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Preliminary phytochemical, UV-VIS and FT-IR spectral analysis of Hibiscus micranthus L

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ABSTRACT

The present study was carried out to investigate the active substances present in the Ethanol, Acetone, Chloroform, Petroleum ether extract of Hibiscus micranthus by using the analysis of Phytochemical, UV-VIS and FT-IR studies. Phytochemical screening of successive extracts showed a positive reaction for Alkaloid, Phenols, Glycoside, Saponin, Terpenoids, Tannin, Flavanoids, Glycoside, Anthraquinones. The UV profile showed different peak ranging from 200-1100 nm with different absorption respectively. The FT-IR spectrum confirmed the presence of Alcohol, Carboxylic acid, Alkynes, Aromatic ring, Aliphatic, Amide, Carbolic acid salts, Sulfonic chlorides, Hydrocarbons, Organophosphorus compounds which shows major peak at 3419.61, 2976.17, 2926.23, 2902.86, 2127.79, 1925.03, 1624.85, 1642.85, 1452.18,1406.40, 1394.41, 1383.80, 1230.42, 1077.03, 1252.22, 1048.99, 880.27, 671.52, 436.58 respectively.

Keywords: *Hibiscus micranthus, Phytochemical compounds, UV-VIS, FT-IR*

1. INTRODUCTION

Hibiscus micranthus L: *Hibiscus* is a genus in the family of Malvaceae encompasses more than 300 species. *H. micranthus* (Malvaceae) is a shrub up to 3 m, stem erect, branched, usually with stiff, slender and stellately hairy plant. The roots are also used traditionally chewed as a cure for a cough in India. Used to cure venereal diseases in Sudan, applied as dressings on wounds and sores of humans and domestic animals and are also taken to cure bronchitis and pneumonia in Kenya and Tanzania. In Ethiopia, the leaves of this plant provide medicines traditionally for treating skin burning (dermatological infections) and skeleton muscular disorders. The leaf and flower of the plant are also used for wound and dermatological purposes by chewed and creamed with cotton in Amhara region, in and around Tara Gedam, South Gonder Zone. *Hibiscus micranthus* also use for burn-in Negelle-Borona, Ethiopia. (Begashaw *et al.*, 2017). Human population in countries around the world has been using plants for thousands of years for treating various ailments of humans and animals. *Hibiscus micranthus* is a shrubby, erect, branched, slender and stellately hairy plant. (Ashok Kumar *et al.*, 2010)

2. MATERIALS AND METHODS

2.1 Collection of plant materials

H. micranthus plant was collected from Inamkulathur in Trichy district, Tamil Nadu, India, plant material was identified with help of Rapinate Herbarium, Joseph College (Autonomous), Trichy.

The plant was cleaned properly, washed and dried under shade at room temperature. The dried leaves were grinding with help of mortal and pestle. The power stored in an airtight container separately for the uses.

2.2 Preparation of extracts

50gms of the powder of *Hibiscus micranthus* were transferred into four different conical flask (250ml). The conical flask containing 100ml of four different solvent viz. Ethanol, Acetone, Chloroform, Petroleum ether. The conical flask containing *H. micranthus* powder and solvent was shacked it well hand. The 72 hours by free hand. The sample was kept incubation in dark for 72 hours. After incubation, the solution was filtered through whatman No.1 filter paper and the filtrate was collected (crude extract). After that extract was taken in a beaker and kept heated at 30to 40^{o}C till all. The solvent got evaporated. The dried extract was stored in a refrigerator at 20± 40^{o}C before use.

2.3 Identification of Phytochemical

Plant extract contain various type of some compound having different polarities their separation still remains a big challenge for the process of identifications and characterization of bioactive compounds. The identification tests for the various phytochemical

present in the species were carried out to test their presence. The various phytochemical that has been studied here includes Alkaloid, Phenols, Sapoing, Steroid, Terpenoid, Tannin, Flavanoids, Glycoside, Anthraquinones. (Ashok Kumar *et al*., 2010)

2.4 UV-VIS Spectroscopic Analysis
UV-VIS spectral analysis has been done by using a 250 spectrophotometer with microprocessor double beam. The wavelength range is between 200-300 nm. (Indira Priya Darsini and Shamshad, 2015). The extracts were scanned in the wavelength ranging from 200-1100 nm using spectrophotometer (Shimadzu, UV-1800) and the characteristic peaks were detected (Singh *et al* ., 2015).

2.5 Fourier Transform Infrared Spectrophotometer (FT-IR) Analysis
Fourier Transform Infrared spectrophotometer (FT-IR) is the most power full method for identifying the type of chemical bond (fictional group) present in compounds. The wavelength of light absorbed is characteristic of the chemical pound as can be seen in the annotated spectrum. The chemical bonds in a molecule can be determined by interpreting the infrared absorption spectrum. Dried powder of *H. micranthus* leaves was used for analysis. 20 mg of the derived powder was encapsulated in 100 mg of the pellet in order to prepare translucent sample discs. The powder leaves sample was loaded in FT-IR spectrum cope with a scan range 400 to 4000 cm-1 with a resolution of 1 cm-1. The aqueous extracts of *A. indicum* were mixed with KBr salt, using a mortar and pestle, and compressed into a thin pellet and infrared spectra and peak values were recorded on a Perkin Elmer FT-IR Spectrometer, between 4000–400 cm-1. (Ranjana Singh *et al.*, 2015).

3. RESULTS AND DISCUSSION
Malvaceae family includes many medicinal plants *H. micranthus* leaves a preliminary quantitative phytochemical screening of the extract was carried out to assess the bioactive components. Qualitative screening of extracts was performed initially with each chemical reagents to detect the phytoconstituents present in each extract. The extract in each showed the presence of Alkaloid, Phenols, Saponin, Terpenoid, Tannin, Flavanoids, Glycoside compounds. Anthraquinones is absent [Table 1].

The results indicated that *Hibiscus sabdariffa* calyces contained Alkaloids, Anthocyanins, Flavonoids, Polyphenol, Saponins, and Tanins which are the main phytochemical groups. (Obouayeba *et al.*, 2015) and (Ashok kumar *et al*., 2010). The preliminary phytochemcial investigation shows the presence of Alkaloids, Saponins, Carbohydrates, Steroids, Glycosides, amino acids, Flavonoids, Phenolic compounds and Tannins (Saraswathi *et al*., 2011). The water extract and other extracting reagents such as Ethanol, Ethanol, Ethyl acetate and Petroleum ether on *Hibiscus sabdariffa* were subjected to preliminary phytochemical screening to identify the chemical constituents (Okereke *et al.*, 2015). The presence of flavonoids in *Guiera senegalensis* leaves extract documented in this study supports the findings (Alshafei *et al.*, 2015). The filtrate was concentrated using a rotary evaporator at low temperature (40-45º C) and pressure. The presence or absence of the primary and secondary phytoconstituents was detected by usual prescribed method (Dhanapal *et al.*, 2014).

3.1 UV-VIS & FTIR Spectrophotometric Analysis
The UV-VIS profile of plant extract was taken at the 200 to 1100 nm wavelength due to the sharpness of the peaks and proper baseline. The profile showed the peaks at 211.90 with the absorption 4.000 respectively [**Table 2 & Fig. 1]**. Its tail desorbs to broader wavelength while H-Eth desorbs from 400 nm to 420 nm and absorbs to the peak of 460 nm and towards the second peak at 550 nm and desorbs at the further wavelength.

The FTIR spectrum was used to identify the functional group of the active components based on the peak value in the region of infrared radiation. The results of FT-IR peak values and functional groups were represented. When the leaf extract was passed into the FT-IR, the functional groups of the components were separated based on its peaks ratio [**Table 3 & Fig 2]**. FT-IR spectra of the H-Eth starting from the peaks at 1050 cm-1 and 1092 cm-1 are attributed to the CO stretching vibrations which represent the esters group. The peak at 1423 cm-1 corresponds to the C-C stretching vibration in the aromatic group.

4. CONCLUSION
The present investigation of phytochemical screening, UV-VIS, and FT-IR studies is use full to the phytocompound data quantification and separating of phytochemical compounds.

Conflict of interest
There is no conflict of interest in the present study.

Table 1: Phytochemical analysis of different leaves extracts of *H. micranthus* L.

Phytoconstituents	Ethanol	Acetone	Chloroform	Pet. ether
Alkaloid	+	-	-	-
Phenols	+	+	-	+
Saponin	-	-	-	+
Steroid	+	-	+	+
Terpenoid	+	-	-	-
Tannin	-	+	-	-
Flavanoids	-	+	-	-
Glycoside	-	+	+	-
Anthraquinones	-	-	-	-

Present (+), Absent (-)

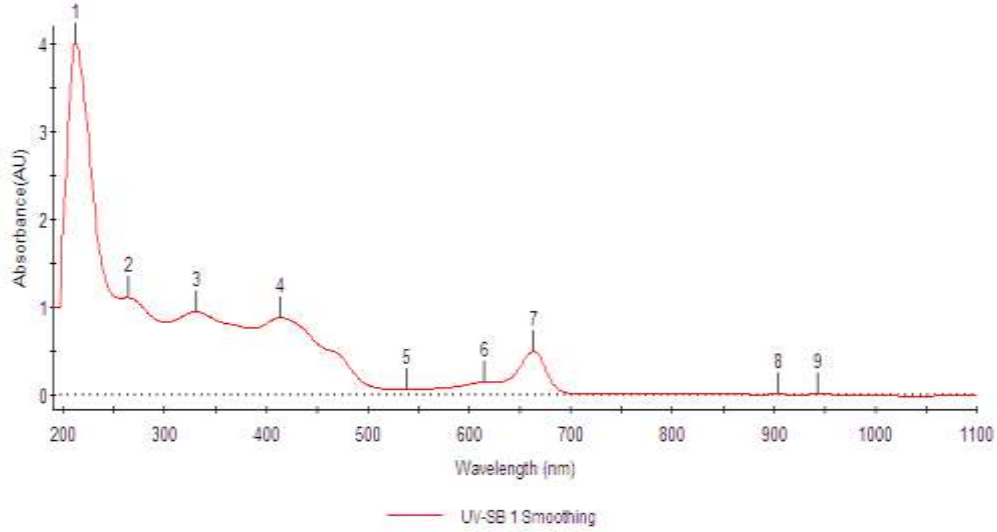

Fig. 1: UV-VIS Analysis

Table 2: UV-VIS spectrum of Ethanolic Leaves of an extract of *H .micranthus*

S. No.	Wave length	Peak value (nm)
1.	200-300	4.000
2.	263.75	1.114
3.	330.65	0.956
4.	413.75	0.890
5.	537.90	0.081
6.	614.90	0.153
7.	663.25	0.505
8.	903.60	0.018
9.	943.45	0.020

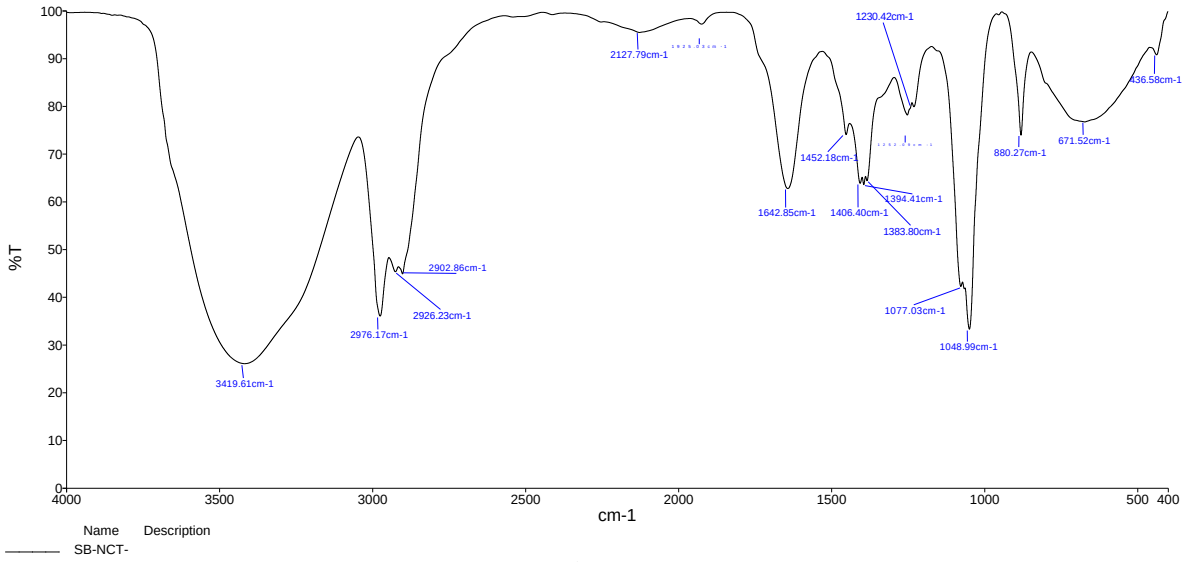

Fig. 2: FTIR

Table 3: FTIR spectrum of Ethanolic Leaves extract of of *H. micranthus*

S. No.	Name of the bond	Functional group	Stretching frequency (CM^{-1})	Intensity
1.	Primary and secondary and amides (stretch)OH	Amides	3419.61	Medium
2.	CH_3 and CH_2 aliphatic compounds	Anti sym and stretching	2976.17	Medium, strong
3.	CH_3 and CH_2 aliphatic compounds	Anti sym and stretching	2926.23	Medium, strong
4.	CH_3 and CH_2 aliphatic compounds	Anti sym and stretching	2902.86	Medium, strong
5.	C=C alkynes (monosubst)	stretch	2127.79	Weak, Medium
6.	C=C=C allenes	Anti sym stretching	1925.03	Strong
7.	NH_2 primary amines	Deformation	1642.85	Medium, Strong
8.	CH_3 aliphatic compounds	Anti sym deformation	1452.85	Very, Strong
9.	C-N primary amides	Stretch (Amide III band)	1405.40	Medium
10.	Coo^- group in carboxylic acid salts	Sym stretch broad band	1394.41	Strong

11.	Coo^- group in carboxylic acid salts	Sym stretch broad band	1383.80	Strong
12.	1 buty in hydrocarbons	Skeletal vibration ; second band near $1200cm^-$	1252.09	Medium
13.	C-C-N amines	bending	1230.42	strong
14.	SO_3 sultomic acid	Sym stretch	1077.03	Strong
15.	P-O-C organophorus compounds	Antisym stretch	1048.99	Very strong
16.	1,2,4 trisubst benzenes	CH out of plane deformation (two bands)	880.27	Very strong
17.	C-OH alcohols	Bending	671.52	Strong
18.	CI-C=O acid chlorides	Plane deformation	436.58	Strong

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