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Research Article – Phytochemistry

Evaluation of phytochemical compounds in *Corbichonia decumbens* (Frossk). Excell by using Gas Chromatography – Mass Spectrometry

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Abstract

The aim of the present study was to investigate the presence of phytochemical compounds and GCMS analysis of *Corbichonia decumbens*. The Soxhlet apparatus was used for the organic solvent extraction. Solvents used were hexane and ethanol. The results showed in preliminary phytochemical analysis alkaloids, flavonoids, saponins, glycosides, steroids were observed in hexane and ethanolic extracts. The phenols and tanins were present only in ethanolic extract. The GC-MS analysis has shown the presence of different phytochemical compounds in the ethanolic extract *Corbichonia decumbens*. A total of 30 compounds were identified representing 84.49% of total methanolic extract composition. Our findings provided evidence that organic solvent extracts of tested plant contain medicinally important bioactive compounds and it justifies their use in the traditional medicines for the treatment of different diseases.

Keywords: *Corbichonia decumbens,* GC-MS, Glycosides, Lophicarpaceae, ethanol

Introduction

In last five decades, these plants have been extensively studied by advanced scientific techniques and reported for various medicinal properties *viz,* anticancer activity, antibacterial activity, antifungal activity, antidibetic activity, antioxidant activity, hepatoproctective activity, haemolytic activity, larvicidal activity, and anti-inflammatory activity (Shoeb *et al*., 2006). Plant materials remain an important resource to combat serious diseases in the world. The traditional medicinal methods, especially the use of medicinal plants, still play a vital role to cover the basic health needs in the developing countries. The medicinal value of these plants lies in some chemical active substances that produce a definite physiological action on the human body. The most important of these bioactive constituents of plants are alkaloids, tannin, flavonoid and phenolic compounds (Edeoga *et al.*, 2005). Within the recent years, infections have increased to a great extent and antibiotics resistance effects become an ever-increasing therapeutic problem (Mahesh and Satish, 2008). Natural products of higher plants may possess a new source of

they are effective in the treatment of infectious disease while simultaneously mitigating many of the side effects that are often associated with synthetic antimicrobials. Therefore, it is of great interest to carry out a screening of these plants in order to validate their use in folk medicine and to reveal the active principle by isolation and characterization of their constituents. Systematic screening of them may result in the discovery of novel active compounds described by Tomok *et al*., (2002).

Medicinal plants represent a rich source of antimicrobial agents. Plants are used medicinally in different countries and are a source of many potent and powerful drugs (Lambert *et al*., 1996). The different parts used include root, stem, flower and fruit twigs exudates and modified plant organs. While some of these raw drugs are collected in smaller quantities by local communities and folk healers for local used, many other raw drugs are collected in large quantities and traded in the market as the raw material for many herbal industries (Jamwal *et al*., 2006). Although hundreds of plant species have been tested for antimicrobial properties, the vast majority of have not been adequately evaluated (Balandrin *et al*., 1985). The increasing failure of chemotherapeutics and antibiotic resistance exhibited by pathogenic microbial infection agents has led to the screening of several medicinal plants for their potential antimicrobial activity (Colombo and Basisio, 1996). India is varietal emporium of medicinal plants and is one of the rich countries in the world in regard to genetic resource of medicinal plants. It exhibits a wide range in topography and climate, which has a bearing on its vegetation and floristic composition (Martins *et al*., 2001). The main objectives of the study are to evaluate the phytochemical analysis of *C. decumbens*.

Materials and Methods

The whole plant *C. decumbens* belongs to the family Lophiocarpaceae were collected in and around Kallipalayam, Annur taluk, Coimbatore District, Tamil Nadu, India

Preparation of plant extracts

50g of powdered *C. decumbens* whole plant was successively extracted using 500ml of hexane and ethanol using the Soxhlet extractor for 8–10h.

Preliminary phytochemical analysis

The ethanol and petroleum ether extracts were subjected to preliminary phytochemical tests to determine the group of secondary metabolites present in the powdered

C. decumbens which was followed by Harborne, 1984.

Gas chromatography-mass spectrometry (GC-MS) analysis

GC-MS analysis of the ethanol extract of *C. decumbens* Wall. ex G. Don leaf was performed using Shimadzu Japan GC QP2010 plus with a fused GC column coated with polymethylsilicon (0.25 nm × 50 m) and the conditions were as follows: Temperature programming from 80 to 200°C held at 80°C for 1 min, rate 5°C/min, and at 200°C for 20 min. Field ionization detector temperature of 300°C, injection temperature of 220°C, carrier gas nitrogen at a flow rate of 1 ml/min, and split ratio of 1:75 GC-MS were conducted using GCMS-QP 2010 plus Shimadzu Japan with an injector temperature of 220° and carrier gas presence of 116.9 kpa. The color length is 30 m with a diameter of 0.25 mm and flow rate of 50 ml/min. Elutes were automatically passed into a MS with a dictator voltage set at 1.5 kv and sampling rate 0.2 s. The MS was also equipped with a computer fed mass spectra bank. German Hermlez 233M-Z centrifuge was used.

Results

Preliminary phytochemical analysis of C. decumbens

Preliminary phytochemical studies on *C. decumbens* were carried out to find out the presence of phytochemical constituents. *C. decumbens* is erect also herb with compound leaf which is distributed in throughout the India. The plants were exposed to GC-MS analysis. In phytochemical evaluation, initially physical constants were evaluated for its present as well as for its quality of alkaloid, flavonoids, saponin, glycosides, steroids, phenol and tannin were present. Material was subjected to phytochemical analysis separately for observing the present of alkaloids, flavonoids, saponins , glycosides, steroids, phenol and tannin, where present in (Table 1). Alkaloids, flavonoids, saponins, glycosides and steroids present in both hexane and ethanol extracted of *C.decumbens* it was absent in hexane extract. Phenol is absent in ethanol and hexane.

Table 1. Preliminary phytochemical analysis of *C. decumbens*

S. No	Name of the secondary metabolite	Hexane Extract	Ethanol Extract
1	Alkaloids	+	+
2	Flavanoids	+	+
3	Saponins	+	+
4	Glycosides	+	+
5	Steroids	+	+
6	Phenols	-	-
7	Tannins	-	+

GCMS analysis of C. decumbens

The ethanol extract of *C. decumbens* where analyzed by GC-MS (Fig. 1) to identification of active compounds by comparing mass spectra of NIST and Willey library. In the GC-MS analysis of *C. decumbens*, compounds were confirmed by ethanol extract. The active principles with their retention time (RT), molecular formula (MF), molecular weight (MW), peak area (PA), structure, medicinal uses in ethanol extract of *C. decumbens* where give in (Table 2).

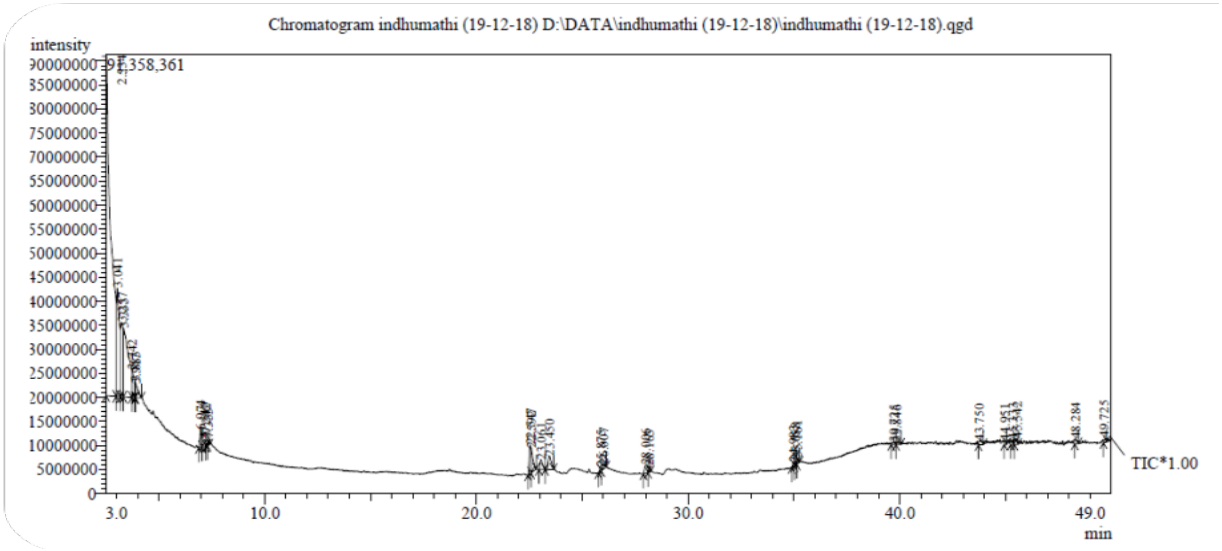


Fig. 1. Phytochemical identified through GC-MS in ethanol extracts of *C. decumbens*

Table 2. GC MS analysis of ethanolic extract in *C. decumbens*

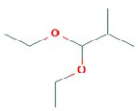
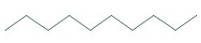
S. No	Rt	Name of the Compound	Molecular Formula	Molecular Weight (g/mol)	Peak Area %	Structure of The Chemical Compound	Properties*
1	2.534	Propane, 1,1-diethoxy-2-methyl-	$C_8H_{18}O_2$	146.23	53.53		Flavoring agents
2	3.041	Decane	$C_{10}H_{22}$ or $CH_3(CH_2)_8CH_3$	142.286	10.56		Antagonists, Thyroid receptor (TP)

Table 2 Conted...

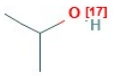
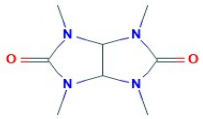
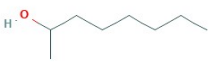
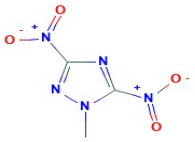
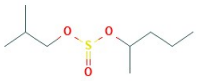
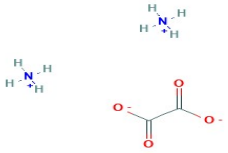
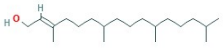
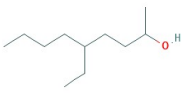
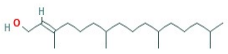
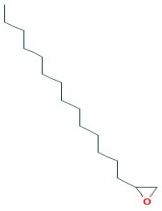
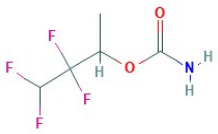
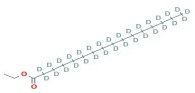
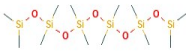
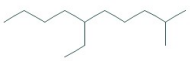
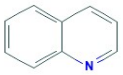
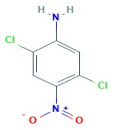
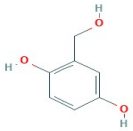
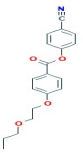
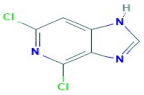
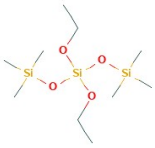
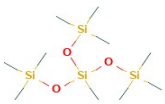
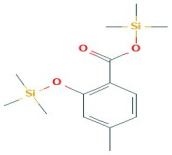
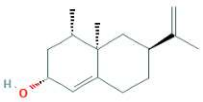
3	3.257	Undecane	$C_{11}H_{24}$	156.313	6.40		Antagonists
4	3.333	2- Propanol	C_3H_8O	61.096	12.06		Anesthetic
5	3.742	2,4,6,8-Tetraazabicyclo[3.3.0]octan-3-one,	$C_8H_{14}N_4O_2$	198.226	2.00		Anti-inflammatory, amitriptyline & diazepam and mebicar
6	3.883	2- Octanol -2-D	$C_8H_{18}O$	130.231	0.33		Antiasthmatics, Antitussive agents
7	3.917	1-Methyl-3,5-dinitro-1H-[1,2,4]triazole	$C_3H_3N_5O_4$	173.088	1.22		Bloodstream
8	6.974	Dodecane	$C_{12}H_{26}$	0.91			Antagonists of the estrogen receptor alpha(ER)
9	7.140	Tetradecane	$C_{14}H_3O$	198.394	1.39		Hair loss
10	7.242	Sulfurous acid, isobutyl 2-pentyl ester	$C_9H_{20}O_3S$	208.316	0.49		Antibacterial agents, Antivirals
11	7.333	Ammounium Oxalate	$C_2H_8N_2O_4$	124.096	0.35		Tissue level, Xanthine oxidase
12	22.547	2-Hexadecen-1-OL, 3,7,11,15-tetram	$C_{20}H_{40}O$	296.539	1.63		Antitubercular activity against *Mycobacterium tuberculosis* H37Rv by BACTEC460 radiometric susceptibility assay
13	22.592	2-Nonanol, 5-ethyl-	$C_{11}H_{24}O$	172.321	1.57		Anticancer
14	23.061	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	$C_{20}H_{40}O$	296.539	0.84		Antitubercular activity, Antimycobacterial activity
15	23.450	Oxirane, tetradecyl-	$C_{16}H_{32}O$	240.431	1.38		Antioxidant

Table 2 Conted...

16	25.875	Carbamic acid,2,2,3,3-tetrafluo	$C_5H_7F_4NO_2$	189.11	0.23		Anticancer
17	26.007	Hexadecanoic acid, ethyl ester	$C_{18}H_{36}O_2$	315.673	0.52		Anti-inflammatory activity
18	28.006	2-Hexadecen-1-ol, 3,7,11,15-tetram	$C_{20}H_{40}0$	296.539	0.80		Antitubercular activity, Antimycobacterial activity
19	28.163	1,1,3,3,5,5,7,7,9,9,11,11,13,13,15,15-Hexa	$C_{12}H_{36}O_5S_{i6}$	428.925	0.32		No reported activity
20	34.983	2-methyl-6-phenethylamino-tet	$C_{13}H_{28}$	184.367	0.23		No reported activity
21	35.058	Quinolin-6(7h)-one, 1,2,3,4,8,8a-hex	C_9H_7N	129.162	0.44		Antagonist
22	35.161	Benzenamine, 2,5-dichloro-4-nitr	$C_6H_4CL_2N_2O_3$	207.01	0.26		Anticancer
23	39.725	2,5-dihydroxybenzyl alcohol 3	$C_7H_8O_3$	140.138	0.23		Antioxidant, Antileishmania
24	39.846	p-Cyanophenyl p-(2-propoxyethoxy)benzoa	$C_{19}H_{19}NO_4$	325.364	0.23		Therapeutic agent
25	43.750	Pentasiloxane 1,1,3,3,5,5,7,7,9,9-DE	$C_{10}H_{30}O_4Si_5$	354.771	0.47		No reported activity
26	44.951	1H-Imidazo[1,5-c]thiazole-5,7(6H,7ah)-dio	$C_6H_3CL_2N_3$	188.011	0.23		Anticancer, Leulcemia
27	45.333	Silicic acid, diethyl bis(trimethylsilyl) ester	$C_{10}H_{28}O_4Si_3$	296.585	0.25		No reported activity
28	45.542	Methyltris(trimethylsiloxy)silane	$C_{10}H_{30}O_3Si_4$	310.687	0.45		Anti-acne agent, Antibacterial agents
29	48.284	Benzoic acid, 4-methyl-2-trimethylsilyloxy-	$C_{14}H_{24}O_3Si_2$	296.513	0.36		No reported activity
30	49.725	trans-4,4'-Dimethoxy-beta-methylchalcone	$C_{15}H_{24}O$	220.356	0.31		Cytotoxicity against

*–Source (PUBCHEM)

The major Thirty compounds which were found in ethnol extracted Propane, 1,1-diethoxy-2-methyl-(53.53), Decane(10.56), Undecane(6.40), 2-Propanol-(12.06), 2,4,6,8-Tetraazabicyclo[3.3.0]octan-3-one(2.00), 2-Octanol-2-D (0.33), 1-Methyl-3,5-dinitro-1H-[1,2,4]triazole(1.22), Dodecane(0.91), Tetradecane(1.39), Sulfurous acid, isobutyl 2-pentyl ester(0.49), Ammounium Oxalate(0.35), 2-Hexadecen-1-OL, 3,7,11,15-Tetram(1.63) 2-Nonanol, 5-ethyl-(1.57) 3,7,11,15-Tetramethyl-2-hexadecen-1-ol(0.84), Oxirane, tetradecyl-(1.38), Carbamic acid, 2,2,3,3-tetrafluo-(0.23), Hexadecanoic acid, ethyl ester-(0.52), 2-Hexadecen-1-OL,3,7,11,15-tetram-(0.80), 1,1,3,3,5,5,7,7,9,9,11,11,13,13, 15,15-Hexa-(0.32), 2-Methyl-6-Phenethylamino-tet(0.23), Quinolin-6(7H)-one, 1,2,3,4,8,8A-hex-(0.44), Benzenamine, 2,5-dichloro-4-nitr-(0.26), 2,5-Dihydroxybenzyl alcohol 3-(0.23), p-Cyanophenyl p-(2-propoxyethoxy)benzoa-(0.23), Pentasiloxane, 1,1,3,3,5,5,7,7,9,9-de-(0.47), 1H-Imidazo[1,5-c]thiazole-5,7(6H,7ah)-dio-(0.23), Silicic acid, diethyl bis(trimethylsilyl) ester-(0.25), Methyltris(trimethylsiloxy) silane-(0.45), Benzoic acid, 4-methyl-2-trimethylsilyloxy-(0.36), and trans-4,4'-Dimethoxy-beta-methylchalcone-(0.31).

Discussion

The phytochemical analysis carried out in the whole plants Hexane extract and ethanol showed the presence of some bioactive compounds in *C. decumbens*. In the two forms of extract, eight bioactive constituents were tested for, out of which only three were present in the two extractions (Table. 1). Analysis of tannins in the two extracts was positive but higher colour intensity was observed in the ethnolic extract than the dry leaves hexane extract. Presence of tannins suggests the ability of this plant to play major roles as antidiarrhoec and antihaemorrhagic agent (Asguit and Butler, 1986). Saponins though positive for both extracts, persistent frosting was intense in the ethnolic extract than the dry leaf hexane extract. This compound has been shown to have immense significance as antihypercholesterol, hypotensive and cardiac depressant properties (Trease and Evans, 1978; Price, 1987. Hence this plant could be suitable for these purposes. Cardiac glycosides showed positive results for both the ethnolic and Hexane extract with no clear intensity indication in both extracts. The cardiac glycosides have been used for over two centuries as stimulants in cases of cardiac failure (Trease and Evans, 1978; Olayinka *et al*., 1992). This perhaps justifies and already locally established function of the plant in the treatment and management of hypertension.

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