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Research Article

Antimicrobial and GC-MS Analysis of *Memecylon edule* Leaf Extracts

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ABSTRACT

Memecylon edule (L.) is belongs to Melastomataceae family used in many folklore medicines. The present study was focused on different solvent (methanol, acetone, ethyl acetate, chloroform and hexane) leaf extracts of *M. edule* were evaluated for their antimicrobial potential and bioactive components (ethyl acetate extract) were analyzed by GC-MS. The antimicrobial activity was done by well in agar and disc diffusion methods against four fungal pathogens and 17 bacterial pathogens include 5 reference (MTCC) strains. `The results show all these extracts exhibited different degree of antimicrobial activity on tested organisms. Agar well diffusion method, contributed superior antimicrobial activity than disc diffusion method. The maximum antimicrobial activity was exhibited in ethyl acetate extract against *Streptococcus pneumoniae* (MTCC 655) (32 mm) with minimum inhibitory concentration (MIC) concentrations of 62.5 µg/ml and minimum bactericidal concentration (MBC) of 1 mg/ml with 5 CFU followed by acetone extract. In disc diffusion method, the ethyl acetate extract shows maximum antibacterial potential against *S. pneumoniae* (MTCC 655) (25 mm), *Salmonella typhimurium 1* (MTCC 98) (25 mm) followed by acetone extract (against *S. pneumoniae* (MTCC 655) (22 mm), *S. typhimurium 1* (MTCC 98) (22 mm)). Most of the tested extracts were show nil or least activity on fungal pathogens in both methods. The maximum antifungal activity was observed in ethyl acetate

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extract against *Mucor racemosus* (11 mm). The GC-MS profile of ethyl acetate extract of *M. edule* showed 26 major compounds (peaks) with different parentage of peak values. Among them, steric acid was predominant (20.19%) constituent. The results from this investigation encourage *M. edule* extracts may be used in treatment of diseases caused by pathogenic microorganisms.

Keywords: *Memecylon edule*, agar well diffusion, disc diffusion, GC-MS analysis.

INTRODUCTION

Plants act as important source for all treatments in traditional medicine system of the world. Herbs have been used for medical treatment since ancient times[1]. According to the World Health Organization (WHO), more than 80% of the world's population relies on traditional medicine for their primary healthcare needs[2]. Medicinal plants have verity of secondary metabolites which play important physiological role in therapeutic purpose. The secondary metabolites of plants are an important source for variety of structural leads in discovering the effective and safe drugs[3]. Nowadays, multiple drug resistance has been developed in pathogenic bacteria due to indiscriminate use of commercial antimicrobial drugs and causes major problem to public health. In recent year, this situation has triggered scientists to search new, high potential antimicrobial from plant sources[4].

Memecylon edule (Melastomataceae kayam in Tamil) grows as medium sized evergreen trees found in tropical and subtropical regions of the world[5]. *M. edule* is an iron wood tree and it's used for decorative work, light axe handles, walking sticks and combs and has a dye yielding capacity[6]. The ethnobotanical property of leaf lotion was used for ophthalmia and conjuctivities. Fruits are used cooling astringent. Leaf decoction of *M. edule* was given internally for gonorrhea and treat urticarial antipirutic in Thai medicine[7]. Roots are potentially control the excessive menstrual discharge and their decoction used for food poisoning[8]. Roots and heart wood extracts used to get relief from fever sympotoms of several diseases such as common cold, measles and chicken box[9].

Leaves of *M. edule* have strong anti-inflammatory, analgesic[10], free radical scavenging[11], anti-leucorrhoeic, spasmolytic, hypoglycaemic[12] and larvicidal[13] properties. Secondary metabolites of *M. edule* show the presence of flavonoids and triterpinoids[14] and the presence of 13 fattyacids, 12 methyl tetradeconate, glucose, aminoacids, carotenoids, glycosides and saponins[15]. The bioactive chemical constituents (epigallocatechin gallate, myricetin and

ellagic acid glycosides) were isolated and tested for anti-inflammatory activity[16]. The better antibacterial activity were noticed in seeds and leaves extracts[6, 17]. With this background, the main aim of the present study was to carryout the antimicrobial and GC-MS analysis of different solvents (hexane, chloroform, acetone, ethyl acetate and methanol) leaf extracts of *M. edule*.

MATERIAL AND METHODS

Plant material: The fresh leaves of *M. edule* were collected from Kolli hills (above 1000 m), Eastern Ghats of Tamil Nadu. The nomenclature of this plant was identified by Dr. D. Natarajan, Assistant Professor, Natural Drug Research Lab (NDRL), Department of Biotechnology, Periyar University, Salem, Tamil Nadu and also crosschecked with available books[18] and herbarium specimen. Voucher specimen was deposited in NDRL, Department of Biotechnology, Periyar University, Salem. The leaves were washed with tap water, dried at room temperature for three weeks and then powdered.

Extract preparation: Powdered plant material was extracted with different organic solvents in increasing polarity manner (hexane, chloroform, acetone, ethyl acetate and methanol) in a soxhlet apparatus. All extracts were passed through Whatmann No. 1 filter paper and concentrated under reduced pressure at 40º C to yield crude extracts which was maintained at 4º C until further use. The crude extracts were analyzed for antimicrobial activity and preliminary phytochemical analysis.

Microorganisms used: A total of four fungal pathogens (*Candida albicans, Cryptococcus neoformans, Mucor* and *Aspergillus niger*) and 17 bacterial pathogens such as *Streptococcus pneumoniae* (MTCC 655), *Klebsiella pneumoniae 1* (MTCC 109), *Salmonella typhimurium 1* (MTCC 98) *Escherichia coli* (MTCC 739) and *Shigella flexneri* (MTCC 1457), *Corynebacterium diphtheriae, Enterococcus faecalis, K. pneumoniae, Salmonella typhi, Escherichia coli, Shigella boydii, S. dysenteriae, S. flexneri, S. sonnei, Vibrio alginolyticus, V. vulnificus,* and *Serratia marcescens.* The fungal cultures were obtained from clinical laboratories in and around Salem District, Tamil Nadu and the MTCC cultures were procured from IMTECH, Chandigarh. The young bacterial cultures of each test organism was prepared by inoculating a loop-full of mother culture in a 5 ml of nutrient broth and incubated at 37°C in a shaker for 16 hours and the culture turbidity was adjusted to 0.5 McFarland equivalents. Fungal cultures were inoculated the broth media (in 5 ml) and incubated at room temperature for 72 hours.

Antimicrobial activity

Agar well diffusion method: The antibacterial activity of leaf extracts was determined using agar well diffusion method, as per the modified method of Natarajan *et al*[19]. A suspension of test cultures (50 µl) was swabbed on the Müeller Hinton Agar (MHA) for bacteria and Sabourd Dextrose Agar (SDA) for fungus using sterile cotton swab. In each plate, six wells were made using sterile cork borer (5mm diameter) in the seeded plates. Then, 50 µl of each extract was separately added into wells and allowed to diffuse at room temperature. Equal volume of DMSO was served as negative control. About 25 µl of ciprofloxacin (0.1µg/µl) for bacteria and 25 µl of fluconazole (0.1µg/µl) for fungus were served as positive control. The respective solvents were acted as a negative control. The microbial plates were incubated at 37°C for 24 hours (for bacteria) and room temperature for 72 hours (for fungi). After incubation the zone of growth inhibition was measured (in mm) and recorded**.**

Disc diffusion method: The disc diffusion test was performed by using the standard procedure of NCCLS[20] with some modifications. About 50 µl of test microbial suspensions was spread on the MHA by using sterile cotton swab. Sterile discs (5 mm diameter) were loaded with 50 µl of each extract and allowed to dry at room temperature. The discs were placed on the seeded MHA plates. Standard antibiotic discs (Gentamicin, Vancomycin and Ampicillin (10 mcg/disc)) were used as positive control and respective solvents as negative controls. The plates were incubated at 37°C (for 24 hours) and the diameter (in mm) of clear zone of growth inhibition were recorded.

Determinatiion of Minimum Inhibitory Concentration (MIC): The MIC was determined by the modified broth microdilution bioassay method Eloff [21]. This study was carried out on the extract, (ethyl acetate) show high antimicrobial activity against prominent bacteria (*Streptococcus pneumoniae*, MTCC 655). About 100 µl ethyl acetate extract (20 mg/ml) of plant was introduced into 96 well microplates containing 100 µl of Muller-Hinton broth and 20 µl bacterial cultures was added to each well. The microplate was closed and incubated for 24 h at 37°C. Then, add 40 µl of p-iodonitrotetrazolium violet (INT) (0.2 mg/ml) solution to the wells to serve as an indicator of bacterial growth and incubated at 37°C for 1 hour. The minimum inhibitory concentration (MIC) was taken as the lowest concentration of the extract that completely inhibits bacterial growth. These experiments were carried out in triplicates.

Determination of Minimum Bactericidal Concentration (MBC): The MBC was determined by subculturing the selected bacteria (20 µl of inoculum from MIC test dilutions on freshly prepared Mueller Hinton Agar plates) and incubated at 37°C for 24 h. In which MIC dilution concentration yield low bacterial colony count was taken as the Minimum Bactericidal Concentration[22].

GC–MS analysis: The GC–MS analysis was carried out on a GC Clarus 500 Perkin Elmer system. Employing the Elite-1 fused silica capillary column with electron impact mode at 70 eV and helium (99.99%) was used as carrier gas at flow of 1 ml/min. Sample injection volume was 0.5 µl. The oven temperature was programmed from 110°C, increased at 10°C/min, upto 200° C, then 5°C/min to 280° C, finally, ending with 9 min isothermal at 280°C. Mass spectra were taken at 0.5 second scan interval patterns. The spectrum of sample components was compared with standard spectrums available in NIST and WILEY library. The name, molecular weight and structure of the components of the test materials were ascertained.

RESULTS AND DISCUSSION

Antimicrobial activity: The antimicrobial activity of different solvents leaf extracts of M. *edule* was done by both agar well diffusion and disc diffusion method (Table 1). All the crude extracts of *M. edule* were show broad spectrum of antimicrobial potential against most of tested organisms (both well in agar and disc diffusion method). The result shows the well in agar method was superior activity than disc diffusion method. Ethyl acetate extract of *M. edule* show significant activity in both method against all tested pathogens and the maximum activity was observed in *S. pneumoniae* (32 mm; 25 mm diameter in agar well and disc methods) with MIC of 62.5 µg/ml value and MBC of 1 mg/ml with 5 CFU (Table 2) followed by *S. typhimurium* (25 mm in agar well method) and *S. boydii* (19 mm in disc method). Similarly, the acetone extract show better antibacterial activity against all the tested bacteria's, the highest activity was observed in *S. pneumoniae* (32 mm; 22 mm in agar well and disc method) followed by *S. typhimurium* (22 mm in agar well method) and *S. boydii* (16 mm in disc method). Methanol extract express moderate activity against most of the tested strains. Hexane and chloroform extract shows least to moderate activity against all tested pathogens.

All tested extracts were expresses minimal or nil activity against most of the fungal pathogens in both tested methods. However, maximum antifungal activity was noticed in ethyl acetate extract against *Mucor racemosus* (11 mm in agar well method, 9 mm in agar well method) followed by hexane extract. The rest of tested fungal pathogen has nil or minimal growth inhibitory effect. No significant antifungal effect was detected in standard antibiotic (fluconazole) against most of tested fungal cultures; it's may be due to the resistance of the tested fungal pathogens.

Table 1: Antimicrobial activity of different solvent leaf extracts of *M. edule*

S. No	Organisms	Method	Diameter of zone of inhibition (in mm)*					
			Methanol	Acetone	Ethyl acetate	Chloroform	Hexane	Control
1	*C. diphtheria*	Well	09.00±1.00	14.00±0.00	15.67±1.53	09.00±1.73	09.00±0.33	22.00±0.00
		Disc	00.00±0.00	15.00±1.73	15.33±0.58	08.00±0.00	09.67±0.58	13.00±1.00
2	*E. faecalis*	Well	11.33±1.53	13.67±1.15	15.00±0.00	09.33±2.00	07.33±0.58	23.67±0.58
		Disc	00.00±0.00	15.33±0.58	17.00±0.00	07.33±0.58	09.00±1.00	16.00±1.73
3	*E. coli*	Well	07.00±7.67	12.33±0.58	14.00±1.00	08.33±0.58	00.00±0.00	27.00±1.73
		Disc	00.00±0.00	12.67±0.58	13.67±1.15	00.00±0.00	08.33±0.58	17.67±1.53
4	*K. pneumoniae*	Well	08.00±0.00	13.33±1.53	15.00±1.00	00.00±0.00	00.00±0.00	29.67±2.52
		Disc	08.00±0.00	15.00±1.00	16.67±2.08	09.00±1.00	10.00±0.00	13.00±2.00
5	*S. typhi* A	Well	07.33±1.15	13.00±0.00	13.00±1.00	08.67±0.58	00.00±0.00	20.33±0.58
		Disc	00.00±0.00	15.00±0.00	17.67±1.53	08.33±0.58	09.33±0.58	14.33±0.58
6	*S. boydii*	Well	09.33±0.58	14.67±0.58	15.00±0.00	00.00±0.00	00.00±0.00	23.33±1.53
		Disc	00.00±0.00	16.67±1.15	19.33±0.58	10.00±0.00	10.00±1.00	15.67±1.57
7	*S. dysenteriae*	Well	10.00±0.58	14.00±0.00	15.33±0.58	00.00±0.00	00.00±0.00	27.67±1.15
		Disc	10.00±0.00	12.33±0.58	13.00±0.00	00.00±0.00	07.67±0.58	15.67±2.08
8	*S. flexneri*	Well	08.00±0.00	12.33±0.58	14.00±0.00	07.67±1.15	08.00±0.00	20.67±1.15
		Disc	00.00±0.00	13.33±0.58	14.67±0.58	07.00±0.00	08.00±1.00	15.67±1.15
9	*S. sonnei*	Well	10.00±1.00	13.00±1.00	14.00±0.00	08.33±1.15	08.00±0.00	23.33±1.53
		Disc	00.00±0.00	13.67±1.15	15.33±0.58	08.33±1.53	08.00±0.00	14.00±1.00
10	*V. alginolyticus*	Well	09.00±0.00	11.67±1.15	13.33±0.58	09.00±1.00	08.00±1.00	24.33±1.53
		Disc	08.33±0.58	13.00±0.00	13.33±1.53	08.33±1.53	10.00±0.00	12.67±1.15
11	*V. vulnificus*	Well	10.67±1.15	13.00±0.00	15.00±1.00	00.00±0.00	07.33±0.58	21.00±1.00
		Disc	00.00±0.00	13.00±1.00	13.00±0.00	07.67±1.15	08.67±1.53	13.00±3.00
12	*S. marcescens*	Well	10.33±0.50	14.33±0.58	15.00±0.00	00.00±0.00	09.00±1.00	22.00±1.00
		Disc	00.00±0.00	14.67±0.58	16.33±0.58	08.00±0.00	08.33±0.58	16.00±1.00
13	*E. coli* (MTCC 739)	Well	00.00±0.00	13.33±0.58	12.00±1.00	00.00±0.00	00.00±0.00	29.00±1.00
		Disc	07.67±1.15	12.67±1.15	10.67±1.15	08.00±0.00	07.33±1.53	15.00±1.00
14	*K. pneumoniae 1* (MTCC 109)	Well	00.00±0.00	11.33±058	12.67±1.15	00.00±0.00	00.00±0.00	29.00±1.00
		Disc	00.00±0.00	10.33±0.58	11.33±0.58	08.00±1.00	08.33±0.58	00.00±0.00
15	*S. typhimurium 1* (MTCC 98)	Well	19.33±0.58	22.33±0.58	25.00±0.00	14.33±1.53	14.00±0.00	23.67±1.15
		Disc	00.00±0.00	09.00±0.00	10.67±1.15	08.00±1.73	08.00±1.00	00.00±0.00
16	*S. flexneri* (MTCC 1457)	Well	10.33±0.58	14.67±1.15	16.00±0.00	09.00±1.00	08.00±1.00	16.67±1.15
		Disc	00.00±0.00	14.00±0.00	14.33±1.53	08.00±0.00	09.33±0.58	00.00±0.00
17	*S. pneumoniae* (MTCC 655)	Well	15.00±.2.00	32.00±1.00	32.00±0.00	09.00±1.00	09.00±1.00	31.00±1.00
		Disc	08.33±0.58	22.67±2.52	25.00±0.00	08.33±0.58	08.00±1.00	21.00±2.65
Fungal Cultures								
18	*C. albicans*	Well	00.00±0.00	00.00±0.00	00.00±0.00	00.00±0.00	00.00±0.00	00.00±0.00

Table 1: Antimicrobial activity of different solvent leaf extracts of *M. edule*

S. No	Organisms	Method	Diameter of zone of inhibition (in mm)*					
			Methanol	Acetone	Ethyl acetate	Chloroform	Hexane	Control
19	*C. neoformans*	Disc	00.00±0.00	00.00±0.00	00.00±0.00	00.00±0.00	00.00±0.00	00.00±0.00
		Well	00.00±0.00	07.67±0.58	07.67±1.15	08.33±0.58	07.00±0.00	00.00±0.00
		Disc	00.00±0.00	00.00±0.00	00.00±0.00	00.00±0.00	00.00±0.00	22.67±2.52
20	*M. racemosus*	Well	08.33±1.53	09.00±0.00	11.67±0.00	10.00±1.00	11.00±1.15	00.00±0.00
		Disc	07.67±1.15	07.33±0.58	09.00±0.00	08.67±1.15	08.0±.0.58	00.00±0.00
21	*A. niger*	Well	07.33±0.58	08.00±0.00	10.67±1.15	00.00±0.00	00.00±0.00	00.00±0.00
		Disc	00.00±0.00	07.33±0.58	08.00±0.58	00.00±0.00	00.00±0.00	00.00±0.00

Table 2: MIC and MBC values of ethyl acetate extract of *M. edule* against *S. pneumonia.*

S. No	Concentrations (µg/ml)	MIC	MBC (CFU*)
1	1000	NGD	5.0±1.00
2	500	NGD	10.0±1.00
3	250	NGD	19.0±2.65
4	125	NGD	45.0±5.00
5	62.5	NGD	90.0±6.00
6	31.25	GD	145.0±7.00
7	15.62	GD	>300.0±0.00
8	7.81	GD	>300.0±0.00

*NGD– No Growth Detected; GD–Growth Detected; *-Mean value of three replicates ±SD*

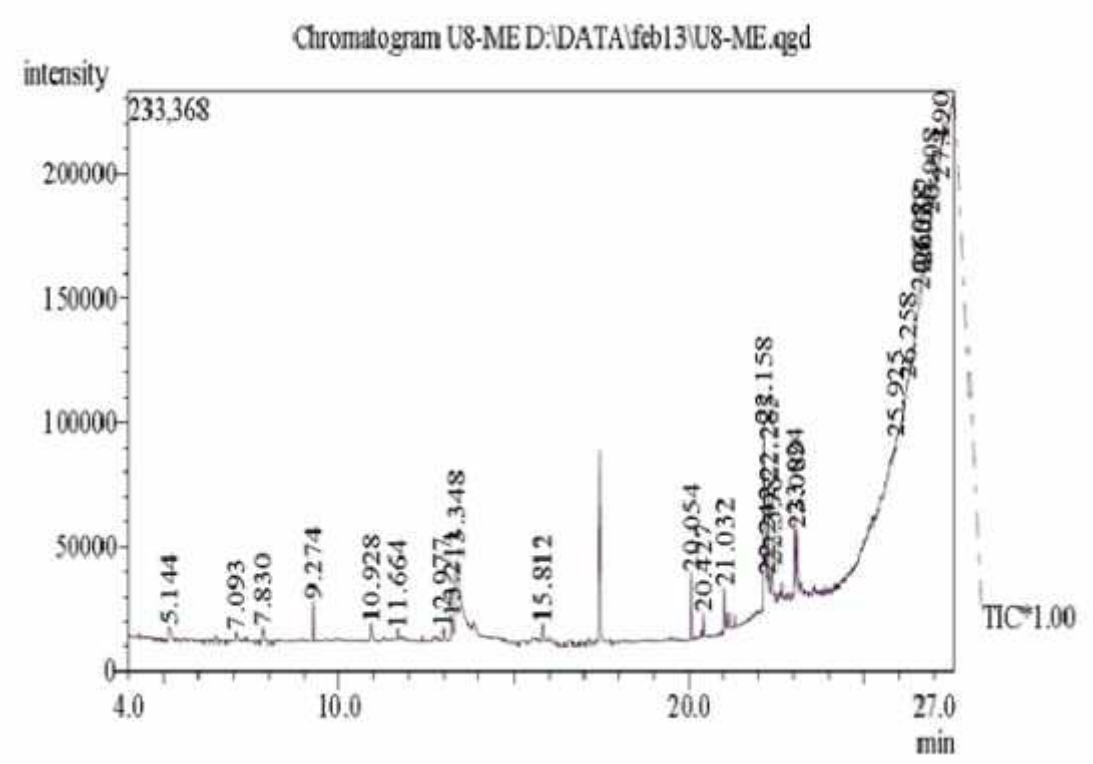

Fig. 1: GC-MS Chromatogram of ethyl acetate leaf extract of *M. edul*

Table 3: Compounds detected in ethyl acetate leave extract of *M. edule* using GC-MS analysis

S. No	RT	% of Area	Compound Name	Molecular Formula	Molecular Weight	Compound Nature
1	5.144	2.62	3,4:5,6-diepoxycyclohex-1-ene	$C_6H_6O_2$	110	Alkene
2	7.093	0.57	Heptanal, 4-methyl-4-nitro-5-oxo	$C_8H_{13}NO_4$	187	Aldehyde
3	7.830	1.44	Isoxazole, 4-(chloromethyl)-3,5-dimethyl	$C_6H_8C_lNO$	145	Hetrocyclic compound
4	9.274	1.80	Bicyclohexan-3-one, 4-methyl-1-(1-methylethyl)-	$C_{10}H_{16}O$	152	Bicyclic ketone
5	10.928	1.73	4-Vinylphenol	C_8H_8O	120	Phenolic compound
6	11.664	0.93	2-Fluoro-1-methoxy-4-methylbenzene	C_8H_9FO	140	Methoxy phenol
7	12.977	0.98	1-Acetoxy-2-(t-butyl)-4-methyl-2,3-pentadiene	$C_{12}H_{20}O_2$	196	Alkene
8	13.211	2.34	N,N'-diacetylethylenediamine	$C_6H_{12}N_2O_2$	144	N-substituted amide
9	13.348	11.30	1,2,3-Benzenetriol	$C_6H_6O_3$	126	Phenolic compound
10	15.812	1.11	N-[2-(acetylamino) ethyl] acetamide	$C_6H_{12}N_2O_2$	144	N-substitued amide
11	20.054	3.24	16-Heptadecenal	$C_{17}H_{32}O$	252	Aliphatic aldehyde
12	20.427	1.42	2-Decen-1-ol	$C_{10}H_{20}O$	156	Carboxylic acid
13	21.032	3.30	Decanoic acid	$C_{10}H_{20}O_2$	172	Carboxylic acid
14	22.158	20.19	Stearic acid	$C_{18}H_{34}O_2$	284	Carboxylic acid
15	22.242	2.01	Butanoic-3,3-D2 acid, 2-methyl	$C_5H_8D_2O_2$	104	------
16	22.285	8.39	Trimethylsilyl ester of tetracosanoic acid	$C_{27}H_{56}O_2$	440	-----
17	22.398	4.67	1,3-Methanonaphthalene, decahydro-2,2-dimethyl-	$C_{13}H_{22}$	178	-----
18	23.024	5.17	16-Heptadecenal	$C_{17}H_{32}O$	252	Aliphatic aldehyde
19	23.089	6.50	2,2-Dimethylglutaric acid	$C_7H_{12}O_4$	160	Dicarboxylic acid
20	25.925	1.80	3,6-bis-dimethyl aminomethyl-2,7-dihydroxy-fluoren-9-one	$C_{19}H_{22}N_2O_3$	326	Phenolic compounds
21	26.258	1.95	Cyclotetrasiloxane, octamethyl	$C_8H_{24}O_4$	296	Siloxane
22	26.608	3.48	[2,2']Bithiophenyl-5-YL(3-hydroxybenzo[1,2,5]oxadiazol-5-YL)methanone	$C_{15}H_8N_2O_3S_2$	328	Hetrocyclic compounds
23	26.658	1.86	3-(4-Dimethylamino-naphthalen-2-(4-nitro-phenyl)-Acrylonitrile	$C_{21}H_{17}N_3O_2$	343	Terpene
24	26.692	1.81	6-fluoro-1,3-bis (fluorodimethylsilyl)-2,2,4,4-tetramethyl-1,3,5-triaza-2,4-disila-6-boracyclohexane	$C_8H_{25}BF_3N_3$	343	Hetrocyclic compounds substituted alkane

Table 3: Compounds detected in ethyl acetate leave extract of *M. edule* using GC-MS analysis

S. No	RT	% of Area	Compound Name	Molecular Formula	Molecular Weight	Compound Nature
25	26.908	3.85	Thiophen-2-methylamine, N,N-didecyl-	$C_{25}H_{47}$	393	-----
26	27.190	5.53	Dimethyl 9-isopropyl-1,6-dimethyltricyclo[5.4.1.0(4,12)] dodeca-3,5,7(120,8,10-pentaene-2,3-dicarboxyl	$C_{21}H_{24}O_4$	340	-----

GC-MS Analysis: The results of GC-MS analysis show the ethyl acetate extract of *M. edule,* clearly indicates the presence of 26 compounds. The identification of active principles are based on their retention time (RT), molecular formula, molecular weight (MW) and concentration (peak area %) (Table 3) and peak of the compounds (Figure 1). The results revealed stearic acid (with the peak area 20.19 % and retention time 22.158) followed by 1, 2, 3-benzenetriol (with the peak area 11.30% and retention time 13.34) was identified as major components. Although, trimethylsilyl ester of tetracosanoic acid (peak area 8.39%, RT-22.285), 2, 2-dimethylglutaric acid (peak area 8.39%, RT-22.285) were identified in significant amount in the tested extract. These phytochemicals have been found to possess a wide range of biological activities, which may help in the protection against infectious diseases caused by pathogenic microbes.

The findings of present investigation were reveal that ethyl acetate to be suitable solvent for extracting potential bioactive principal from the leaves of *M. edule* which harbor broad spectrum antimicrobial activity. The outcome of this study show antimicrobial potentials of different solvent leaf extracts of *M. edule* has promising high antibacterial potency. Different solvents seed extracts of *M. edule* showed the broad spectrum of antimicrobial activity against most of the tested bacterial strains. The strongest antibacterial effect was found in chloroform extract against *B. subtilis* and the weakest activity was noticed against *V. chlorae* which support the results of present investigation. However, present study reveal ethyl acetate extract has greater activity when compared with earlier reports[6].

Similarly, leaf methanolic extract of *M. edule* expressed significant antibacterial activity against most of the tested pathogens (such as *E-coli, S. aureus, B. subtilis, Pseudomonas* spp. and *K. pneumoniae* with the MIC values of 3.24 µg/ml to 6.25 µg/ml). Based on the results of present study, methanol extract expressed moderate antibacterial activity and least activity was noticed against fungal pathogens. The MIC value of ethyl acetated extract was much higher in the present investigation which was dissimilar with previous reports[17]. The present result was quit comparable to earlier reports of the antibacterial activities of *Memecylon umbellatumh*[23-27] and *M. malabaricum*[28].

The result of GC-MS profile of ethyl acetate extract of *M. edule* was indicates 26 compounds with different parentage of peak area. Among them, alkene (2), phenolic (2) nitrogen contain compound (2), carboxylic acids (3) and hetrocyclic compounds (3) were identified. The abundant component of this extract (stearic acid (20%)) reported as potential antimicrobial principle[29-31] which strengthen the outcome of present study. Similarly, 1,2,3, benzenetriol is a potential compound for nephrotoxic, fungicide, candidicide and antibacterial which present in the ethyl acetate may be responsible for the antimicrobial activity[32]. All tested extracts of *M. edule* possessed remarkable antimicrobial property which may be used in traditional medicines to treat the various infections caused by selected microbes.

CONCLUSION

The results of present investigation was explored the ethyl acetate leaf extract of *M. edule* possess potent antimicrobial bioactive principles, and the isolation, purification and structural elucidations of bioactive compounds is under process. This is first time report on antifungal activity of different solvent extracts of *M. edule*.

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