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Research Article

PHYTOCHEMICAL ANALYSIS OF *ALSEODAPHNE SEMECARPIFOLIA* LEAF EXTACT BY GC-MS

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ABSTRACT

OBJECTIVE: To explore the phytochemical constituents present in the leaves of *Alseodaphne semecarpifolia* using GC-MS analysis. METHODS: The shade-dried leaves of *A.semecarpifolia* were extracted with 80% ethanol subjected to cold percolation. The concentrated ethanolic extracts were further subjected to GC-MS. RESULTS: The alcoholic leaves extract showed 50 different types of phytoconstituents, primarily 1H-Pyrrole, 1-methyl- (33.79 %), phytol (14.66 %), coumarins (2.2%), fatty acids and its ester, terpenoids, alkaloids, phenols, and hetero cyclic containing compounds are present. CONCLUSION: *A.semecarpifolia* which possesses several known and unknown bioactive compounds. Most of the identified compounds by GC-MS in the leaf extracts are basically biological important. Further investigation may lead to the development of drug formulation.

Keywords: *Alseodaphne semecarpifolia* Nees, leaf extracts, phytochemical analysis, GC-MS.

INTRODUCTION

Explosive growth of modern chemical and biological science has created new awareness in the unlimited potential of the natural products from plants [1]. *Alseodaphne* species, isoquinoline types of alkaloids are the main alkaloidal constituents. Previously, the following compounds have been isolated in this species such as aporphines, benzylisoquinolines, morphinandienones, protoamines, lactonic compounds and Neolignans. It has been studied for anti-microbial, CNS and anti-inflammatory activity [2-9]. Data collected from the review of literature from web, journals and tribals have informed that this plant contains several other compounds too. Traditional phytotherapy of South India in general could provide very interesting clues for further phytochemical and pharmacological research on lesser known plant sources of Indian flora. Research on the *Alseodaphne* species is still rare.

Alseodaphne semecarpifolia belongs from Lauraceae (Laurel family), it is commonly known as nelthare in Tamil kanaippirandai, arambamaram, attapattai. Nelthare is a large evergreen tree up to 18 m tall, found in Kolli Hills, Eastern Ghats, India. *A.semecarpifolia* in ethno veterinary practices the stem bark is used for rinderpest disease, dysentery in cattle's and leach bite. Traditional methods of veterinary treatments using plants are predominant in rural folk medicine. The bark of *A.semecarpifolia* and unripe fruit were used in the region for the treatment of cholera-like illness [10-14]. So far, the phytochemical screening of *A.semecarpifolia* by using of GC-MS method has not been explored much.

MATERIAL AND METHODS

COLLECTION AND IDENTIFICATION OF PLANT MATERIAL

The leaves and bark of *A.semecarpifolia* were collected from the Kolli Hills, Namakal District, Tamilnadu, India, in Jan 2011. They were identified by *Rapinat Herbarium*, St. Joseph's College, Trichy, Tamilnadu, India.

PREPARATION OF EXTRACT

The shade-dried leaves of *A.semecarpifolia* (1kg) were extracted, with 80% ethanol (4x500 ml) and 3-5 days subjected to cold percolation method. The alcoholic extract was concentrated in a flash evaporator.

GC-MS ANALYSIS

GC-MS was performed using a Clarus 500 Perkin Elmer gas chromatography equipped with an Elite-5 capillary column (5% phenyl 95% dimethyl polysiloxane) (30nm X 0.25mm ID X 0.25µmdf) and mass detector turbo mass gold of the company which was operated in EI mode. Helium was the carrier gas at a flow rate of 1 ml/min. The injector was operated at 2900C and the oven temperature was programmed as follows; 500C at 80C /min to 2000C (5min) at 70C /min to 2900C (10min). Mass Range: 40-600amu.1 micro liter of the extract was injected into GC-MS. Interpretation on mass spectrum of GC-MS was done using the database of National Institute Standard and 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, molecular weight and structure of the components of the test materials were ascertained [21-22].

RESULTS AND DISCUSSION

In GC-MS report of *A.semecarpifolia* leaf extract reveals that 50 types of phytochemicals were found out, the identification are listed in Table 1. The well pronounced biologically active compounds and their nature discussed below. The gas chromatogram shows the relative concentrations of various compounds getting eluted as a function of retention time shown in Figure 1.The heights of the peak indicate the relative concentrations of the components present in *A. semecarpifolia* leaves extract. The mass spectrometer analyzes the compounds eluted at different times to identify the nature and structure of the compounds. The major phytochemical constituents is N-Methyl-pyrrole33.79% it is acting as an excellent anti-oxidants15. The presence of phytol is (14.66%) it is almost abundant acyclic isoprenoid compound. The bio active compound methyl steviol is present in the leaf extract (0.16%), a diterpene compound which is attractive as natural sweeteners to diabetics.

Sesquiterpene compounds like caryophyllene oxide, α and β caryophyllene were identified in the extract among this β-caryophyllene was shown selectively bind to the cannabinoid receptor type-2 (CB2) and significant cannabimimetic anti-inflammatory effects in mice[16].Hetero cyclic compounds like 4-(4-Methyl-piperazin-1-yl)-1, 5,-dihydro-imidazol-2-one (1.2%), N-

Methylpyrrole-2-carboxylic acid 1.72%. It is acting as modulators of AMPA receptors[17].Deconic, Octadecanoic, Tetradecanoic, Hexadecanoic, Eicosanoic, 11, 14, 17-Eicosatrienoic acid (higher fatty acids and its ester) were also recorded. Poly saturated fatty acid already used in the clinical medicine especially in cardiology[18].Spiro compound like 5, 6, 6-Trimethyl-5-(3-oxobut-1-enyl)-1-oxaspiro [2.5] octan-4-one and bicyclic compound like Bicyclo [4.1.0]-3-heptene, 2-isopropenyl-5-isopropyl-7, 7-dimethyl considerable amounts are present in the leaf extract. Hypotensive effect pyrrolidine containing alkaloid[19]4.16%, anti-HIV active principles coumarins[20].2.2%, ketone containing compounds, saturated and unsaturated hydrocarbons, phenolics, chromones and androst-3-one (steroids) were also present in minimum percentage. These metabolites are responsible for the cure of various diseases like anti-inflammatory, anti-tumor, anti-septic, anti-microbial *etc.*, Based on the literature data all these compounds of *A.semecarpifolia* leaf extract may effective contribute to the biological activities.

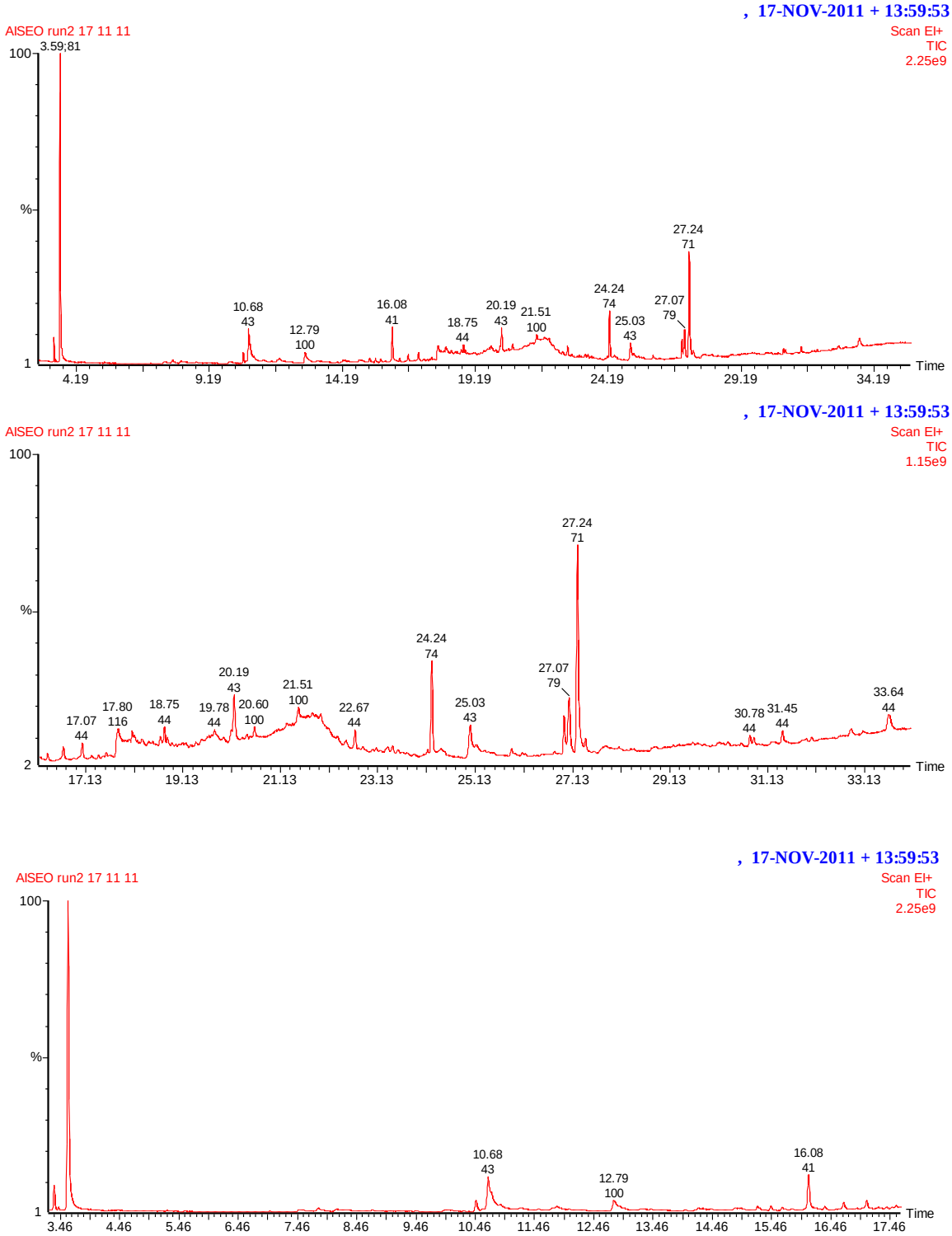

Figure1: Chromatogram of *A. semecarpifolia* leaf extract.

Table 1: GC-MS Profile of *A. semecarpifolia* leaf extract

S.No.	Peak Name	Retention time	%Peak area
1.	Ethane, 1,1-diethoxy-	3.36	1.9021
2.	1H-Pyrrole, 1-methyl-	3.59	33.7948
3.	Butane, 1,1-diethoxy-	5.26	0.0768
4.	8-Azabicyclo[3.2.1]oct-6-en-3-ol, 8-methyl-	5.56	0.0506
5.	Phenol	8.12	0.6742
6.	Tetrahydrocyclopenta[1,3]dioxin-4-one	9.18	0.1698
7.	Ethanone, 1-(1-cyclohexen-1-yl)-	10.00	0.8529
8.	4-(4-Methyl-piperazin-1-yl)-1,5,-dihydro-imidazol-2-one	10.47	1.2000
9.	N-Methylpyrrole-2-carboxylic acid	11.84	1.7392
10.	l-[-]-4-Hydroxy-1-methylproline	12.79	4.0384
11.	2-Methoxy-4-vinylphenol	14.23	0.4743
12.	Phenol, 2,6-dimethoxy-	14.83	0.3410
13.	Cyclohexane, 1-ethenyl-1-methyl-2,4-bis(1-methylethenyl)-, 1à,2á,4á)-	15.45	0.4958
14.	Caryophyllene	16.08	4.6006
15.	α-Caryophyllene	16.67	1.1240
16.	1,6-Cyclodecadiene, 1-methyl-5-methylene-8-(1-methylethyl)-,	17.07	1.2457
17.	Bicyclo[4.1.0]-3-heptene, 2-isopropenyl-5-isopropyl-7,7-dimethyl-	17.26	0.2347
18.	D-Glucopyranoside, methyl 3-O-methyl-	17.39	0.1775
19.	Naphthalene, 1,2,3,5,6,8a-hexahydro-4,7-dimethyl-1-(1-methylethyl)-, (1)-	17.55	0.4284
20.	2(4H)-Benzofuranone, 5,6,7,7a-tetrahydro-4,4,7a-trimethyl-,	18.03	0.0965
21.	1,6,10-Dodecatrien-3-ol, 3,7,11-trimethyl-,	18.09	0.8882
22.	3',5'-Dimethoxyacetophenone	18.29	0.4146
23.	Caryophyllene oxide	18.75	1.1480
24.	Decanoic acid, methyl ester	18.90	0.1617
25.	1-Naphthalenol, decahydro-4a-methyl-8-methylene-2-(1-methylethyl)-, acetate, (1α,2α,4αα',8αα')	19.39	0.1875
26.	4,4,5,8-Tetramethylchroman-2-ol	19.78	0.2508
27.	1H-Cycloprop[e] azulene, decahydro-1, 1,7-trimethyl-4-methylene-	19.96	0.2805
28.	2-Pentadecanone	20.19	4.0800
29.	1-Oxaspiro [2.5]octane, 5,5-dimethyl-4-(3-methyl-1,3-butadienyl)-	20.44	0.2356
30.	Tetradecanoic acid, 12-methyl-, methyl ester	20.60	0.8287
31.	Eicosanoic acid	21.51	0.7855
32.	Octadecanoic acid, methyl ester	22.48	0.4514
33.	1,19-Eicosadiene	22.67	1.1627
34.	2-Pentadecanone, 6,10,14-trimethyl-	22.83	0.2837
35.	3H-3,10α-Methano-1,2-benzodioxocin-3-ol, octahydro-7,7-dimethyl-, (3α,6αα',10αα')-	23.03	0.1145
36.	Androst-3-one,	23.18	0.0737
37.	3,7,11,15-Tetramethyl-2-hexadecen-1-ol	23.44	0.3642
38.	2-(1,4,4-Trimethyl-cyclohex-2-enyl)-ethanol	23.55	0.2333
39.	Methyl steviol	23.87	0.1647
40.	7-Hexadecenoic acid, methyl ester,	24.16	0.6588
41.	Hexadecanoic acid, methyl ester	24.24	6.4048
42.	Tetradecanoic acid, 12-methyl-, methyl ester,	25.88	0.7079
43.	Methyl 4-oxodecanoate	26.76	0.4347
44.	9,12-Octadecadienoic acid- methyl ester	26.96	2.2741
45.	11,14,17-Eicosatrienoic acid, methyl ester	27.07	4.5906
46.	Phytol	27.24	14.6635
47.	Octadecanoic acid, methyl ester	27.40	1.2238
48.	5,6,6-Trimethyl-5-(3-oxobut-1-enyl)-1-oxaspiro[2.5]octan-4-one	30.78	0.6858
49.	Decanoic acid, 5,5-dimethyl-9-oxo-, methyl ester	30.86	0.2999
50.	2H-Pyran-2-one, 4-methoxy-6-(2-oxopropyl)-	33.64	2.2294

CONCLUSION

In the present study 50 types of phytochemical constituents have been identified from *A.semecarpifolia* leaf extract by GC-MS analysis. The presence of various bioactive compounds justifies the use of leaves for various ailments by traditional practitioners. Further isolation, characterization, structural elucidation of active principles and clinical studies on the isolated compounds would through more lights on their therapeutic usefulness and application and to pave the way for development of new therapeutic biological compounds.

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