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Scientific Investigation of *Pavonia zeylanica* (L.) Cav. A Potent Medicinal Plant

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ABSTRACT: The examination was carried out to establish the possible bioactive components of entire plant of *Pavonia zeylanica* by Qualitative investigation, UV –VIS, FT-IR and GC-MS analysis. FT-IR spectroscopy is a well-established and efficient method for characterizing and identifying functional groups in the ethanol extract of the entire *Pavonia zeylanica* plant. At Vellore Institute of Technology (VIT), GC-MS analysis was conducted to determine the chemical composition of some of the powerful volatile constituents present in the extract. The ethanol extract showed the positive result to alkaloids, phenols, flavonoids, quinone, coumarin, gum and mucilage, fixed oil & fat. The UV-VIS Spectrum profile showed the peaks at 245, 743 and 665 nm with the absorption of 0.106, 0.006, and 0.006 correspondingly. The FT-IR showed a broad peak at 3.398.57 cm^{-1} which indicated the presence of N-H stretch and may be attributed to amine and the peak around 1427.32 cm^{-1} are due to carbonate group, peak at 1265.3 cm^{-1} represents hydroxyl O-H bending. The FT-IR spectrum confirmed the occurrence of alkane, haloalkane, hydroxyl, nitrile, and amine in powder pellet. Fifteen chemical substances belonging to diverse categories were identified. The peak area percentage of N-Hexadecanoic acid (23.280%) was found to be maximum when compared to other compounds. The study comes to the conclusion that the species *Pavonia zeylanica* may provide bioactive substances such as amines, ketone, alcohols, esters, and alkenes, among others. The traditional use of this species is justified by this study.

Keywords: GC-MS, *Pavonia zeylanica*, phytol, ketone and esters.

INTRODUCTION

Both conventional and modern medical procedures constantly emphasise the importance of plants. Plants are primarily useful as medicines because they contain a variety of phytoconstituents, including tannins, flavonoids, phenolic chemicals, and alkaloids. Phytochemicals are non-nutritive, bioactive compounds obtained from plants that are good for human health and disease prevention. These compounds give plants their distinctive scent and colour and are crucial to their defence mechanisms against illness (Bano and Deora 2019).

There is much more to medicinal plant research than just finding new medications. Natural products, moreover as unadulterated compounds or as standardized plant extracts, offer limitless opportunities for new drug. This field has been expanding and includes various subjects as negotiation of value based on medicinal plant knowledge. The diverse phytoconstituents present in plants contain arthra glycosides, bitter drugs, flavonoids, alkaloids, saponins, coumarins, phenol carboxylic acids and terpenes. Spectroscopic (UV-Vis, FT-IR) methods jointly or separate can be used in this sense as well as conventional methods (Dhivya and Kalaichelvi 2017).

In this study the medicinal plant *Pavonia zeylanica* belonging to the family Malvaceae was taken for scientific evaluation. The genus *Pavonia* includes around 30 species. The plant is origin of Eurasia and North Africa, but later migrated to all continents except the two poles. Numerous review articles have been published about the conventional uses of *Pavonia* species, but to the best of our knowledge, there are no published review articles that summarize the scientific literature regarding all *Pavonia* species surveyed (Abdullatif Azab, 2017).

Phytochemicals show tremendous potential in the prevention and treatment of wounds and microbial infections (Ayaz *et al*., 2015; 2017). Antimicrobial, antioxidant, and wound-healing phytochemicals promote blood coagulation, combat infection, and hasten wound healing. Medicinal plants wealthy in polyphenols are reported to acquire notable anti-oxidant activity (Ovais *et al*., 2018; Mehta *et al*., 2015; Zohra *et al*., 2019). Phenolics encourage wound healing chiefly due to their astringent, antimicrobial and free radical scavenging properties (Deshmukh *et al*., 2009; Lopes *et al*., 2005). Finally, polyphenolic components like flavonoids can encourage tremendous curative of wounds probably by means of antimicrobial and anti-

oxidative property, in that way inhibiting the lipid peroxidation, which led to the avoidance of cell damage and increase in the viability of collagen fibrils (Getie *et al*., 2002; Shetty *et al*., 2008).

Phytochemical screening is vital for validating the conventional use of therapeutic plants. In addition GC-MS analysis method can be used to study traditional remedy and to exemplify the compounds of interest. Ultraviolet-visible spectrophotometry (UV-Vis) related to the spectroscopy of photons in the UV-visible region. UV-visible spectroscopy uses light in the visible ranges or its nearby ranges. The colour of the chemicals concerned directly affects the absorption in the visible ranges. Molecules undergo electronic transitions in these ranges of the electromagnetic spectrum (Dhivya and Kalaichelvi 2017). The Fourier Transform Infrared spectroscopy (FT-IR) allows the analysis of a applicable quantity of compositional and structural information in plants. Furthermore, FT-IR spectroscopy is an recognized time-saving process to characterize and identified functional groups.

Analytical method that gives an impression of a tissue's metabolic makeup at a specific moment but does not resolve the concentrations of particular metabolites (Griffiths and De Haseth 1986). The structure of an unknown composition and the strength of the absorption spectra linked to the molecular composition or concentration of the chemical group can be determined using FT-IR. The vibrations of bonds within chemical functional groups are measured by the FT-IR method, which produces a spectrum that can be thought of as a biological sample. The concrete structure of some plant secondary metabolites has currently been identified using FT-IR, especially in phytochemistry (Yang and Yen 2002; Ivanova and Singh 2003). But, on pharmacognosy FT-IR is still a novel tool to characterize and recognize the trade components from the adulterant. FT-IR method has been effectively utilized in the characterization of bacterial, fungal and plant species. FT-IR is one of the most extensively used methods to identify the chemical constituents and elucidate the compounds structures, and has been used as a necessary technique to identify medicines in Pharmacopoeia of several countries. During last few decades UV-VIS, FT-IR and GC-MS were acted as influential techniques for the recognition, separation and structural determination of phytochemicals. Gas chromatography- mass spectroscopy (GC-MS) helped in identification of compounds at less than 1 mg. usually GC-MS applied for drug finding, environmental research and discovery of unknown samples. GC-MS method has been founds very effective for the parting and detection of composite mixtures of phytochemicals. UV-Visible and FT-IR can be used collectively or separately as conventional methods to identify phytoconstituents (Prabhu and Ramar 2018).

MATERIALS AND METHODS

Pavonoia zeylanica (L.) Cav.

Collection of Specimen. The leaves of *Pavonia zeylanica* was gathered from Sulakarai, Krishnagiri district, Tamil Nadu, India. The plant material was dried separately under shade and pulverized in a motorized chopper and stored in a closed container for future use.

Plant Description. Its large, branching herb can grow to a height of 1-1.5 m. On flower stalks and stem leaves, hairs have been found. Leaves are 1.5-3cm long, 1-2.5 cm broad and lance-shaped to ovate. However, subordinate leaves are 3-lobed and lobes oblong or obovate. Leaf stalks are of 1-4.5 cm long. Flowers are originate singly in leaf axils and are about 1.5 cm long and pink in colour. The length of flower stalk is about 2-4 cm long. Sepals are lance-shaped. Fruit is velvety, spherical and about 5 mm. This shrub is mainly found in the countries like Srilanka, India, Pakistan, Arabia and Tropical Africa (Joga Rao *et al*., 2020) Plate 1.

Traditional Medicinal uses. The plant leaves are macerated and paste, the paste is applied over the broken limbs for 1-2 weeks to cure bone fracture. The leaves are used for the treatment of Ezema (Perumal Samy and Ignacimuthu 2000). The stem and leaves of *Pavonia zeylanica* has an analgesic and anti-inflammatory property (Hepcy Kalarani *et al*., 2012). The root portion is thoroughly washed and boiled to prepare a decoction. This preparation is thoroughly sieved and used to control dysentery and abdominal pain. Another remedy for reducing itching is the root decoction combined with turmeric. Fresh leaf paste is used as a treatment on wounds to reduce inflammation and other skin problems. (Joga Rao *et al*., 2020).

Shade drying and powdering of the collected Specimens. Fresh leaves of experimental plant were cleaned to eliminate adhering dirt and then shade dried. For phytochemical analysis, the shade-dried plant materials were mechanically ground into a coarse powder and put through a Willy Mill to achieve a 60-Mesh size. Samples were kept in high-quality plastic containers and kept at room temperature until analysis (Harborne, 1973).

Extraction procedure: Using a hot percolation method, benzene, ethanol, and water were used to extract coarsely powdered plant material using a Soxhlet apparatus. After that, the extracts were used to test the preliminary phytochemicals.

Phytochemical analysis

Qualitative phytochemical analysis. Phytochemical analyses are done to provide common plan about the nature of constituents present in the crude extract. The phytochemical screening of constituents *viz*., carbohydrates, proteins, alkaloids, aminoacids, flavonoids, tannins, phenols, terpenoids, steroids, saponins, coumarin, quinine, anthraquinone, glycosides, gum and fixed oil present in the leaves of *Pavonia zeylanica* in various extracts (Benzene, Ethanol and aqueous) were carried out by the following standard procedures of Harborne (1998).

Plant extracts preparation for FT-IR and UV-VIS studies. The shade dried leaves of *Pavonia zeylanica* (at 25°C) was powdered in a mechanical grinder. 20 gms of leaves powder was weighed; 150 ml of Ethanol was added and retained for 3 days. Whatman No. 1

filter paper was used to filter the extract, and the supernatant was then gathered. Two further extractions of the residue were performed (with 3 days of the interval for each extraction) and the supernatants were collected. Supernatants were pooled and evaporated (at room temperature, 28±1 °C) until the quantity was condensed to 150 ml. Extract of the entire plant powder with ethanol was prepared and kept in airtight bottles for after examination.

UV-VIS spectrum examination. The extract was centrifuged at 3000 rpm for 10 min and filtered through Whatman No.1 filter paper. The sample was diluted to 1:10 with the similar solvent. The extract was scanned at wavelength range from 200 to 1100 nm by Perkin Elmer Spectrophotometer and the characteristic peaks were detected. The peak values of the UV-VIS were recorded.

FT-IR analysis. Dried powder (ethanolic extract) of test plant was used for FT-IR analysis. 1 mg of the dried powder was encapsulated in 10 mg of KBr pellet, in order to prepare translucent sample discs. The powdered sample of the pellet was loaded in FT-IR spectroscope (Shimadzu, Japan), with a Scan range from 400 to 4000$cm^{-1}$with a resolution of 4$cm^{-1.}$

Gas chromatography-Mass spectrum (GC-MS). Ethanolic extract of plant sample was analyzed for the occurrence of diverse volatile compounds by Gas Chromatography-Mass Spectroscopy (GC-MS) method. GC-MS analysis of a little of the potent volatile constituents present in the extract was performed at Vellore Institute of Technology (VIT), Vellore, Tamil Nadu, India. GC analysis of the extracts was performed using a GC-MS (Model; Thermo Trace GC Ultra Ver.5.0, Thermo MS DSQ II) equipped with a DB-35MS capillary standard Non – polar column (30m length X outside diameter 0.25 mm X internal diameter 0.25 µm) and gas chromatograph interfaced to a Mass Selective Detector (MS-DSQ-II) with XCALIBUR software. GC analysis was carried out at a Clarus 500, Perkin Elmer and Computer MS Programme Library used NIST Version -2005. The capillary column was Elite-5MS (5% Diphenyl/95% Dimethyl poly siloxane), 30×0.25mm × 0.25µm df. The mass detector was Turbo mass gold-Perkin Elmer. The extract was injected in the split mode with 10:1 ratio, 1ml per minute.

For GC-MS detection, an electron ionization system with ionization energy of -70eV was used. Helium gas was used as a carrier gas at a constant flow rate of 1ml/min and the sample injected was 1µl; Injector temperature 260°C; Ion source temperature 200°C. The oven temperature was programmed from 75°C to 260°C at the rate of 10°C/min, held isothermal for 1minute and finally raised to 260°C at 6°C/min. Interface temperature was kept at 260°C. Total GC run time was 37.53 min. The relative percentage of each extract constituent was expressed as percentage with peak area normalization.

The components were identified after comparison with those available in the computer library attached to the GS-MS instrument and reported in literature (Jennings and Shibamoto 1980; Anonymous, 1962).

RESULTS AND DISCUSSION

Qualitative phytochemical screening. Successful evaluation of phytocompounds from plant material was mainly dependent on the kind of solvent used in the extraction method. The current work on the various solvent leaf extracts of *Pavonia zeylanica* shown the presence of alkaloids, tannin, phenols, flavonoids, terpenoid, saponin, quinone, coumarin, gum & mucilage, fixed oil & fat (Table 1). The Benzene leaf extract shows the presence of alkaloids, phenols, flavonoids, coumarin, fixed oil & fat. The same extract showed the negative result to carbohydrate, protein, aminoacids, tannin, terpenoid, saponin, glycoside, anthraquinone, quinone, gum & mucilage. The ethanol extract showed the positive result to alkaloids, flavonoids, coumarin, phenols, quinone, gum and mucilage, fixed oil & fat. The aqueous extracts revealed the occurrence of half of the compounds except carbohydrate, protein, aminoacid, glycoside, anthraquinone, fixed oil & fat. Aqueous extracts comprised greater secondary metabolites with a high degree of precipitation (+++) than other solvent extracts. The (+) or (-) symbol indicates whether an ingredient is present or absent.

The occurrence of phytochemical compounds like alkaloids, tannins, flavonoids and phenolic compounds in There are many uses for medicinal plants, and they might be applied in many different utilization (Lena, 2010). Our findings concur with the research of Edeoga *et al.* (2005). All of the test plants extract contained flavonoids, tannin, phenols, saponins, proteins, and amino acids. This is consistent with research of Leon Stephan Raj *et al*. (2015). The alkaloids present in plants were used in medicine as aesthetic agents (Leon Stephan Raj *et al*., 2015). Presence of tannin in test plant could be useful in the treatment connected with heart, anti-inflammatory action, anticoagulant, diarrhoea and dysentery (Bokhad *et al.,* 2012). In the current study tannin were present in aqueous extract of the test plant.

Phenols were present in benzene, ethanol and aqueous extracts of all the test plant. Phenols and phenolic substances in the plants indicated that these plants may be used as an anti-microbial agent. This was in agreement with the result of Ofokansi *et al.* (2005). Saponins have the property of precipitating and coagulating red blood cells (Sodipo *et al.,* 2000; Okwu and Okwu 2004). Quinones were present in ethanol and aqueous extracts of the test plant. Quinones were used as adrenergic nervous system and hemostaic action (Ridhambaradevi *et al*., 2018).

Benzene, ethanol, and aqueous extracts of the study plant contained coumarin. Due to their antibacterial properties, coumarins are also known to inhibit gram-positive bacteria and it is produced in carrots in response to fungal disease which could be attributed to its antimicrobial activity (Shihabudeen *et al.*, 2010).

When compared to synthetic compounds phyto chemicals have low side effects and an excellent dose response. The studies conducted on leaves of *Pavonia zeylanica* showed the presences of phytochemicals. Their medicinal benefits are due to the existence of secondary metabolites called phytochemicals. It also expresses optimism for the creation of several more unique therapeutic agents or templates from these plants, which might one day be used to produce synthetically enhanced curative compounds.

UV-VIS spectrum and FT-IR study. Spectroscopic technique has developed into a potent and analytical tool for the qualitative and quantitative study of pharmaceutical and biological materials. Dried powder of *Pavonia zeylanica* was subjected to UV-VIS and FT-IR analysis. The qualitative UV-VIS spectrum report of ethanol extract of *Pavonia zeylanica* was selected at wavelength from 200 to1100 nm due to sharpness of the peaks and proper baseline. The report showed the peaks at 245, 743 and 665 nm with the absorption of 0.106, 0.006, and 0.006 respectively (Table 2 & Fig. 1) and these bands represent the data for the occurrence of flavonoids.

The identification of secondary metabolite profiles by spectroscopy and chromatography yields important insights on the quantitative and qualitative makeup of plant species and how best to recognise them through chemometry. By differentiating between lipophilic and hydrophilic compounds based on polarity, UV-VIS spectroscopy provides an easy technique for identifying the primary phytochemicals. Spectroscopic (UV-VIS, FT-IR) methods jointly or separate can be used in this sense as well as in conventional methods.

The results of FT-IR peak values and functional groups are represented in Table 3 and the FT-IR spectrum profile is illustrated in Fig. 2. The FT-IR showed a broad peak at 3.398.57 cm^{-1} which indicated the existence of N-H stretching and may be attributed to amine. It displayed strong peaks at 2929.87 and 2362.8 cm^{-1}, which indicated the occurrence of O-H and C≡N stretching vibrations corresponds the nitrile and alkane, peak at1643.35cm^{-1} and 1043.49cm^{-1} attributed to C-F represents the haloalkane, the peak around 1427.32cm^{-1} are due to carbonate group, peak at1265.3cm^{-1} represents hydroxyl O-H bending. There was no absorbance in between the region 2220 and 2260 cm^{-1}which indicated that there was no cyanide group in this extract. The present study revealed that *Pavonia zeylanica* does not have any lethal substances. The FT-IR spectrum confirmed the existence of alkane, haloalkane, hydroxyl, nitrile, and amine in powder pellet.

Fourier Transform Infrared spectroscophy (FT-IR) is a high-resolution analytical method to identify the chemical constituents and clarify the structural compounds (Hashimoto and Kameoka, 2005; Hussain *et al.,* 2007), FT-IR offers a fast and non destructive study to fingerprint plant extracts or powders. In addition FT-IR spectroscopy is proved to be a consistent and sensitive technique for finding of biomolecular composition (Komalkumar and Devi Prasad 2011).

GC-MS analysis. The ethanol extract study plant was subjected to Gas Chromatogram and Mass Spectral (GC-MS) studies. Table 4 & Fig. 3 exhibited the presence of chemical constituents with their molecular formula, molecular weight, retention time, percentage of peak area, functional groups, biological activity, compound structure and hit spectrum. Fifteen chemical compounds belonging to diverse categories were recognized. Ethane,1,1-diethoxy- (7.376%), 4H-Pyran-4-one,2,3-dihydro-3,5-dihydroxy-6-methyl- (5.161%), 2-Methyl-6-methylene-octa-1,7-dien-3-ol (2.412%), 3-Tetradecen-5-yne,(E)- (3.330%), Trans-z-.alpha.-bisabolene epoxide (1.797%), 3,7,11,15-Tetramethyl-2-hexadecen-1-ol (5.482%), 9-Methyl-z,z-10,12-hexadecadien-1-ol acetate (2.912%), N-Hexadecanoic acid (23.280%), Phytol (6.412%), 1-Tridecyne (2.088%), 3-Tetradecyn-1-ol (11.767%), Pentadecanoic acid (5.291%), Oleic acid (2.984%), 6,11-Dimethyl-2,6,10-dodecatrien-1-ol (2.711%), Bisnorallocholanic acid(2.613%) are the chief compounds present in the ethanol extract. The peak area percentage of N-Hexadecanoic acid (23.280%) was found to be maximum when compared to other compounds.

The chief components present in the flowers are 2,3-hexanediol (RT:17.59), n-Hexadecanoic acid (RT:26.02), 1,2- Benzenedicarboxylic acid (RT: 35.91) and squalene (RT: 41.55). GC-MS chromatogram of leaf methanolic extract of the plant *Abutilon pannosum* showed various peaks indicating presence of 50 phytochemical compounds. The principle components recognized with highest peak area was n-Hexadicanoic acid (13.38) at retention time 25.47 minutes and lowest peak area recorded was of 2-Butanone, 4-(2, 6, 6-trimethyl-1, 3cyclohexadien-1-yl)-(0.15) with retention time 16.97 minutes (Bano and Deora 2019).

Table 1: Preliminary phytochemical analysis of test plant.

Sr. No.	Metabolites	*Pavonia zeylanica*		
		Benzene	Ethanol	Aqueous
1.	**Carbohydrate Test** Barfored's Test	-	-	-
2.	**Protein Test** Biuret Test	-	-	-
3.	**Aminoacid Test** Ninhydrin Test	-	-	-
4.	**Alkaloids** Wagner's Test	+	+	+

5.	**Tannin** Ferric Chloride Test	-	-	+
6.	**Phenols** Lead acetate Test	+	+	+
7.	**Flavonoids** Ammonium hydroxide Test	+	+	+
8.	**Terpenoid Test**	-	-	+
9.	**Saponin Test** Foam Test	-	-	+
10.	**Glycoside Test** Borntrager's Test	-	-	-
11.	**Anthraquinone Test**	-	-	-
12.	**Quinone Test**	-	+	+
13.	**Coumarin Test**	+	+	+
14.	**Gum and Mucilage Test**	-	+	+
15.	**Fixed oil and fat Test**	+	+	-

Table 2: UV-VIS Spectrum Peak values of ethanolic extracts of *Pavonia zeylanica.*

Sr. No.	Wavelength nm.	Abs.
1.	665.00	0.004
2.	466.00	-0.002
3.	337.00	0.041
4.	273.00	0.270
5.	743.00	-0.006
6.	583.00	-0.007
7.	457.00	-0.002
8.	305.00	0.029
9.	245.00	0.106

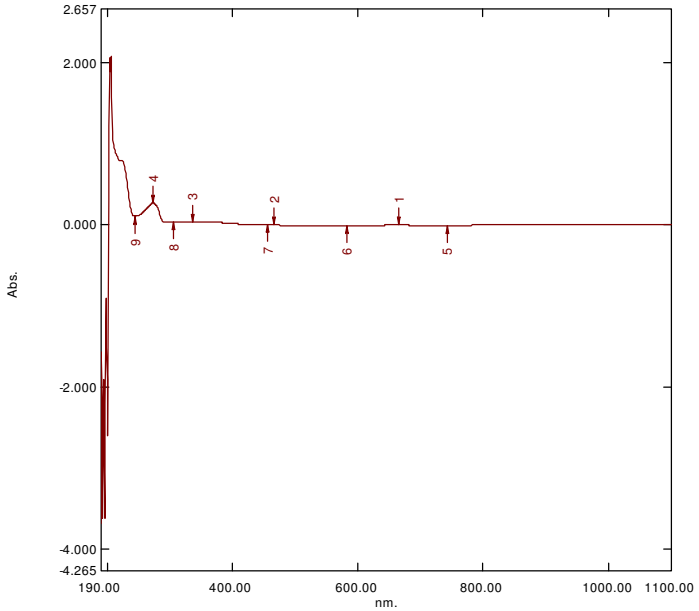

Fig. 1. Ultraviolet-Visible Specroscopy analysis of ethanolic extracts of *Pavonia zeylanica.*

Table 3: FT-IR peak values and functional group of ethanolic extract of *Pavonia zeylanica.*

Extracts	Peak value	Functional group	Name of functional group	Vibrations
Ethanolic extracts of *Pavonia zeylanica*	688.59	C-H	Alkane	Stretch
	1043.49	C-F	Haloalkane	-
	1265.3	O-H	Hydroxyl	Bending
	1427.32	Carbonates	-	-
	1643.35	C-F	Haloalkane	-
	2362.8	C≡N	Nitrile	Stretch
	2929.87	O-H	Alkane	Stretch
	3398.57	N-H	Amine	Stretch

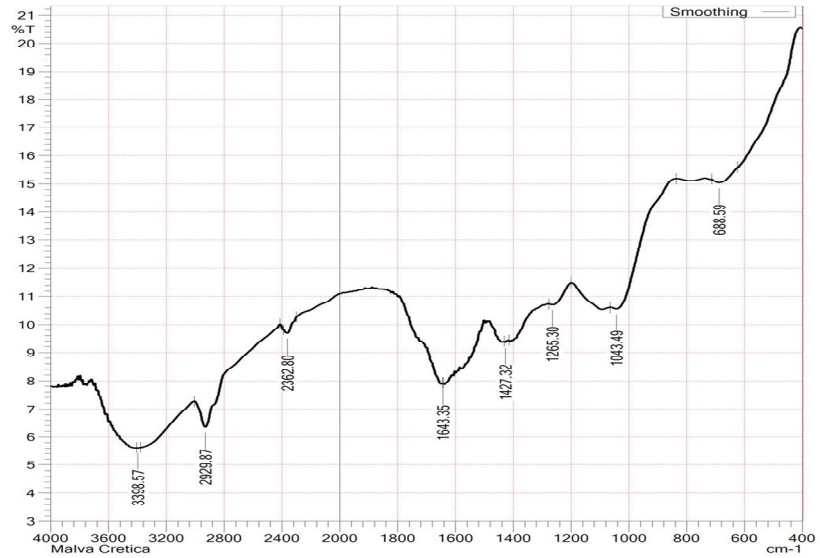

Fig. 2. Fourier-Transform Infrared Spectroscopy analysis of ethanolic extract of *Pavonia zeylanica.*

Table 4: GC-MS study of the ethanolic extract of *Pavonia zeylanica.*

Sr. No.	Retention time	Compound name	Molecular formula	Molecular weight	Area %	Molecular structure	Hit spectrum	Functional group	Biological activity
1.	2.528	Ethane, 1,1-Diethoxy	$C_6H_{14}O_2$	118	7.376			Acetal	Antibacterial activity
2.	9.201	4h-Pyran-4-One, 2,3-Dihydro-3,5-Dihydroxy-6-Methyl	$C_6H_8O_4$	144	5.161			Phenol	Antioxidant, analgesicsantipyretic and anti inflammatory
3.	15.674	2-Methyl-6-Methylene-Octa-1,7-Dien-3-Ol	$C_{10}H_{16}O$	152	2.412			Methyl ester	Anti inflammation and anti microbial activity
4.	16.344	3-Tetradecen-5-Yne, (E)	$C_{14}H_{24}$	192	3.330			-	-
5.	16.719	Trans-Z-.Alpha.-Bisabolene Epoxide	$C_{15}H_{24}O$	220	1.797			Alcoholic compound	Antimicrobial activity
6.	18.445	3,7,11,15-Tetramethyl-2-Hexadecen-1-Ol	$C_{2O}H_{40}O$	296	5.482			Methyl ester	Anti oxidant activity
7.	18.545	9-Methyl-Z,Z-10,12-Hexadecadien-1-Ol Acetate	$C_{19}H_{34}O_2$	294	2.912			Methyl ester	Anti inflammation and anti microbial activity
8.	19.790	N-Hexadecanoic Acid	$C_{16}H_{32}O_2$	256	23.280			Saturated fatty acid	Anti microbial activity
9.	21.261	PHYTOL	$C_{20}H_{40}O$	296	6.412			Alcohol	Anxiolytic, metabolism – modulating, cytotoxic, antioxidant, autophagy and

									apotosis – including antinociceptive, anti inflammatory immune – modulating and antimicrobial activity
10.	21.481	1-Tridecyne	$C_{13}H_{24}$	180	2.088			Hydroxyl	Anti microbial activity
11.	21.546	3-Tetradecyn-1-Ol	$C_{14}H_{26}O$	210	11.767			Aromatic bicyclic	Anti cancerous activity compound
12.	21.746	Pentadecanoic Acid	$C_{15}H_{30}O_2$	242	5.291			Odd chain saturated fatty acid	-
13.	23.552	OLEIC ACID	$C_{18}H_{34}O_2$	282	2.984			Alkene	Anti microbial agents, transducer for immunosensor and its method of production, carcinogens, enzymes inhibitors
14.	27.163	6,11-Dimethyl-2,6,10-Dodecatrien-1-Ol	$C_{14}H_{24}O$	208	2.711			Methyl	Liver detoxification, protein methylation, neurotransmitter synthesis, nucleic acid synthesis
15.	30.060	Bisnorallocholanic Acid	$C_{22}H_{36}O_2$	332	2.613			Carboxylic acid	Anti microbial activity

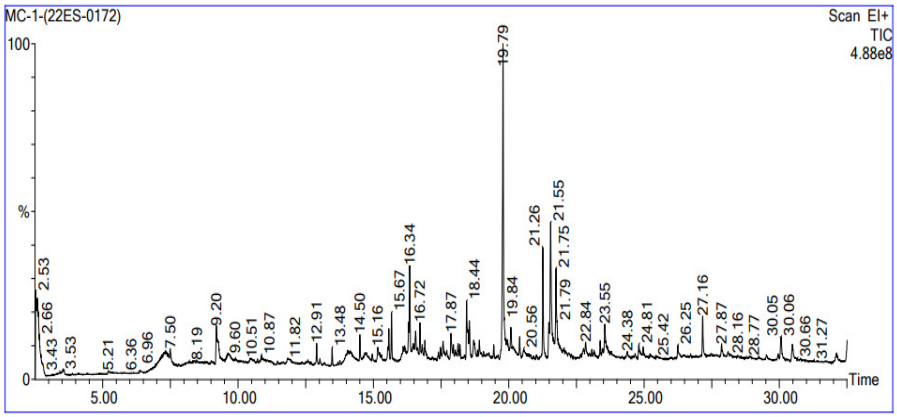

Fig. 3. GC-MS chromatogram of ethanolic extract of *Pavonia zeylanica.*

CONCLUSIONS

To conduct additional pharmacological analysis, the research plant *Pavonia zeylanica* may be exposed to the isolation of some more novel therapeutically useful compounds. This research has made it feasible to manufacture drugs for human consumption using these plants to treat a variety of illnesses. The plants also contained compounds that protected against oxidative stress. To expand the range of drugs now utilised in the treatment and prevention of human illnesses, more research is needed to investigate other bioactivities.

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