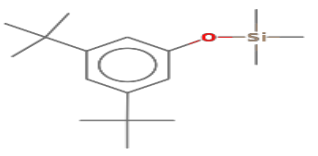
Sr. No.	RT (min)	Name of Compounds	MolecularFormula	Molecular Weight	Area%
1.	22.369	ycloheptasiloxane,tetradecamethyl-	C14H42O7Si7	519.07g/mol	5.31
2.	26.491	Cyclooctasiloxane,hexadecamethyl-	C6H48O8Si8	593.23g/mol	2.95
3.	30.025	clohexasiloxane,dodecamethyl-	C12H36O6Si6	444.192g/mol	1.74
4.	33.158	Octasiloxane, 1,1,3,3,5,5,7,7,9,9,11,1	C16H50O7Si8	579.248 g/mol	2.85
5.	36.017	Cyclooctasiloxane,hexadecamethyl-	C6H48O8Si8	593.23g/mol	3.81
6.	38.610	yclononasiloxane,octadecamethyl-	C18H54O9Si9	66.74g/mol	5.83

7.	41.007	ycloнonasiloxane,octadecamethyl-	$C_{18}H_{54}O_9Si_9$	66.74g/mol	9.01
8.	43.258	ycloнonasiloxane,octadecamethyl-	$C_{18}H_{54}O_9Si_9$	66.74g/mol	12.14
9.	45.377	ycloнonasiloxane,octadecamethyl-	$C_{18}H_{54}O_9Si_9$	66.74g/mol	14.35
10.	47.358	ycloнonasiloxane,octadecamethyl-	$C_{18}H_{54}O_9Si_9$	66.74g/mol	13.67
11.	49.208	ycloнonasiloxane,octadecamethyl-	$C_{18}H_{54}O_9Si_9$	66.74g/mol	11.84
12.	50.941	ycloнonasiloxane,octadecamethyl-	$C_{18}H_{54}O_9Si_9$	66.74g/mol	9.23
13.	52.570	ycloнonasiloxane,octadecamethyl-	$C_{18}H_{54}O_9Si_9$	66.74g/mol	5.30
14.	56.948	henol, 2,4-bis(1,1-dimethylethyl)-, p	$C_{18}H_{54}O_9Si_9$	278.5g/mol	1.98

According to figure 18 and table 10 in the plant *Hypericum oblongifolium* total 14 elements are present. Out of sixteen elements Compound name Cyclononasiloxane octadecamethyl with molecular formula ($C_{18}H_{54}O_9Si_9$), molecular weight (667.4g/mol), RT (min) 47.357 have maximum Area% 14.35 And Cyclohexasiloxane, dodecamethyl with ($C_{12}H_{36}O_6Si_6$), molecular weight (444.92g/mol), RT(min) 30.025 have minimum Area% 1.74.

Table 11. Compound structure and uses of phytochemicals of *Hypericum oblongifolium*

Sr.No.	Name of Compounds	Structure of Compound	Uses of Compounds
1.	ycloheptasiloxane Tetradecamethyl-		This compound is used intextile, leathers and fibersas a softening and brighteningagents. These chemicalcompounds have antifungal properties (Moustafa, et al., 2013).
2.	Cyclooctasiloxane, hexadecamethyl-		It is used as biologicalresistance and it have antifungal properties. It is useful for the detection of post-harvest fungi in grains (Barkat, etal., 2017)
3.	Cyclohexasiloxane, dodecamethyl		This compound is used for skin and hair care, antifungal, antibacterialand deodorants (Mebude,& Adeniyi., 2017).
4.	Octasiloxane,1,1,3,3,5,5,7,7, 9,9,11,1-		It is used asantimicrobial.
5.	Cyclooctasiloxane, hexadecamethyl-		It is used as biologicalresistance and it have antifungal properties. It is useful for the detection of post-harvest fungi in grains (Barkat, et al., 2017)

6.	Cyclononasiloxane, octadecamethyl-		This compound has a good antifungal property(Syed, et al., 2022)
7.	Cyclononasiloxane, octadecamethyl-		This compound has a good antifungal property(Syed, et al., 2022)
8.	Cyclononasiloxane, octadecamethyl-		This compound has a good antifungal property(Syed, et al., 2022)
9.	Cyclononasiloxane, octadecamethyl-		This compound has a good antifungal property(Syed, et al., 2022)
10.	Cyclononasiloxane, octadecamethyl-		This compound has a good antifungal property(Syed, et al., 2022)
11.	Cyclononasiloxane, octadecamethyl-		This compound has a good antifungal property(Syed, et al., 2022)
12.	Cyclononasiloxane, octadecamethyl-		This compound has a good antifungal property(Syed, et al., 2022)
13.	Cyclononasiloxane, octadecamethyl-		This compound has a good antifungal property(Syed, et al., 2022)
14.	Phenol,2,4-bis (1,1-dimethylethyl)-p		It is reported for antibacterial activity (Yogeswari, et al., 2012)

In this table we will study about the structure of compounds and their uses. The name of first compound is Cycloheptasiloxane Tetradecamethyl- and it is used in textile, fibres and leathers asa softening agents, these compound also have antifungal properties, the name of the second compound is, Cyclooctasiloxane, hexadecamethyl- and it is used as biological resistance and it is useful for the detection of post-harvest fungi in grains, third compound name is Cyclohexasiloxane, dodecamethyl- and it is used for hair and skin care , fourth compound is Octasiloxane 1,1,3,3,5,,5,7,7,9,9,11,1, used as antimicrobial, the name of fifth compound is Cyclooctasiloxane, hexadecamethyl- it is used as biological resistance and it have antifungal properties. From compounds six to thirteen the name of compounds and their uses area same as mention in table and the name of the last compound is Phenol,2,4-bis (1,1-dimethyl ethyl-), -p and it is reported for antibacterial activities.

Antifungal Activity of *Hypericum oblongifolium* Choisy (Figure 16):

At a concentration of 100%, methanolic leaf extract recorded a maximum of 24 mm inhibition for *Cladosporium*

cladosprioides (Fresenius) de Vries. For ethanol extract it was 22 mm and aqueous extras was a minimum of 07 mm. The minimum inhibition by the extract was recorded at 2 mm for *Cladosporium cladosprioides* (Fresenius) de Vries at 25% aqueous extract (Table 1).

Among the extracts assayed, the methanolic extract showed maximum activity (24 mm) at 100% concentration; while minimum activity was observed with aqueous extract a t 25% concentration against the fungi *Cladosporium cladosprioides* (Fresenius) de Vries. (7 mm) under investigation. Results showed that radial growth in all the test organisms was impaired by the addition of the extracts in the culture medium used. The test organisms differed in their reaction to the different extracts but on the whole, growth inhibition increased with the concentration of each extract.

Table 12 Activity of *Hypericum oblongifolium* Choisy extracts against plant pathogenic fungi *Cladosporium cladosprioides* (Fresenius) de Vries.

Sr.No.	Solvent	*Cladosporium cladosprioides* (Fresenius) de Vries.			
		Inhibition* (mm) by extract			
		25 %	50 %	75 %	100 %
1	**Methanol**	**13**	**17**	**21**	**24**
2	**Ethanol**	**12**	**16**	**20**	**22**
2	**Chloroform**	**08**	**11**	**14**	**19**
4	**Aqueous**	**07**	**10**	**16**	**18**

Note: * - values given are mean values of triplicates; Aqueous- Distilled water

Table 13 Minimum Inhibitory concentration (MIC) of *Hypericum oblongifolium* Choisy against *Cladosporium cladosprioides* (Fresenius) de Vries.

Sr. No.	MIC against(mg/ml)	Water extract	Chloroform extract	Ethanolic extract	Methanolic extract
1.	***Cladosporium cladosprioides* (Fresenius) de Vries.**	50	45	40	30

SUMMARY AND CONCLUSION

A total of 2 Wild Ornamental Plants belonging to 2 families were reported in present study. The Wild Ornamental plants belong to the families Convolvulaceae and Hypericaceae. Plant specimens were surveyed and collected from the Sarkaghat region, characterized through their anatomical and morphological characters, and for final authentification plant specimenswere sent to HFRI (Himalayan Forest Research Institute) Shimla. Qualitative and quantitative analyses of the phytochemicals of all plants have been performed. In the plant *Ipomea cairica* total 16 elements were present such as Cyclohexasiloxane, dodecamethyl-, Cycloheptasiloxane, tetradecamethyl-, Cyclooctasiloxane, hexadecamethyl-, Cyclohexasiloxane, dodecamethyl-, Cyclodecasiloxane, eicosamethyl-, Cyclooctasiloxane, hexadecamethyl-, Cyclononasiloxane, Octadecamethyl-, Cyclononasiloxane, octadecamethyl-, Cyclononasiloxane, octadecamethyl-, Cyclononasiloxane, octadecamethyl-, Cyclononasiloxane, octadecamethyl-, Cyclononasiloxane, Octadecamethyl-,Cyclononasiloxane, Octadecamethyl-1, Cyclodecasiloxane, octadecamethyl-, Phenol,2,4-bis(1,1-dimethylethyl)-p. In the plant *Hypericum oblongifolium*, total 14 elements were present such as Cycloheptasiloxane, tetradecamethyl- Cyclooctasiloxane, hexadecamethyl, Cyclohexasiloxane, dodecamethyl, Octasiloxane,1,1,3,3,5,5,7,7,9,9,11,1, Cyclooctasiloxane, hexadecamethyl, Cyclononasiloxane, octadecemthyl, Cyclononasil oxane,octadecamethyl-, Cyclononasiloxane, octadecamethyl, Cyclononasiloxane, octadecamethyl-Cyclononasiloxane, octadecamethyl, Cyclononasiloxane, octadecamethyl, C yclononasiloxane, octa decamethyl-, Cyclononasiloxane, octadecamethyl-, Phenol,2,4-bis(1,1-dimethylethyl)-,p. The antifungal propertied of these two plants were assayed against *Cladosporium cladosprioides* (Fresenius) de Vries separately. Both the plants have good antifungal potential against *Cladosporium cladosprioides* (Fresenius) de Vries. Methanol extract of *Hypericum oblongifolium* shows maximum antifungal property and i.e 24 mm followed by methanol extract of *Ipomoea cairica* and ethanol extract of *Hypericum oblongifolium* i.e. 22 mm. The minimum antifungal property was shown by aqueous extract of *Ipomoea cairica i.e.* 6 mm. In future there are a vide scope in pharmacognosy, as therapeutic agents, in the field of plant pathology and in agriculture.

ACKNOWLEDGMENTS

The author is thankful to the Division of Microbiology, School of Pharmaceutical and Health Sciences, and Department

of Biosciences, School of Basic and Applied Sciences, Career Point University, Hamirpur, Himachal Pradesh for providing essential facilities.

CONFLICT OF INTERESTS

The authors claim that there is no conflict of interest. The funder had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

ETHICAL APPROVAL

Approved from all the ethical point of view.

DATA AVAILABILITY STATEMENT

Data will be made available on request.

ADDITIONAL INFORMATION

No additional information is available for this paper.

Figure 1 Flower of *Ipomea cairica* (L.) Sweet

Figure 2 Flower of *Hypericum oblongifolium* Choisy

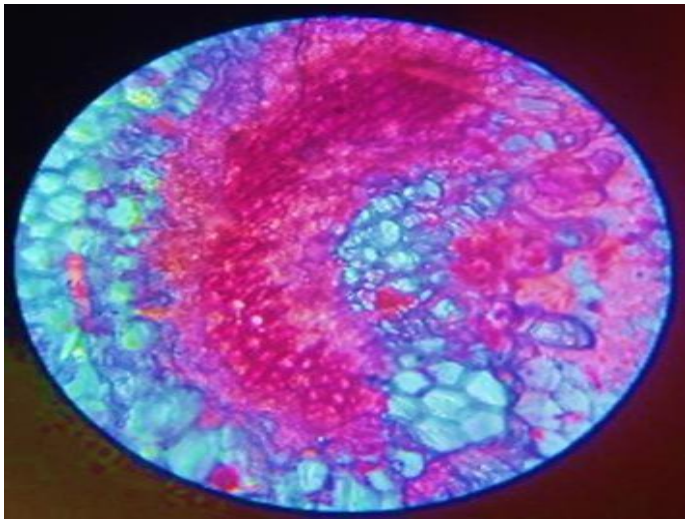


Figure 3. T.S of Stem of *Ipomea cairica* (L.)Sweet

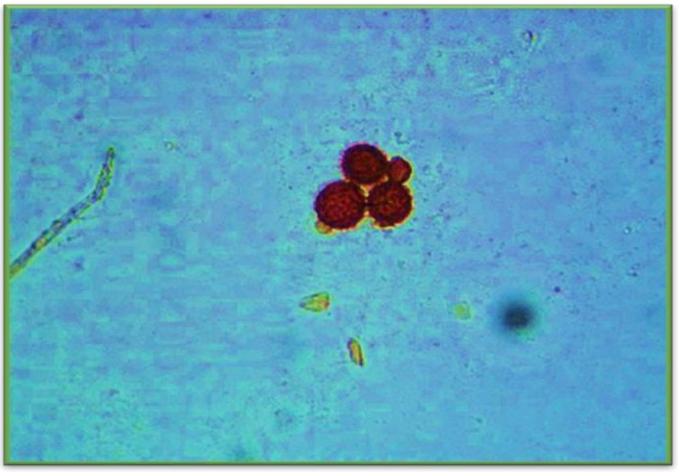


Figure 4. Pollen Grains of *Ipomea cairica* (L.)Sweet

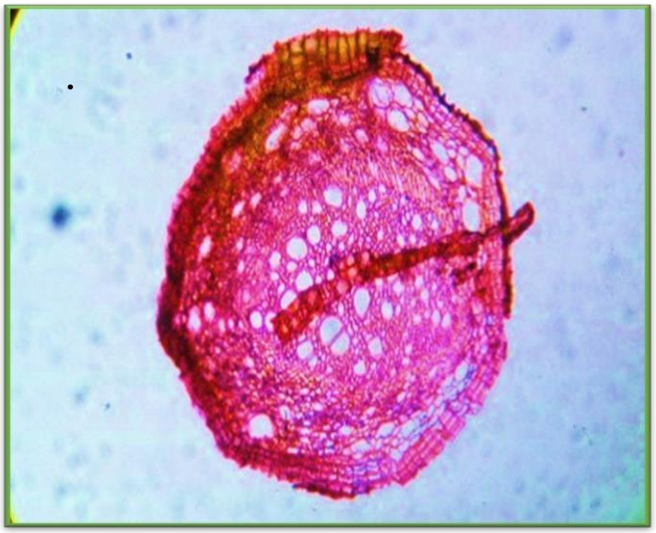


Figure 9. T.S of Root of *Hypericumoblongifolium* Choisy

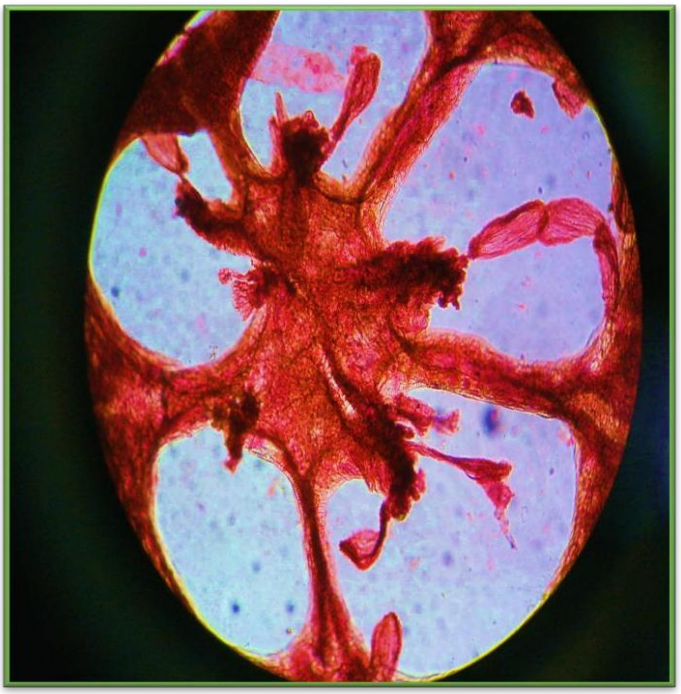


Figure 10. T. S of Ovary of *Hypericumoblongifolium* Choisy

Test for *Ipomea cairica (L.) Sweet*

Figure 5. Test for Carbohydrate (Red Precipitate are show the presence of carbohydrates).

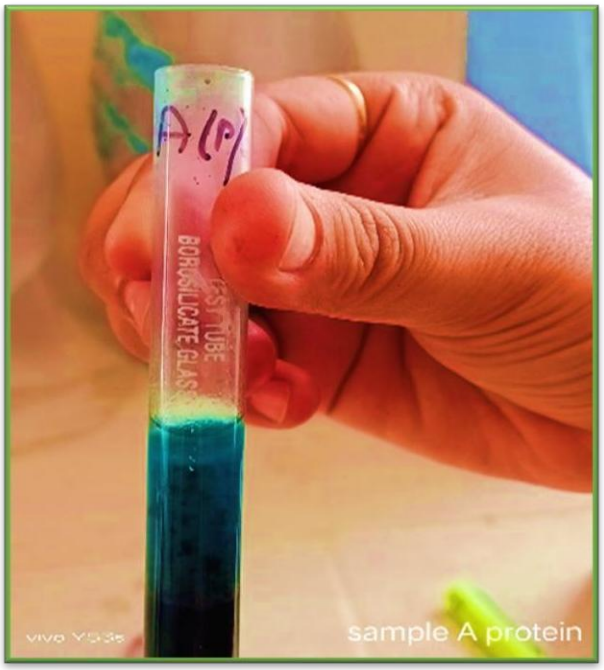


Figure 6. Test for Protein (Bluish violet colourshow the presence of protein).

Figure 7. Test for Flavonoids (Dark yellowcolour appear gradually become colorless).

Figure 8. Test for Terpenoids (Reddish browncolor are absent).

Test for *Hypericum oblongifolium* Choisy

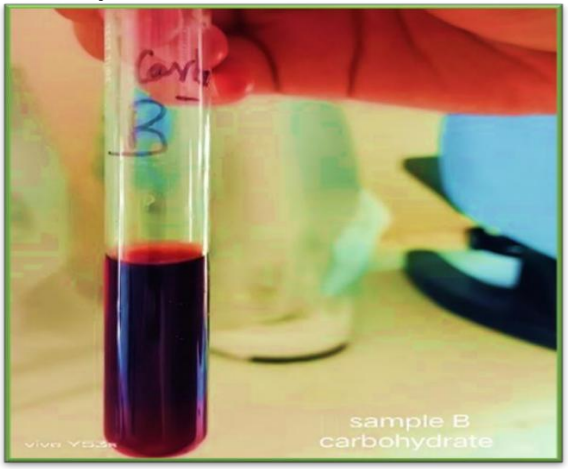


Figure 11. Test for *Hypericum oblongifolium* (Red colour show the presence of carbohydrates).

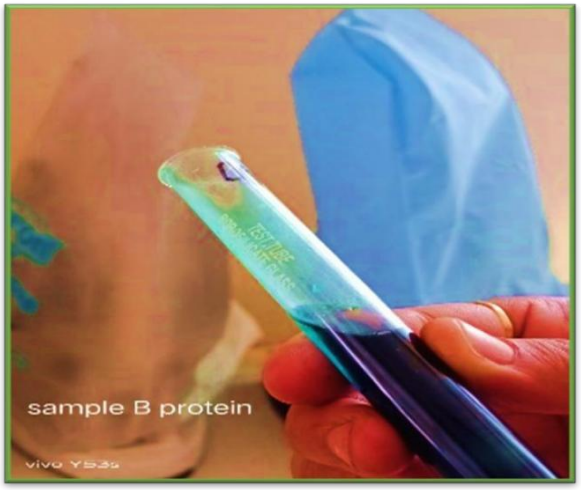


Figure 12. Test for *Hypericum oblongifolium*(Bluish violet colour show the presence ofprotein).

Figure 13. Test for *Hypericum oblongifolium* (dark yellow to colourless).

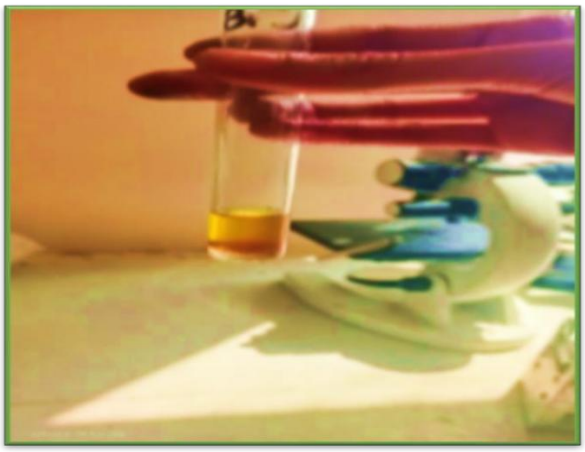


Figure 14.Test for *Hypericum oblongifolium(Reddish* brown colour are absent).

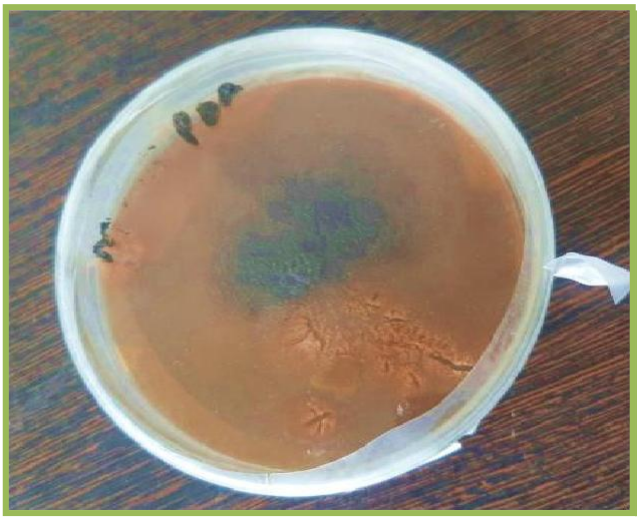


Figure 15. Antifungal activity of *Ipomoea cairica* (L.) Sweet against *Cladosporium cladosprioides* (Fresenius) de Vries

Figure 16. Antifungal activity of *Hypericum oblongifolium* Choisy against *Cladosporium cladosprioides* (Fresenius) de Vries

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