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Address:-Ashok Yakkaldevi 258/34, Raviwar Peth, Solapur - 413 005 Maharashtra, India
Cell : 9595 359 435, Ph No: 02172372010 Email: ayisrj@yahoo.in Website: www.ror.isrj.net

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ORIGINAL ARTICLE

EFFECT OF BIOACTIVE COMPOUNDS ANALYSIS IN THE LEAF OF Acacia catechu BY GC- MS METHOD

B. Kayathri , K. Kanimozhi and A. Panneerselvam

Department Of Botany & Microbiology,
A.V.V.M. Sri Pushpam College, (Autonomous) Poondi , Tanjavur (D.T), Tamil Nadu, India.

Abstract:

The present study deals with the GC- MS analysis of the medicinal plant of Acacia catechu. The methanol extract of this plant showed good bioactive compounds found in GC – MS analysis of Acacia catechu. The result showed that twenty six bioactive compounds are present in leaf sample. Myo-Inositol, 4-C-methyl- $CH_{14}O_6$(Molecular weight- 194.00, RT- 33.55) showed high percentage (32.03%) of peak area than other compounds.

KEY WORDS:

Acacia catechu, Leaf, Bioactive compounds, GC- MS.

INTRODUCTION

Acacia catechu commonly known as Catechu. Catechu is an important medicinal plant and an economically important forest tree. *Acacia* is a very important herbal tree for skin disorders and bleeding tendencies. The bark possesses astringent, anti-inflammation, antibacterial, antifungal and large amount of antioxidant activities (Singh and Brij lal, 2006). Externally, catechu bark powder is applied for boils, ulcer and cutaneous eruption (Lakshmi, 2011). Acacia main chemical constituents of Acacia catechu are Catechin, Epicatechin, Epigallocatechin, Phloroglucin, Protocatechui acid, Quercetin Poriferasterol glucosides, Lupenone, Procyanidin, Kaemferol, L- arabinose, D- galactose, D-rhamnose and Aldobiuronic acid, Mineral and Taxifolin (Jain *et al.*, 2007; Sham *et al.,* 1984; Anonymous, 2004; Singh and Lal,2006) , the plant extracts were purified by column chromatography and were further identified by Gas Chromatography- Mass Spectrum (GC- MS) analysis of *Acacia catechu* (Negi and Dave, 2011).

MATRIALS AND METHODS

Collection and Processing of plant material

Acacia catechu collected from Nagappatinam District, Tamil Nadu. The samples were washed thoroughly in running tap water. Fresh leaf material of *Acacia catechu* were dried at room temperature and then grounded into fine powder. The Powdered materials were stored in air tight bottle for further use.

Estimation of photochemical analysis

technique is used to analyse the plant materials. This important analytical

Preparation of plant extract

About 5g of dried leaf powder were extracted with 50 ml of methanol for 24 h at room temperature by constant shaking and filtered twice through Whatman No. 1 filter paper with the help of a suction pump. Then the solvent were collected and transferred to the screw cap bottles.

GC-MS Condition

Capillary column 30m × 0.25 mm coated with 0.25 µM film of HP-5. Sample elution using 50: 1 helium was used as carrier gas at 1.0 ml min-1. Column temperature 100°C for 1 minutes increased 10°C min^{-1} to 275°C min^{-1} for 20 minutes. Time taken for chromatography per sample in 40 mins.

Analysis of the phytocomponents in *Acacia catechu* leaf using GC-MS technique:

One micro liter of the filtrate was injected into the GC-column. Then the sample get evaporated and carried away by the carrier gas, helium and it got segregated into individual fractions. The sample fraction coming out of the column was let into the mass detector and the mass spectrum of each component was recorded. The mass spectrum of the unknown component was compared with the known spectrum was accomplished using computer searches in commercial libraries.

Identification of components

The database in the National Institute Standard and Technology (NIST) has been used for the interpretation on GC – MS. The spectrum of the unknown component was compared with the spectrum of the known component stored in the NIST library. Then the structures, molecular formula, molecular weight of components were identified accordingly.

RESULT AND DISCUSSION

In the present investigation effect of bioactive compounds of *Acacia catechu* leaf was analysed by GC-MS methods. The results of the experiments were presented in Table- 1 and Fig. 1. The GC-MS study of *Acacia catechu* showed twenty six different compounds resulting different retention time. Based on the peak area percentage, Myo-Inositol, 4-C-methyl- $C_7H_{14}O_6$(Molecular weight- 194.00, RT- 33.55) shows high percentage (32.03%) than other compounds, followed by, 2-Pyridine carboxylic acid C6H5NO2 (Molecular weight- 123.00, RT- 3.30, % of Peak area -10.80), Pyridine C_5H_5N (Molecular weight- 79.00, RT- 3.00, % of Peak area -7.96), D-Allose $C_6H_{12}O_6$(Molecular weight- 180.00, RT- 17.41, % of Peak area -4.73), L-Arabinitol $C_5H_{12}O_5$(Molecular weight- 152.00, RT- 14.03, % of Peak area -4.51), Glycerin $C_3H_8O_3$ (Molecular weight- 92.00, RT- 7.96, % of Peak area -4.28), 2-Cyclohexen-1-one, 4-ethyl-3,4-dimethyl- $C_{10}H_{16}O$ (Molecular weight- 152.00, RT- 17.83, % of Peak area -4.26), Ethanone, 2-cyclopentyl-1-(1H-imidazol-2-yl)- $C_{10}H_{14}N_2O$ (Molecular weight- 178.00, RT- 20.79, % of Peak area – 4.06),N,N-Dimethyl-2-amino ethanol $C_4H_{11}NO$ (Molecular weight- 89.00, RT- 10.27, % of Peak area – 3.95), 3,7,11,15-Tetramethyl-2-hexadecen-1-ol $C_{20}H_{40}O$ (Molecular weight- 296.00, RT- 20.44, % of Peak area – 3.91), Benzofuran, 2,3-dihydro- C_8H_8O (Molecular weight- 120.00, RT-12.12, % of Peak area – 3.14), 2-Methoxy-4-vinylphenol $C_9H_{10}O_2$(Molecular weight- 150.00, RT-12.97, % of Peak area – 2.83), Ethanone, 1-(3,4-dimethoxyphenyl)- $C_{10}H_{12}O_3$(Molecular weight- 180.00, RT-17.09, % of Peak area – 2.57), Cycloate $C_{11}H_{21}NOS$ (Molecular weight- 215.00, RT-18.00, % of Peak area – 2.14), Benzenepropanoic acid, á,2,5-trimethyl-, methyl ester $C_{13}H_{18}O_2$(Molecular weight- 206.00, RT-15.29, % of Peak area – 1.28), 2-Pyrrolidinone C_4H_7NO (Molecular weight- 85.00, RT-8.88, % of Peak area – 1.04), Propanedioic acid, phenyl- $C_9H_8O_4$(Molecular weight- 180.00, RT-12.53, % of Peak area – 0.91), 1-(3,6,6-Trimethyl-1,6,7,7a-tetrahydrocyclopenta[c]pyran-1-yl)ethanone $C_{13}H_{18}O^2$ (Molecular weight- 206.00, RT-18.49, % of Peak area – 0.90), N,N-Dimethylglycine $C_4H_9NO_2$(Molecular weight- 103.00, RT-10.66, % of Peak area – 0.80), Benzeneacetonitrile, à-acetyl- $C_{10}H_9NO$ (Molecular weight- 159.00, RT-13.15, % of Peak area – 0.75),3-Furanacetic acid, 4-hexyl-2,5-dihydro-2,5-dioxo- $C_{12}H_{16}O_5$(Molecular weight- 240.00, RT-19.42,

% of Peak area – 0.58), 2,6-Octadiene-4,5-diol, 3,6-dimethyl- $C_{10}H_{18}O_2$(Molecular weight- 170.00, RT-11.75, % of Peak area – 0.58), Ethanamine, 2-chloro-N,N-dimethyl- $C_4H_{10}ClN$ (Molecular weight- 107.00, RT-5.42, % of Peak area – 0.53), 10-Methyl-10-nonadecanol $C_{20}H_{42}O$ (Molecular weight- 298.00, RT-13.41, % of Peak area – 0.49),Phenol, 2,6-dimethoxy-4-(2-propenyl)- $C_{11}H_{14}O_3$(Molecular weight-194.00, RT-19.14, % of Peak area – 0.42), 2(4H)-Benzofuranone, 5,6,7,7a-tetrahydro-4,4,7a-trimethyl-$C_{11}H_{16}O_2$(Molecular weight- 180.00, RT-16.69, % of Peak area – 0.41). The GC-MS analysis showed the presence of various bioactive compounds in leaf sample of Acacia catechu.

CONCLUSION

Plants are natural source of bioactive compounds to treat many diseases. The plant Acacia catechu has showed good phytochemicals which means that it can use for treating diseases. In GC-MS analysis in twenty six bioactive compounds for leaf were identified from the leaves. The result may have bioactive compounds prevention of throat related diseases.

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FIG:1 Effect of Bioactive compounds present in leaf of *Acacia catechu* by GC-MS method

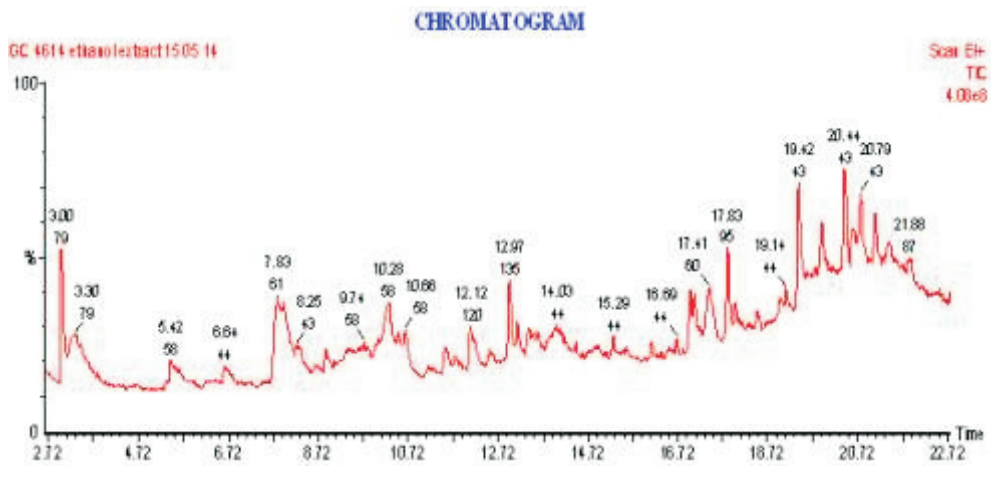

Table-1 Effect of Bioactive compounds present in leaf of *Acacia catechu* by GC-MS method

S. No	Retention Time	Compound Name	Molecular Formula	Molecular Weight	% of Peak Area
1.	3.00	Pyridine	C_5H_5N	79.00	7.9669
2.	3.30	2-Pyridinecarboxylic acid	$C_6H_5NO_2$	123.00	10.8031
3.	5.42	Ethanamine, 2-chloro-N,N-dimethyl-	$C_4H_{10}ClN$	107.00	0.5388
4.	7.96	Glycerin	$C_3H_8O_3$	92.00	4.2818
5.	8.88	2-Pyrrolidinone	C_4H_7NO	85.00	1.0430
6.	10.27	N,N-Dimethyl-2-aminoethanol	$C_4H_{11}NO$	89.00	3.9545
7.	10.66	N,N-Dimethylglycine	$C_4H_9NO_2$	103.00	0.8078
8.	11.75	2,6-Octadiene-4,5-diol, 3,6-dimethyl-	$C_{10}H_{18}O_2$	170.00	0.5815
9.	12.12	Benzofuran, 2,3-dihydro-	C_8H_8O	120.00	3.1421
10.	12.53	Propanedioic acid, phenyl-	$C_9H_8O_4$	180.00	0.9186
11.	12.97	2-Methoxy-4-vinylphenol	$C_9H_{10}O_2$	150.00	2.8329
12.	13.15	Benzeneacetonitrile, à-acetyl-	$C_{10}H_9NO$	159.00	0.7517
13.	13.41	10-Methyl-10-nonadecanol	$C_{20}H_{42}O$	298.00	0.4941
14.	14.03	L-Arabinitol	$C_5H_{12}O_5$	152.00	4.5166
15.	15.29	Benzenepropanoic acid, á,2,5-trimethyl-, methyl ester	$C_{13}H_{18}O_2$	206.00	1.2891
16.	16.69	2(4H)-Benzofuranone, 5,6,7,7a-tetrahydro-4,4,7a-trimethyl-	$C_{11}H_{16}O_2$	180.00	0.4192
17.	17.09	Ethanone, 1-(3,4-dimethoxyphenyl)-	$C_{10}H_{12}O_3$	180.00	2.5785
18.	17.41	D-Allose	$C_6H_{12}O_6$	180.00	4.7353
19.	17.83	2-Cyclohexen-1-one, 4-ethyl-3,4-dimethyl-	$C_{10}H_{16}O$	152.00	4.2662
20.	18.00	Cycloate	$C_{11}H_{21}NOS$	215.00	2.1461
21.	18.49	1-(3,6,6-Trimethyl-1,6,7,7a-tetrahydrocyclopenta[c]pyran-1-yl)ethanone	$C_{13}H_{18}O_2$	206.00	0.9070
22.	19.14	Phenol, 2,6-dimethoxy-4-(2-propenyl)-	$C_{11}H_{14}O_3$	194.00	0.4298
23.	19.42	3-Furanacetic acid, 4-hexyl-2,5-dihydro-2,5-dioxo-	$C_{12}H_{16}O_5$	240.00	0.5820
24.	20.44	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	$C_{20}H_{40}O$	296.00	3.9144
25.	20.79	Ethanone, 2-cyclopentyl-1-(1H-imidazol-2-yl)-	$C_{10}H_{14}N_2O$	178.00	4.0613
26.	33.55	Myo-Inositol, 4-C-methyl-	$C_7H_{14}O_6$	194.00	32.0376

B. Kayathri
Department Of Botany & Microbiology, A.V.V.M. Sri Pushpam College, (Autonomous)
Poondi , Tanjavur (D.T), Tamil Nadu, India.