

GC-MS study of *Artabotrys odoratissimus* fatty oil (leaves)

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RESUMEN

Estudio por GC-MS del aceite de la hoja de *Artabotrys odoratissimus*.

El estudio por GC-MS de dos fracciones del aceite de la hoja de *Artabotrys odoratissimus* indicó la presencia de quince compuestos tales como: ácido nonanoico; fenil propanoato de metilo; ácido decanoico; ftalato de dietilo; ftalato de dibutilo; 2-amino-3-etil bifenilo; 5-metil-9-fenilnonan-3-ol; hexadeca-2,7,11-trieno; 2,6-dimetil-1-fenilheptan-1-ona; 2,5-dimetil-tetradecahidrofenantreno; 1-fenilundecano; 1-isopropil-4,6-dimetil naftaleno; 5-(2-butilfenil)-3-penten-2-ol; 1-fenildecán-1-ona y 1-fenilundecán-1-ona. Algunos de estos compuestos son poco frecuentes y activos biológicamente.

PALABRAS-CLAVE: Aceite – *Artabotrys odoratissimus* – Cromatografía de gases-Espectrometría de masas – Hoja.

SUMMARY

GC-MS study of *Artabotrys odoratissimus* fatty oil (leaves).

GC-MS study of two fatty oil fractions from *Artabotrys odoratissimus* (leaves) indicated the presence of fifteen compounds namely, nonanoic acid; methyl phenyl propanoate; decanoic acid; diethyl phthalate; dibutyl phthalate; 2-amino-3-ethyl biphenyl; 5-methyl-9-phenylnonan-3-ol; hexadeca-2,7,11-triene; 2,6-dimethyl-1-phenylhepta-1-one; 2,5-dimethyltetradecahydrophenanthrene; 1-phenylundecane; 1-isopropyl-4,6-dimethyl naphthalene; 5-(2-butyl phenyl)pent-3-en-2-ol; 1-phenyldeca-1-one and 1-phenylundecan-1-one. Some of the compounds are rare occurring and biologically active.

KEY-WORDS: *Artabotrys odoratissimus* – Gas chromatography-Mass spectrometry – Leaves – Oil.

1. INTRODUCTION

Artabotrys odoratissimus locally known as “Kantili champa” is an ornamental plant and belongs to family Annonaceae. Its flowers are used in the treatment of vomiting, biliousness, blood and heart disease, itching, sweating, foul breath, thirst and headache. Decoction of its leaves are given for the treatment of cholera (1, 2).

The antifertility activity of *A. odoratissimus* has been confirmed in rats (3). The essential oil of leaves of *A. odoratissimus* has shown excellent to good anthelmintic property against tape worms, earthworms and round worms (4). From the stem bark of *A. odoratissimus* two steroids, β -sitosterol

and stigmaterol, an aromatic compound benzyl benzoate and a noraporphine alkaloid asimilabine were isolated (5).

A. odoratissimus stem bark yielded spathulenol (0.006%), norstephalazine (0.004%), isopiline (0.002%), anonaine (0.002%), antherspermidine (0.004%), liridine (0.002%) and N-methyl coclaurine (0.006%) (6). Some novel compounds namely pentadecyl-7-hydroxydodecanoate, 4-epoxydopentacontan-26-ol, dotriacont-7-ene, tetratriacont-10,19-diene, have been reported from *A. odoratissimus* leaves (7, 8). The present communication reports the identification of main constituents of the fatty oil fraction of *Artabotrys odoratissimus* leaves by GC-MS study.

2. EXPERIMENTAL

The leaves were collected from nearby gardens and were identified by the authorities from the School of Botany, Vikram University, Ujjain. The shade dried leaves were powdered and extracted in Soxhlet extractor with n-hexane. Removal of the solvent under reduced pressure left a solid mass, which was fractionated on an alumina grade III column. The column was eluted with different solvents of increasing order of polarity. All the fractions of similar TLC pattern were mixed together and the solvent was recovered.

Hexane and hexane:benzene (9:1, v/v) fractions of this column yielded two oily fractions. Rechromatography of both fractions was done on silica gel column. Rechromatography of hexane fraction yielded oily fraction in hexane eluate (AOGM-1) and rechromatography of hexane:benzene (9:1, v/v) fraction yielded another oily fraction in 10% hexane:benzene eluate (AOGM-3). As it was difficult to separate the compounds present in the oil by column chromatography, we undertook the study of both fractions by GC-MS.

The oil was analyzed at the Regional Sophisticated Instrumentation Center, IIT-Bombay, Mumbai by GC-MS. The operating parameters were as follows: 5.5 x 4 mm id glass column, packed with Carbowax 20 M (10% on Chromosorb W, AW and DMCS treated); helium gas was used as a carrier gas at the rate of 40 ml/min, temp. 70°C to 200°C, at 4°C/min, detector and injection port heaters were

maintained at 300°C and 200°C, respectively. Significant operating parameters of the MS were: ionisation voltage 70eV; ionisation current 100 µA; source temperature 225°C, accelerating voltage 1.33 kV; resolution 1000; scan speed 3 sec/decade. Data were processed on a Kratos DS-50 data processing system.

3. RESULTS

The GC-MS analysis of both fractions, AOGM-1 and AOGM-3 revealed the presence of nine and seven peaks respectively, corresponding to sixteen compounds in all, out of which fifteen compounds were identified by comparing their retention times, covet indexes and by interpretation of their mass spectra (9,10,11). The peak value of one compound

was poor and hence rejected. Compounds I to VI were isolated from fraction code AOGM-3 and compounds VII to XV were isolated from fraction code AOGM-1.

The fifteen compounds identified were: nonanoic acid (I), methyl phenyl propanoate (II), decanoic acid (III), diethyl phthalate (IV), dibutyl phthalate (V), 2-amino-3-ethyl biphenyl (VI), 5-methyl-9-phenyl nonan-3-ol (VII), hexadeca-2,7,11-triene (VIII), 2,6-dimethyl-1-phenyl hepta-1-one (IX), 2,5-dimethyltetradecahydrophenanthrene (X), 1-phenylundecane (XI), 1-isopropyl-4,6-dimethylnaphthalene (XII), 5-(2-butylphenyl) pent-3-en-2-ol (XIII), 1-phenyldeca-1-one (XIV) and 1-phenylundecan-1-one (XV).

Some of the compounds identified are rare and quite useful. This oil can be used as bactericide, since it contains a good amount of nonanoic acid

Table I
GC-MS study of *A. odoratissimus* leaves oil

Peak No.	RT (min)	% in oil	Mol.ion peak	Base peak	m/z	Other important fragments	Identified Compounds
1.	7.18	19.25	158	60	130,129,115,101,87	74,73,57.	nonanoic acid .
2.	7.39	11.64	164	104	164,133,121,91,77,65, 51,	65,51.	methyl phenyl propanoate.
3.	9.21	14.01	172	60	143, 129, 115, 101, 87, 74, 73,	59, 57.	decanoic acid .
4.	14.22	15.09	222	149	178,177,121,120,105,104,	93, 76,65,43.	diethyl phthalate .
5.	32.59	16.77	278	149	249,220,222,193,165,	120,76,57.	dibutyl phthalate .
6.	19.92	19.08	197	182	168,152,141,128,115,	89,63,51.	2-amino-3-ethyl biphenyl .
7.	13.12	5.43	234	91	219,203,191,159,133,	119,105, 91, 85.	5-methyl-9-phenyl nonan-3-ol .
8.	13.46	10.53	220	96	205, 191,177,150,138	123,109,79,55.	hexadeca-2,7,11- triene.
9.	13.97	5.48	218	134	203,175,147,133,134,	119, 91, 79, 77.	2,5-dimethyl(-1-phenylheptan-1- one.
10.	14.65	33.02	220	81	205,177,159,149,135,	121,107,93,67.	2 , 5- dimethyl tetradecahydro phenanthrene.
11.	15.72	6.12	232	91	203,187,175,161,133,	119,105,77.	1-phenyl undecane.
12.	16.09	11.13	198	183	168,153,141,115,89,63.		1-isopropyl-4,6-dimethyl naphthalene.
13.	16.21	13.30	218	147	204,203,175,161,133,	122,105,91, 77.	5-(2-butylphenyl) pent-3-en-2-ol.
14.	16.52	7.08	232	105	217,198,161,147,119,91.		1- phenyl deca-1- one.
15.	18.65	7.91	246	105	231,216,183,174,158,	145,91.	1- phenyl undecan-1- one.

(19.15 %), which is being reported as a good bactericide and fungicide. It is used in the preparation of snail repellents and also isolated from *Ajania*, *Rhamnus* (12), *Artimisia spp.*(13), and human skin. Its simple esters are used as flavoring ingredients. The oil also contains a fungistat active compound identified as 2-amino-3-ethylbiphenyl (1.13 %), especially used for oranges (14).

The oil also contains diethyl phthalate (16.77 %) which is a toxic compound used as plasticiser (14). Decanoic acid (14 %) is also found as a glyceroids in some milks. It is used as corrosion inhibitor and surfactant. Its simple esters have perfumery and flavor properties (15,16). The results and mass fragmentation data are being given in Table I .

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