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Original Article

Bioactive components of *Cynodon Dactylon* using ethanol extract

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ABSTRACT

The present investigation was carried out to determine the possible bioactive compounds from *Cynodon dactylon* by GC-MS Technique. This analysis revealed that *C. dactylon* contain fourteen bioactive compounds namely 3-Ethyl-6-Methoxy-2,4,7-Trioxa-3-Borabicyclo(3.3.1) nonan-9-ol, 2,3-Dihydro-Benzofuran, Erythritol, Xanthosine, 4-(1E)-3-Hydroxy-1-propenyl)-2-methoxyphenol, n-Hexadecanoic acid, Benzeneacetic acid, alpha,dihydroxy-3-methoxy-methyl ester, Benzenemethanol,2,5-dimethoxy acetate, Hexadecanoic acid, ethyl ester,Octadecanal, Stismasta-5,22-dien-3-ol, actetate, (3beta) Ergost-5-en-ol,(3beta), Stigmasterol, Gamma-sitosterol. Which were having activity towards antibacterial activity, antilipidemic proporties, antiasthma, diuretic, and hypolipidemic property.

Keywords: *Cynodon dactylon*, GC-MS, Bioactive Components

INTRODUCTION

Most traditional medicines are developed from nature. Plants are rich source of secondary metabolites with interesting biological activities .Distinguished example of these compounds include flavonoids, phenols, saponins and cyanogenic glycosides. [1,2] *Cynodon dactylon*(L.) Pers. (family –Poaceae), commonly known as Bermuda grass or Durva in Hindi is a weed .It is traditionally used for diabetes [3]anti-inflammatory, kidney problems, urinary disease, gastrointestinal disorder constipation, abdominal pain and as a blood purifying agent[4].Whole plant is used for-diuretic, dropsy, syphilis, wound infection, piles[5].The juice of the plant is astringent and is applied externally to fresh cuts and wounds. It is used in the treatment of catarrhal opthalmia, hysteria, epilepsy, insanity, chronic diarrhea and dysentery. The plant is folk remedy for calcus, carbuncles, cough, hypertension, snake bites and gout[6,7].The ethanolic extract of aerial parts of *C.dactylon* showed marked protection against convulsions induced by chemo convulsive agents in mice [8].Ethanol extract of aerial parts of *C. dactylon* has marked CNS depressant [9] and antioxidant activity[10].Since there is no report on the phytoconstituents of *C. dactylon* leaves it was chosen as the subject of this study. The aim of this paper is to determine the organic compounds present in *C. dactylon* with the aid of GC-MS Technique, which may provide an insight in its use in folklore medicine.

MATERIALS AND METHODS

Collection and preparation of plant material: The fresh whole plants of *Cynodon dactylon* were collected from Nagercoil, Kanyakumari district, Tamilnadu, India. The samples were washed thoroughly in running tap water to remove soil particles and adhered debris and finally washed with sterile distilled water. The whole plants were shade dried and ground into fine powder. The powdered materials were stored in air tight polythene bags until use.

Plant sample extraction: The powder samples of *Cynodon dactylon* were extracted with ethanol at temperature between 60-65ºC by using soxhlet extractor. The solvent was evaporated by rotavapor to obtained viscous semi solid masses. The semi dry ethanol crude extract from the whole plant of *Cynodon dactylon* analysed by GC-MS, it has led to the identification and characterization of 14 different organic compounds.

Gas Chromatography-Mass Spectrometry (GC-MS Analysis): GC-MS Analysis of the ethanol extract in the selected plant was performed using a

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Perkin Elmer GC Clarus 500 system comprising AOC-20i Auto sampler and a Gas chromatograph interfaced to a mass spectrometer (GC-MS) equipped with a Elite-5MS (5% Diphenyl/Dimethyl poly siloxane) fused silica capillary column (30×0.25mm×1D×0.25mmdF). For GC-MS detection, an electron ionization system was operated in electron impact mode with ionization energy of 70ev. Helium gas (99.999%) was used as carrier gas at a constant flow rate of 1ml/mi, and an injection volume of 2ml was employed (split ratio of 10:1). The injector temperature was maintained at 250^0c, the ion-source temperature was 200˚c, the oven temperature was programmed at 110˚c (isothermal for 2 min)with an increase of 100c/min to 200˚c then, 5˚c/min to 280˚c ending with 9min isothermal at 280˚c. Mass spectra was taken at 70ev; a scan interval of 0.5 seconds and fragments from 45-450Da. The solvent delay was 0 to 2 min. The relative percentage of each component was calculated by comparing its average peak area to the total areas. The mass detector used in this analysis was Turbo-Mass Gold-Perkin Elmer and the software adopted to handle mass spectra and chromatograms was a *Turbomass.*

Identification of components: Interpretation on mass spectrum of GC-MS was done using the database of National institute of standard technology (NIST) having more than 62,000 patterns. The mass spectrum of the unknown component was compared with the spectrum of the known components stored in the NIST library. The name, Retention time, molecular weight, and structure of the components of the test materials were ascertained.

RESULTS

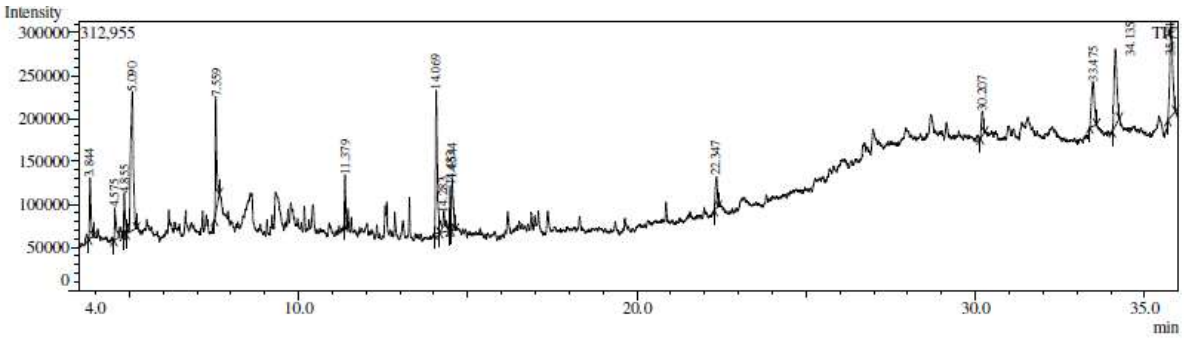
The results pertaining to GC-MS analysis led to the identification of number of compounds from the GC fractions of the ethanolic extract of *Cynodon dactylon*. These compounds were identified through mass spectrometry attached with GC. The results of the present study were tabulated in Table 1. The results revealed that the presence of 3-Ethyl-6-Methoxy-2,4,7-Trioxa-3-Borabicyclo(3.3.1) nonan-9-ol, 2,3-Dihydro-Benzofuran, Erythritol, Xanthosine, 4-(1E)-3-Hydroxy-1-propenyl)-2-methoxyphenol, n-Hexadecanoic acid, Benzeneacetic acid, alpha.,dihydroxy-3-methoxy-methyl ester, Benzenemethanol,2,5-dimethoxy acetate, Hexadecanoic acid, ethyl ester,Octadecanal, Stismasta-5,22-dien-3-ol, actetate, (3beta) Ergost-5-en-ol,(3beta), Stigmasterol, Gamma- sitosterol. The spectrum profile of GC-MS confirmed the presence of 14 compounds with retention time 4.575, 4.858, 5.092, 7.558, 11.375, 14.067, 14.283, 14.483, 14.542, 22.350, 30.208, 33.475, 34.133, and 35.783 respectively. The individual fragmentation of the components is illustrated in Figures 1.

Table 1: Chemical composition of ethanol extract in *Cynodon dactylon*

Sl no	RT	Compound name	Molecular weight	Activity
1	4.575	3-ethyl-6-methoxy-2,4,7-trioxa-3-borabicyclo[3.3.1]nonan-9-ol	202	Antibacterial activity
2	4.858	2,3-dihydro-benzofuran	120	Antilipidemic properties
3	5.092	Erythritol	122	Sweet antioxidant
4	7.558	xanthosine	284	Hydrogen ion symporter *activity*
5	11.375	4-((1E)-3-Hydroxy-1-propenyl)-2-methoxyphenol	180	Anticancer activity
6	14.067	n-Hexadecanoic acid	256	Anti-inflammatory, Antibacterial activity, Antioxidant, Hypocholesterolemic Nematicide, Pesticide,Lubricant, Antiandrogenic, Flavor, Hemolytic, 5-Alpha reductase inhibitor
7	14.283	benzeneacetic acid, .alpha.,4-dihydroxy-3-methoxy-, methyl	212	Antioxidant

		ester		
8	14.483	Benzenemethanol, 2,5-dimethoxy-, acetate	210	Antibacterial activity
9	14.542	hexadecanoic acid, ethyl ester	284	Antioxidant, Hypocholesterolemic Nematicide, Pesticide, Lubricant, Antiandrogenic, Flavor, Hemolytic 5-Alpha reductase inhibitor
10	22.350	Octadecanal	268	alkane-lyase *activity*
11	30.208	Stigmasta-5,22-dien-3-ol, acetate, (3.beta.)-	454	antibacterial activity, antinflammatory, antiarthritic antiasthma, diuretic
12	33.475	Ergost-5-en-3-ol, (3.beta.)-	400	Antimicrobial, anti-inflammatory effects
13	34.133	Stigmasterol	412	Antimicrobial activity
14	35.783	gamma.-Sitosterol	414	hypolipidemic property

Figure.1. GC-MS Chromatogram of ethanol extract in *Cynodon dactylon*



DISCUSSION

Nonacosaneis a straight-chain hydrocarbonit plays a role in the chemical communication of several insects, including the female Anopheles stephensi mosquito[11]. Nonacosane occurs naturally and has been identified within several essential oils. It can also be prepared syntheticall[12]. Stigmasterol also known as Wulzen anti-stiffness factoris one of a group of plant sterols, or phytosterols, that include β-sitosterol, campesterol, ergosterol(provitamin D2), brassicasterol, delta-7-stigmasterol and delta-7-avenasterol, that are chemically similar to animal Cholesterol. Phytosterols are Stigmasterol is used as a precursor in the manufacture of semisyntheticprogesterone [13]a valuable human hormone that plays an important physiological role in the regulatory and tissue rebuilding mechanisms related to estrogen effects, as well as acting as an intermediate in the biosynthesis of androgens, estrogens, and corticoids. It is also used as the precursor of vitamin D3[14].The Upjohncompany used stigmasterol as the starting raw material for the synthesis of cortisone[15]insoluble in water but soluble in most organic solvents and contain one alcohol functional group. Research has indicated that stigmasterol may be useful in prevention of certain cancers, including ovarian, prostate, breast, and colon cancers. Studies have also indicated that a diet high in phytoesterols may inhibit the absorption of cholesterol and lower serum cholesterol levels by competing for intestinal absorption. Studies with laboratory animals fed stigmasterol found that both cholesterol and sitosterol absorption decreased 23% and 30%, respectively, over a 6-week period. It was demonstrated that it inhibits several pro-inflammatory and matrix degradation mediators typically involved in osteoarthritis-induced cartilage degradation[16].It also possesses potent antioxidant, hypoglycemic and thyroid inhibiting properties[17].

CONCLUSION

In the present investigation fourteen bioactive compounds were identified using ethanol extract in *Cynodon dactylon*. The presence of various bioactive compounds justifies the use of the *Cynodon dactylon* for various ailments by traditional practitioners.

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