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Phytochemical study UV, and FT-IR and gas chromatography mass spectrometry analysis of *Tabebuia rosea* (Family: Bignoniacae)

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Abstract
Objective: In this study ethanol extract of plant of Tabebuiarosea (Family: Bignoniacae) was screened for the presence of phytochemical components by GC-MS analysis. In addition total phenolics and flavanoids were also estimated.
Methods: The wavelength extending from 200-800 nm using (Shimadzu UVd-1800 PC, Japan) and the individual peaks were noticed. FTIR analysis was achieved using Perkin Elmer Spectrophotometer system, GC-MS analysis of plant extract was performed using a Perkin-Elmer GC Clarus 500 system and Interpretation on mass spectrum GC-MS was conducted using the database of National Institute Standard and Technology (NIST).
Result: study of qualitatively.the UV spectrum is 750.3 nm corresponding to phenolic compounds. The FT-IR spectrum of plantsextract indicates the presence of functional groups with corresponding absorbance frequencies (cm^{-1}.) *viz* Alcohols, Phenols (3367.74, O–H Stretch, H–Bonded), the GCMS chemical compounds are identified from the plant extract. is the major component available at RT 15.534 and 192 % peak area. Other most prevailing phytocomponds are Phenol, 2,4-Bis(1,1-Dimethylethyl), Hexadecanoic Acid, Methyl Ester, Tetradecanoic Acid, Ethyl EsterOctadecanoic Acid Stearic Acid N-Octade, Hexadecanoic Acid, Butyl Ester PalmiticAci, Oleic Acid, Butyl Ester (Z)-9-Octadecenoic, N-Propyl 9,12,15-Octadecatrienoate N-Propy, Octadecanoic Acid, Butyl Ester etc., which are equivalent to gallic acid, rutin, kaempforol,andquercetin, respectively.
Conclusion: UV, Present phenolic compound and O-H functional group. The presence of numerous bioactive compounds validates the use of Tabebuiarosea for various weaknesses by traditional practitioners.

Keywords: *Tabebuiarosea* UV, FTIR-GC-MS, phytochemical screening, ethanol extract

Introduction
Tabebuia roseaplant belongs to Bignoniaceae family and commonly known as Pink trumpet tree grown as an ornamental tree for its pink or purple flowers with different shades of colours.In the traditional days, aerial parts of the tree were used for the treatment of malaria and uterine cancer. A decoction of the cortex of the tree utilized for anaemia and constipation. The flowers, leaves and roots also were used to reduce fever, pain, cause sweating, tonsil inflammation and many other disorders. A lapachol is a botanical product that has been isolated from T. rosea considered to be an anticancer drug and also recommended for anti-malarial and anti-panasomal effects [1, 2] Thus a search for anticancer compounds from medicinal plants is on a rise. Tabebuia rosea (Bertol.) DC. Commonly known as “Pink Trumpet Tree” can grow up to 15 meter and well known for its beautiful flowers. The timber is widely used for general construction and carpentry in many European countries. The fruits are green, long and bean pod -like with a length of 20-40 cm (8-16 inch). The fruits turn dark brown when ripe and contain flat, heart-shaped seeds with tiny wings. The graceful beauty is a treat for the eyes, but the tree has medical uses as well. Tea made from the leaves and bark is known to have a fever-reducing effect [3] Taheebo is reported to be an astringent, anti-inflammatory, antibacterial, antifungal, diuretic, and laxative [4-8]
UV-VIS spectrophotometer at 760 nm using distill water as a blank. Gallic acid (0-100 mg/L) dissolved in distill water was used to prepare standard curve concentration and values were expressed as microgram of gallic acid equivalents (mg Gallic acid/g extract). Three replicates were taken for each concentration and the average optical absorbance was plotted against the respective concentration to compute a regression curve which followed the Beer’s law.

Plant Material and Extraction Procedure
The leaves of *Tabebuiarosea*was shade dried at room temperature. The dried material was then homogenized to obtain coarse powder and stored in air-tight bottles for further analysis. 10 gm powdered plant material was soaked in 20 ml of methanol overnight and then filtered through a Whatman No. 41 filter paper along with 2 gm Sodium sulphate to remove the sediments and traces of water in the filtrate. Before filtering, the filter paper along with Sodium sulphate was wetted with methanol. The filtrate is then concentrated by bubbling nitrogen gas

into the solution and was concentrated to 1 ml. The extract contains both polar and non-polar phytocomponents. This methanol extract is used for GC-MS analysis.

GC Programme
Column: Elite-5MS (5% Diphenyl / 95% Dimethyl poly siloxane), 30 x 0.25 mm x 0.25 mm df, Equipment: GC Clarus 500 Perkin Elmer, Carrier gas: 1 ml per min, Split: 10:1, Detector: Mass detector Turbo mass goldPerkin Elmer, Software: Turbomass 5.2, Sample injected: 2 ml

Oven Temperature Programme
110° C -2 min hold, Up to 200° C at the rate of 10 ° C/min-No hold, Up to 280 ° C at the rate of 5° C / min-9 min hold, Injector temperature 250° C, Total GC running time 36 min

MS Programme
Library used NIST Version-Year 2005,Inlet line tem1perature 200° C, Source temperature 200 ° C, Electron energy: 70 eV, Mass scan (m/z): 45-450, Solvent Delay: 0-2 min, Total MS running time: 36 min

UV-Visible Spectroscopy
UV-Visible spectroscopy analysis for the samples was performed by diluting one gram of the extracted powder with 10ml of the identical solvent [11-12]. The extracts were scanned in the wavelength extending from 200-800 nm using (Shimadzu UV-1800 PC, Japan) and the individual peaks were noticed.

FT-IR Spectrophotometer
FTIR analysis was achieved using Perkin Elmer Spectrophotometer system, which was used to notice the typical peaks and their functional groups. FT-IR (Fourier Transform Infrared spectrophometry is conceivably the most controlling tools for recognizing the kinds of chemical bonds (functional groups) present in compounds. The wavelength of light absorbed is distinguishing of the chemical bond can be seen in the annotated spectrum. The infrared absorption of spectrum can be inferring using chemical bonds in a molecule can be resolute. The plant constituents of dried powder sample of methanol extract was used for FTIR investigation [13]. One hundred Milligrams of the dried powder extract was condensed in KBr pellet, in order to prepare translucent sample discs.
In FTIR spectroscopy powdered sample of plant specimen as loaded with a scan range from 400 to 4000 cm-1 with a resolution of 4cm-1.

Results and Discussions
Phytochemical screening of *Tabebuia rosea*

Table 1

Phytochemical Constituents	Methanol	Ethanol	Water	Ethyl Acetate
Alkaloids	+	+	+	-
Flavonoid	+	+	+	-
Tannins	+	+	+	-
Phenols	+	+	+	+
Carbohydrate	+	+	+	+
Steriods	+	+	+	+
Saponins	+	-	+	-
Terpenoid	+	+	+	+

In the current investigation stated that the Tabebuia rosea is which contain some of the phytochemical constituents (qualitatively) of flavonoids, alkaloids, terpenoids, triterpenoids, tannins, saponins, protein, glycosides, carbohydrate, reducing sugar and poly phenols were extracted with different solvents of ethanol, petroleum ether and aqueous.
Among the solvents, aqueous was maximum extraxtion of phytochemicals when compared with other solvents. (Table-1)The phytocomponds are Phenol, 2,4-Bis(1,1-Dimethylethyl), Hexadecanoic Acid, Methyl Ester, Tetradecanoic Acid, Ethyl EsterOctadecanoic Acid Stearic Acid N-Octade, Hexadecanoic Acid, Butyl Ester PalmiticAci, Oleic Acid, Butyl Ester (Z)-9-Octadecenoic, N-Propyl 9,12,15-Octadecatrienoate N-Propy, Octadecanoic Acid, Butyl Ester etc.,
The UV-VIS spectral studies of Plant extractextract shows the presence of broad peaks at 215.6, 534.2, 663.2 and 750.3 nm corresponding to phenolic compounds. The result (Figure -1) of UV-VIS spectroscopic analysis confirms the presence of flavonoids in the plant extract.

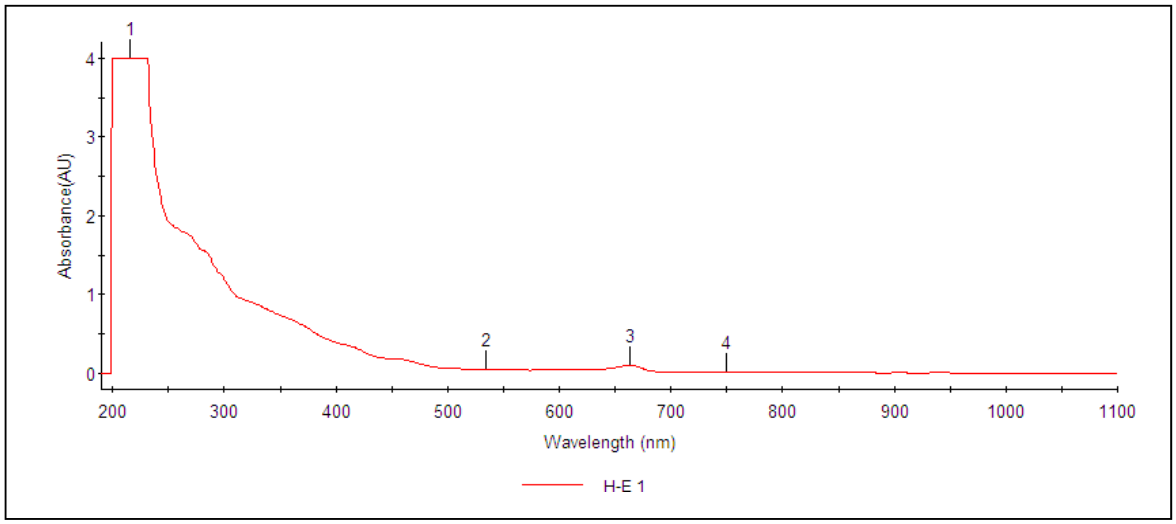

Fig 1: UV-VIS spectroscopic analysis

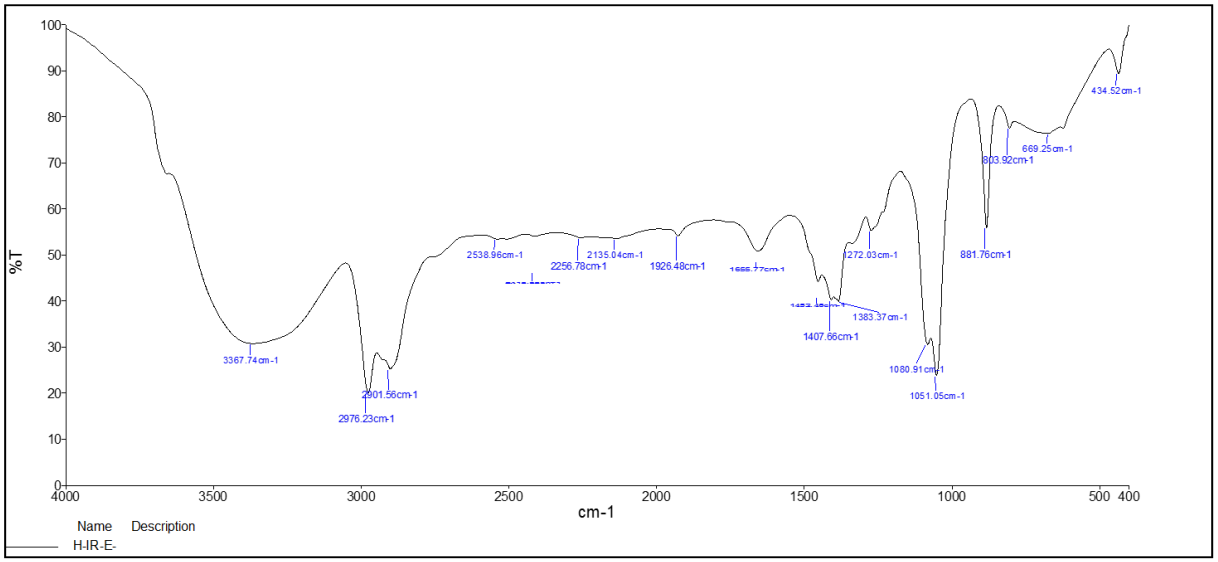

Fig 2: FT-IR spectrum of plantsextract

The obtained FT IR spectrum for the Tabebuia rosea seed oil to identify the functional groups is given below (figure. 2). The peaks obtained for the oil sample is given in the Table 1.The analytical evaluation of the oil was carried out by the comparison of the peaks [13-14], The FT-IR spectrum (Figure -2) of plants extract indicates the presence of functional groups with corresponding absorbance frequencies (cm^{-1}.) *viz* Alcohols, Phenols (3367.74, O–H Stretch, H–Bonded), Alkanes (2901.56, 2976.23, C–H Stretch), Alkenes (1655.77, –C=C– Stretch), Aromatics (1452.46, 1407.66, C–C Stretch (In–Ring), Aliphatic Amines (1080.91, 1051.05, C–N Stretch) and 1˚, 2˚ Amine (669.25, N–H Wag).

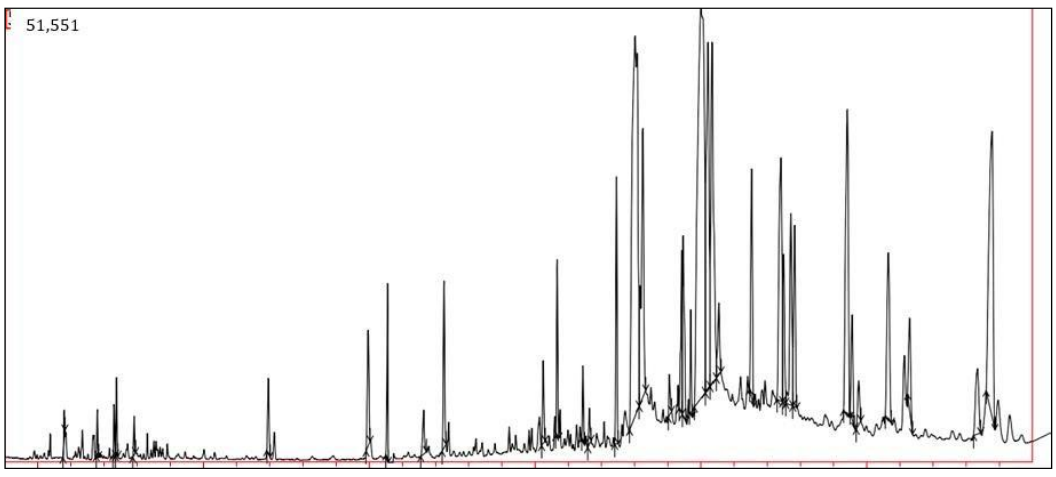

Fig 3: GC-MS Chromatogram of ethanolic extract of the plant of Tabebuia rosea

FTIR analysis reveals the functional groups involved in reduction of silver nitrate to nanosilverfor nanoparticle formation.The FTIR spectrum of the silver nanoparticleshowed bands at 3423, 2918, 2848, 2368, 1593, 1375,1020, 678 cm-1but highly intense broad absorbance peak was observed at 3423 cm-1characteristic of the O-H stretching of phenolic compounds [15]

Interpretation on mass spectrum GC-MS was conducted using the database of National Institute Standard and Technology (NIST) having more than 62,000 patterns. The spectrum of the unknown

Table 2: Phytocomponents identified in the ethanolic extracts of the plant of *Tabebuia rosea* by GCMS

Peak#	R. Time	Molecular weight	Molecular formula	Name
1	5.79	130	$C_8H_{18}O$	1-Hexanol, 2-Ethyl- 2-Ethyl hex
2	6.79	134	$C_{10}H_{14}$	Benzene, 4-Ethyl-1,2-Dimethyl-
3	7.29	134	$C_{10}H_{14}$	Benzene, 1,2,4,5-Tetramethyl-
4	7.37	134	$C_{10}H_{14}$	Benzene, 1,2,4,5-Tetramethyl- Durene
5	7.9	134	$C_{10}H_{14}$	1,3-Cyclopentadiene, 1,2,3,4-Tetramethyl-5-M
6	11.9	210	$C_{15}H_{30}$	1-Pentadecene Pentadecene,1- Pentadec
7	15	240	$C_{12}H_{16}O_5$	3-Furanacetic Acid, 4-Hexyl-2,5-Dihydro-2,5-Di
8	15.5	206	$C_{14}H_{22}O$	Phenol, 2,4-Bis(1,1-Dimethylethyl)
9	16.6	200	$C_{26}H_{48}O_2$	Dodecanoic Acid N-Dodecanoic Acid
10	17.2	266	$C_{19}H_{38}$	1-Nonadecene Nonadec-1-Ene
11	20.2	228	$C_{14}H_{28}O_2$	Tetradecanoic Acid Myristic Acid
12	20.7	266	$C_{19}H_{38}$	1-Nonadecene Nonadec-1-Ene
13	21.4	268	$C_{18}H_{36}O$	2-Pentadecanone, 6,10,14-Trimethyl-
14	21.6	242	$C_{15}H_{30}O_2$	Pentadecanoic Acid 14fa Ai3-
15	22.4	270	$C_{14}H_{28}O_2$	Hexadecanoic Acid, Methyl Ester
16	23	652	$C_{38}H_{68}O_8$	L-(+)-Ascorbic Acid 2,6-Dihexadecanoate
17	23.2	256	$C_{16}H_{32}O_2$	Tetradecanoic Acid, Ethyl Ester
18	24	270	$C_{17}H_{34}O_2$	Heptadecanoic Acid Potassium
19	24.4	294	$C_{19}H_{34}O_2$	Methyl 10-Trans,12-Cis-Octadecadienoate
20	24.5	296	$C_{19}H_{36}O_2$	9-Octadecenoic Acid, Methyl Ester, (E)-
21	24.7	298	$C_{19}H_{38}O_2$	Methyl Stearate Octadecanoic Acid, Methyl
22	25	392	$C_{26}H_{48}O_2$	9,12-Octadecadienoic Acid Lino
23	25.2	284	$C18H_{36}O_2$	Octadecanoic Acid Stearic Acid N-Octade
24	25.3	312	$C_{20}H_{40}O_2$	Hexadecanoic Acid, Butyl Ester Palmitic Aci
25	25.5	594	$C_{40}H_{82}O_2$	Hexadecane, 1,1-Bis(Dodecyloxy)-
26	26.5	366	$C_{26}H_{54}$	Hexacosane Einecs 211-124-1 N
27	27.4	338	$C_{22}H_{42}O_2$	Oleic Acid, Butyl Ester (Z)-9-Octadecenoic
28	27.5	320	$C21H_{36}O_2$	N-Propyl 9,12,15-Octadecatrienoate N-Propy
29	27.7	340	$C_{22}H_{44}O_2$	Octadecanoic Acid, Butyl Ester $
30	27.8	338	$C_{24}H_{50}$	Tetracosane N-Tetracosane
31	29.4	366	$C_{26}H_{54}$	Hexacosane Einecs 211-124-1
32	29.5	364	$C_{24}H_{48}O_2$	Palmitic Acid, N-Octyl Ester
33	29.7	298	$C_{20}H_{42}O$	2-Eicosanol, (.+-.)- 2-Icosanol
34	30.6	390	$C_{24}H_{38}O_4$	Bis(2-Ethylhexyl) Phthalate
35	31.3	562	$C_{40}H_{82}$	Tetracontane N-Tetracontane
36	33.3	288	$C_{21}H_{36}$	14-.Beta.-H-Pregna
37	33.8	478	$C_{34}H_{70}$	Tetratriacontane N-Tetratriacontane

The GCMS analysis revealed the presence of 41 compounds in the ethanolic flower extract of *Tabebuiarosea*. [16] The major phytochemical constituent's presentin ethanolic extract of *Tabebuiarosea* are presented as a mass spectra and compound structures are in (Table2).

The active compounds present in the *Tabebuiarosea*ethanolic leaf extract was studied by Ramalakshmi and Muthuchelian. The GC-MS studies showed thepresence of various chemical constituents are 2-furancarboxaldehyde, 5-hydroxy methyl (19.39%), 2-deoxy, D-erythropentose (11.01%), Santolinatriene (8.28%), 4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl (6.07%), 7-Quinolinol (6.01%), phenol, 2-(2-methyl propyl) (5.41%) and Cinnamadehyde (2.42%). Thus the extract of Tabebuiarosea have been classifiedas compounds of nature such as aromatic aldehydes(21.81%), sugar (11.01%), aromatic compounds (7.28%), terpenoids (8.3%), quinone (6.01%), alkanes (6.35%),phenolics (6.85%) and flavonoid (6.07%) (Rama Lakshmi and Muthuchelian, 2011a).Though many work have been reported on *Tabebuiarosea* leaves, a literature search revealed no referencesto previous work on flower composition. Thus theobjective of the study was to study the cytotoxic, phytotoxicity and volatile profile of the Tabebuiaroseaextractby GC-MS analysis.(17).The GCMS analysis revealed the currently presence of 37 compounds in the ethanolic extract of *Tabebuiarosea.*

Conclusion

Flavonoid and phenolic compounds have widely been reported as antioxidant agents positively correlated in the treatment of cardiovascular diseases. UV spectrum is 750.3nm corresponding to phenolic compounds. The FT-IR spectrum of plants extract indicates the presence of functional groups with corresponding absorbance frequencies (cm^{-1}.) *viz* Alcohols, Phenols (3367.74, O–H Stretch, H–Bonded), In this study Tabebuiarosea extract contained Phenol, 2,4-Bis(1,1-Dimethylethyl), Hexadecanoic Acid, Methyl Ester, Tetradecanoic Acid, Ethyl Ester Octadecanoic Acid Stearic Acid N-Octade, Hexadecanoic Acid, Butyl Ester Palmitic Aci, Oleic Acid, Butyl Ester (Z)-9-Octadecenoic, N-Propyl 9,12,15-Octadecatrienoate N-Propy, Octadecanoic Acid, Butyl Ester etc., which are equivalent to gallic acid ,rutin ,kaempforol, and quercetin, respectively. From the present study, it is concluded that the phytochemicals was obsereved in methanol extract which reveals that *Tabebuiarosea*is highly valuable in medicinal usage for the treatment of various human aliments.

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Conflict of Interest Statement

We declare that we have no conflict of interest.

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