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Chemical Constituents of hydro alcoholic extract and Phenolic fraction of *Cynodon dactylon*

M.Mohamed Shabi[1], K. Gayathri[1], R.Venkatalakshmi[2], C.Sasikala*[2]

[1]SASTRA University, Thanjavur 613402, Tamilnadu, India.

[2]Shri Vishnu College of Pharmacy, Bhimavaram, W.G. (DT), Andhrapradesh, India.

Corres. Author: hasipharm@gmail.com
Mobile No- 09618157460

ABSTRACT: A comparison of the chemical constituents between Phenolic fraction and hydro alcoholic extract of *Cynodon dactylon* was investigated by gas chromatography-massspectrometry (GC/MS). The yield of phenolic fraction was 0.6% and 22 compounds were found in *Cynodon dactylon.* Hydroquinone (69.49%), Levoglucosenone (2.72%), Furfural (6.0%), were found to be the most abundant components among the 20 characterized compounds in *Cynodon dactylon*. However, the constituents of the hydro alcoholic extract contained totally 22 compounds mainly Hexadecanoic acid, ethyl ester (17.49%), Linolenic acid, ethy ester (11.28%), and d-Mannose (11.48%).
Keywords: *Cynodon dactylon*, Hydroalcoholic extract, Phenolic fraction, GC-MS analysis.

INTRODUCTION

Cynodon dactylon (Family: Poaceae, Aruvam pillu in Tamil, Dhub in Hindi, Bermuda grass in English) A creeping herb rooting at the joints with smooth upward stem. The roots are whitish, tough and creeping, almost woody with smooth fibers. Leaves tapering to a sharp point, ribbed with smooth sheath and hairy stipules. Flowers are purplish arranged in 2 close alternative rows in equally crowed 4 or 5 terminal, linear spikes and blooming in the mouth of August to September. The herb contains beta sitosterol, beta-carotene, vitamin C, palmitic acid, and triterpenoids. Alkaloids like ergonovine, ergonovivine. Others include ferulic acid, syringic acid, vanillin acid, p-coumaric acid. Others like furfural, glucose, fructose etc[1].The plant is folk remedy for anasarea, calculus, cancer, carbuncles, cough, hypertension, snakebites, stones, gout and rheumatic affections[2,3]. Ethanol extract of *Cynodon dactylon* showed marked diuretic activity in root stalk Extract in Albino Rats[4]**.** Aqueous extract and non polysaccharide fraction showed antidiabetic activity[5]. Ethanol extract of aerial parts of *C. dactylon* has also marked CNS depressant[6] and antioxidant activities[7]. Fresh extract of *Cynodon dactylon* investigated clinically in 10 patients of Idiopathins Thrombocytopenic Purpurea (ITP) gave remissions for a longer period of time. Durva also controlled haematuria in few patients. In patients with bone marrow depression, it increased the platelet count and white blood cells. The drug was safe and had no side effect [8].

MATERIALS AND METHODS

Plant material

Whole parts of *Cynodon dactylon* were collected during April-May 2008, from around of Pudukkotai dist, Tamilnadu India. Plant was authentified by Dr Ravichendran, Faculty of Carism, Sastra University Thanjavur, India. The voucher specimens were deposited at the Carism, Sastra University Thanjavur, India.

Preparation of extract (CD)

The raw herb was coarsely powdered and soaks in ethanol: water (70:30). The plant material was soaked in the solvent for 72 hours and filtered. The

filtrate was concentrated *invaccuo*. The concentrated extract is stored in refrigerator until used.

Separation of phenolic fraction (CDP)

5.0 gm of dry plant was measured in the beaker. To this 125 ml of 1 N HCl was added. The mixture was soaked and maintained at 50^0C for 30 minutes and at room temperature for 2 hours. The extract was filtered. To the filtrate 50 ml of ether was added. The ether fraction was separated and allowed to evaporate. The concentrated fraction is used for GC-MS analysis.

GC-MS analysis

10 mg of samples were dissolved in methanol and analyzed by GC–MS on GC Clarus 500 Perkin Elmer using the following experimental conditions: Column type - Elite -5 (5 % diphenyl 95 % dimethyl polysiloxane), Column dimension 30 m X 0.32 mm), carrier gas – Helium 1 ml/min, column temperature from 50 °C up to 285°C at the rate of 10 °C/min and 5 min hold, at 285 °C, injector and detector temperature - 290°C, injection mode split, volume injected: 0.5 µl of a solution prepared from 2 mg/100 ml in methanol. Total run time was 30 minutes. Mass spectrum was taken using Mass detector – Turbo Mass gold – Perkin Elmer. Transfer line temperature – 230 °C, Source temperature – 230 °C, scan range is from 40 – 450 amu, ionisation technique – Electron ionization technique.

Identification of components

Identification of components of the ethanolic extract and phenolic fraction was based on direct comparison of the retention times and mass spectral data, and computer matching with the Wiley 229, Nist 107, Nist 21 Library, as well as by comparison of the fragmentation patterns of the mass spectra with those reported in the literature [9,10,11].

RESULTS AND DISCUSSION

The results of the GC-MS analyses on the hydro alcoholic extract and phenolic fraction of the whole parts of *Cynodon dactylon* are presented in Table 1 & 2.

A total of 20 compounds were identified from the hydroalcoholic extract of the whole parts of *Cynodon dactylon*. The identified compounds Hexadecanoic acid, ethyl ester , Linolenic acid, ethy ester and d-Mannose were the major components of the hydro alcoholic extract, and Hexadecanoic acid ethyl ester was the most abundant one (17.49%). Of these major constituents, hexadecanoic acid, Linolenic acid is relatively common for essential oils of higher plants. Total of 22 compounds were identified from the phenolic fraction of the whole parts of *Cynodon dactylon*. From the phenolic fraction of *Cynodon dactylon* were identified Hydroquinone, Levoglucosenone and Furfural . Hydroquinone was the most abundant one (69.49%).

CONCLUSION

The GC-MS analyses revealed that the alcoholic extract is mainly composed of oxygenated hydrocarbons; the phenolic fraction contains predominantly phenolic hydrocarbons.

Table 1: GC-MS Peak table of hydro alcoholic extract of *Cynodon dactylon*

S.No.	Peak Name	Retention Time	% Peak Area
1	3H-Pyrazol-3-one, 2,4-dihydro-2,4,5-trimethyl- Formula: $C_6H_{10}N_2O$, MW: 126	5.20	2.2112
2	4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl- Formula: $C_6H_8O_4$, MW: 144	6.12	3.2157
3	Menthol Formula: $C_{10}H_{20}O$, MW: 156	6.49	1.1807
4	Benzoic acid, 2-hydroxy-, methyl ester Formula: $C_8H_8O_3$, MW: 152	6.72	2.0455
5	Benzofuran, 2,3-dihydro- Formula: C_8H_8O, MW: 120	6.92	0.9639
6	2-Furancarboxaldehyde, 5-(hydroxymethyl)- Formula: $C_6H_6O_3$, MW: 126	7.01	2.3088

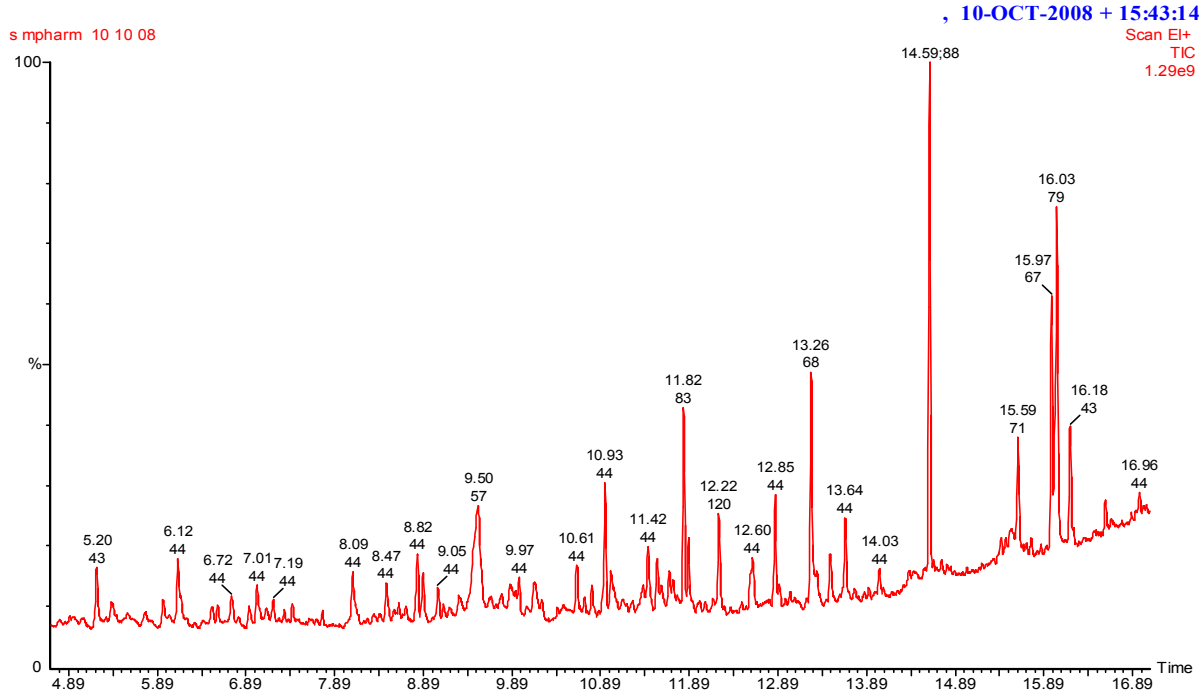
7	2-Methoxy-4-vinylphenol Formula: $C_9H_{10}O_2$, MW: 150	8.09	3.2348
8	Decanoic acid, ethyl ester Formula: $C_{12}H_{24}O_2$, MW: 200	8.82	2.4063
9	d-Mannose Formula: $C_6H_{12}O_6$, MW: 180	9.50	11.4820
10	3-Tert-Butyl-4-hydroxyanisole Formula: $C_{11}H_{16}O_2$, MW: 180	10.79	0.9040
11	Ar-tumerone Formula: $C_{15}H_{20}O$, MW: 216	11.82	5.7431
12	Tumerone Formula: $C_{15}H_{22}O$, MW: 218	11.88	1.9123
13	Curlone Formula: $C_{15}H_{22}O$, MW: 218	12.22	4.2422
14	Tricyclo[6.3.0.0(1,5)]undec-2-en-4-one, 2,3,5,9-tetramethyl- Formula: $C_{15}H_{22}O$, MW: 218	12.60	2.8914
15	3,7,11,15-Tetramethyl-2-hexadecen-1-ol Formula: $C_{20}H_{40}O$, MW: 296	13.26	10.3540
16	Hexadecanoic acid, ethyl ester Formula: $C_{18}H_{36}O_2$, MW: 284	14.59	17.4905
17	Phytol Formula: $C_{20}H_{40}O$, MW: 296	15.59	5.2078
18	9,12-Octadecadienoic acid, ethyl ester Formula: $C_{20}H_{36}O_2$, MW: 308	15.97	6.9257
19	Linolenic acid, ethyl ester Formula: $C_{20}H_{34}O_2$, MW: 306	16.03	11.2885
20	Octadecanoic acid, ethyl ester Formula: $C_{20}H_{40}O_2$, MW: 312	16.18	3.9916

Table 2: GC-MS Peak table of Phenolic fraction of *Cynodon dactylon*

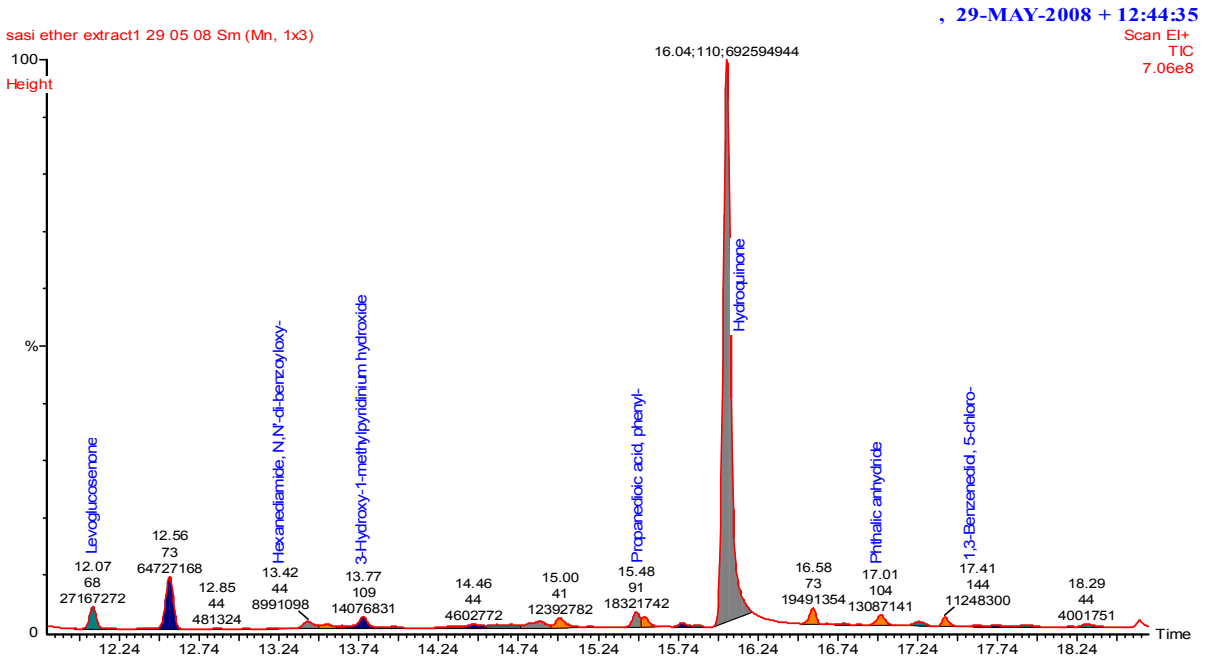
S.No,	Peak Name	Retention Time	Peak Area	% Peak Area
1	Propanoic acid, 2-oxo- Formula: $C_3H_4O_3$ MW: 88	3.79	15889106	1.5939
2	Furfural Formula: $C_5H_4O_2$ MW: 96	5.22	60035480	6.0224
3	2H-Pyran-2-one, 5,6-dihydro- Formula: $C_5H_6O_2$ MW: 98	6.77	13281388	1.3323
4	Pantolactone Formula: $C_6H_{10}O_3$ MW: 130	9.84	8948949	0.8977
5	Pentanoic acid, 4-oxo- Formula: $C_5H_8O_3$ MW: 116	9.97	7266058	0.7289
6	Levoglucosenone Formula: $C_6H_6O_3$ MW: 126	12.07	27167272	2.7253
7	Hexanediamide, N,N'-di-benzoyloxy- Formula: $C_{20}H_{20}N_2O_6$ MW: 384	13.42	8991098	0.9019
8	3-Hydroxy-1-methylpyridinium hydroxide Formula: $C_6H_9NO_2$ MW: 127	13.77	14076831	1.4121
9	2-Furancarboxaldehyde, 5-methyl- Formula: $C_6H_6O_2$ MW: 110	7.75	15668762	1.5718
10	Propanedioic acid, phenyl- Formula: $C_9H_8O_4$ MW: 180	15.48	18321742	1.8379
11	Hydroquinone Formula: $C_6H_6O_2$ MW: 110	16.04	692594944	69.4771
12	Phthalic anhydride Formula: $C_8H_4O_3$ MW: 148	17.01	13087141	1.3128
13	1,3-Benzenediol, 5-chloro- Formula: $C_6H_5ClO_2$ MW: 144	17.41	11248300	1.1284
14	Benzaldehyde, 3-(chloroacetoxy)-4-methoxy- Formula: $C_{10}H_9ClO_4$ MW: 228	18.63	7991102	0.8016
15	Ethanone, 1-(4-hydroxy-3-methoxyphenyl)- Formula: $C_9H_{10}O_3$ MW: 166	20.15	5166593	0.5183

16	1,6-Anhydro-á-D-glucopyranose (levoglucosan) Formula: $C_6H_{10}O_5$ MW: 162	20.29	10948029	1.0982
17	Vanillic acid Formula: $C_8H_8O_4$ MW: 168	21.30	11963609	1.2001
18	1-(2-Hydroxy-4,5-dimethoxy-phenyl)-ethanone Formula: $C_{10}H_{12}O_4$ MW: 196	23.89	3598416	0.3610
19	Syringic acid Formula: $C_9H_{10}O_5$ MW: 198	24.94	11118965	1.1154
20	Pyrrolidin-2-one, N-(2,4-dimethylcyclopent-3-enoyl)-, cis- Formula: $C_{12}H_{17}NO_2$ MW: 207	25.03	18545210	1.8603
21	Cinnamic acid, 4-hydroxy-3-methoxy- Formula: $C_{10}H_{10}O_4$ MW: 194	25.74	12306664	1.2345
22	9,9-Dimethoxybicyclo[3.3.1]nona-2,4-dione Formula: $C_{11}H_{16}O_4$ MW: 212	26.97	8652143	0.8679
			996867802	100.0000

Chromatogram 1: GC-MS Chromatograms of Hydro alcoholic extract of *Cynodon dactylon*



Chromatogram 2: GC-MS Chromatograms of Phenolic fraction of *Cynodon dactylon*



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