

International Journal of Advances in Pharmaceutical Analysis

IJAPA Vol. 4 Issue 4 (2014) 123-125

Identification bioactive compound of *Nycanthes arbortrisis* linn by GC-MS

Mrunal K. Shirsat^{*}, Khemchand Gupta, Sanjay Bais, Umesh S. Pal and
Vaibhav V. Buchake

¹Pacific College of Pharmacy, Udaipur-313024, Rajasthan-India

²Sandip Institute of pharmaceutical Sci., Nasik (Maharashtra)

Abstract

Objective: To determine possible bioactive compounds of the different extract fraction of entire plant of *Nycanthes arbortrisis* linn.

Methods: The present research work was carried out by using GC-MS analysis, while mass spectra of the compounds found in the extract fraction was conducted by using the database of national institute of standard and technology (NIST) having more than 62000 patterns.

Results: Forty components from different extract fraction of entire plant of *Nycanthes arbortrisis* linn were identified. Active principles with their retention time, area, height of peak, percentage of area of peak were obtained.

Conclusions: This is the first report of documentation of active constituents from entire plant of *Nycanthes arbortrisis* linn. The research reveals the potential of entire plant of *Nycanthes arbortrisis* Linn as a good source of bioactive such as fatty acid esters, alcohol, hydrocarbon, aldehyde, ketones, amide, terpenes, sterols that justify used of this plant for its various ailments for traditional Practitioners.

Keywords: GC-MS, *Nycanthes arbortrisis* linn, Phytol, Alpha-Comphenol

1. Introduction

The flowers of *Nycanthes arbortrisis* linn was used as stomachic, carminative, astringent to bowel, antibilious, expectorant, hair tonic and in the treatment of piles and various skin diseases¹ and in the treatment of ophthalmic purposes². The bright orange corolla tubes of the flowers contain a coloring substance nycanthin, which is identical with α -Crocetin (C₂₀H₂₄O₄) from Saffron. The corolla tubes were formerly used for dyeing silk, sometimes together with Safflower or turmeric³.

Traditionally the powdered stem bark is given in rheumatic joint pain, in treatment of malaria and also used as an expectorant⁴. The bark is used for the treatment of snake bite and bronchitis^{1,5}. The resulting paste of *Nycanthes arbortrisis* on mixing with Arjuna bark is rubbed on the body to treat internal injury and for joint broken bones³. Medicinal used for the treatment of various diseases such as sciatica, chronic fever, rheumatism, and internal worm infections, and as a laxative, diaphoretic and diuretic⁶. Leaves are used in cough. Leaf juice is mixed in honey and given thrice daily for the treatment of cough. Paste of leaves is given with honey for the treatment of fever, high blood pressure and diabetes⁷. Therefore characterization extracts fraction of medicinal plant necessary due to the numerous benefits to the sciences and society.

2. Material and Methods

2.1. Plant material

The plant *Nycanthes arbortrisis* linn were collected from local area of Udaipur in the month of January 2011 and authenticated from Department of

botany, Nagpur University. Voucher specimen no. 9112 was deposited in university.

2.2. Chemicals: All solvents used in this present study such as hexane, Petroleum ether, chloroform and methanol were analytical grade.

2.3. Extraction: *Nycanthes arbortrisis* linn entire plant powders (500g) were extracted with petroleum ether, Chloroform methanol solvent (1000 ml, 72 h) by using successive hot Soxhlet extractor. After extraction, it was filtered and each solvent was evaporated by using rotary evaporator (Yamato Rotary Evaporator, Model RE 801). The solvent free Petroleum ether, Chloroform and methanol crude extract (11.5g, 10.6g, 9.6g respectively) was obtained that was free from particle and dried under vacuum then fractionation by different solvent by formation of three different fraction i.e. Petroleum ether, Chloroform, Methanol then send by GC-MS Study.

2.4. Preliminary Phytochemical screening and fluorescence analysis

The fresh plants were subjected to shade drying (22°C) for two weeks and then proceed at laboratory mail. Air dried coarsely powder of plant was 1 kg coarse powder was extracted with petroleum ether, chloroform, ethanol and distilled water in soxhlet extractor by continues successive hot method. Finally the extract was collected and concentrated for various qualitative phytochemical tests and fluorescence analysis in observed under UV 366 nm (Table 1) for identification of chemical constituents present in plant material and results were presented. (Table 2, 3, 4)

2.5. GC-MS analysis

The GC-MS analyses were carried out in Perkin Elmer, auto system XL GC+.

Carrier gas: helium with a flow rate of 0.7 ml/min.

Column temperature: 5minute in 180⁰C, 180-260⁰C at 3⁰C/min., 5minute in 260⁰C, 260-280 at 0.2⁰C, and finally 5 in 280⁰C injector temperature 280⁰C to 290⁰C detector temperature.

Volume injected: 1μL of sample

Ionization potential: 70 eV

Ion source temperature: 290⁰C

Identification of compound GC-MS chromatogram of Petroleum ether fraction, Chloroform fraction and methanol fraction of *Nycanthes arbortristis* linn (Figure 1, 2, 3) showed peaks indicating the presence of 40 phyto-constituents. Interpretation of mass spectrum and GC-MS was conducted by using the database of national institute of standard and technology (NIST)

having more than 62000 patterns. (Figure 1, 2, 3 and Table 2, 3, 4)

2.6. Identification of compounds

The identity of the compounds in the extract was assigned by the comparison of their retention indices and Interpretation of mass spectrum and GC-MS was conducted by using the database of national institute of standard and technology (NIST) having more than 62000 patterns.

3. Result

The bioactive compounds present in the different extract fraction of entire plant of *Nycanthes arbortristis* linn. The active principles with their retention time (RT), area, height, percentage of area and their structure were presented.

Table 1: Percentage extractive, fluorescence analysis, and preliminary phytochemical screening of entire plant of *Nycanthes arbortristis* linn.

Solvent Extracts	(% W/W)	Fluorescence Observed	Chemical constituents					
			Alkaloid	Sterols	Terpenoid	Sugar	Glycoside	Phenolic
Pet. Ether (60-80 ⁰ C)	2.75±0.076	Orange colour	----	++	+++	---	-----	-----
Chloroform	1.20±0.060	Reddish orange colour	-----	++	+	++	++	++
Ethanol	3.25±0.070	Yellowish Orange	++	++	++	+	+++	++
Distilled Water	7.09±0.067	Greenish Blue	----	---	+	++	++	+

+ Present; +++ Prominently Present; ++ Significantly Present; ---- Absent

3.1. Study for petroleum ether Fraction of *Nycanthes arbortristis* linn.

Figure 1: GC-MS Chromatogram of Petroleum ether Fraction

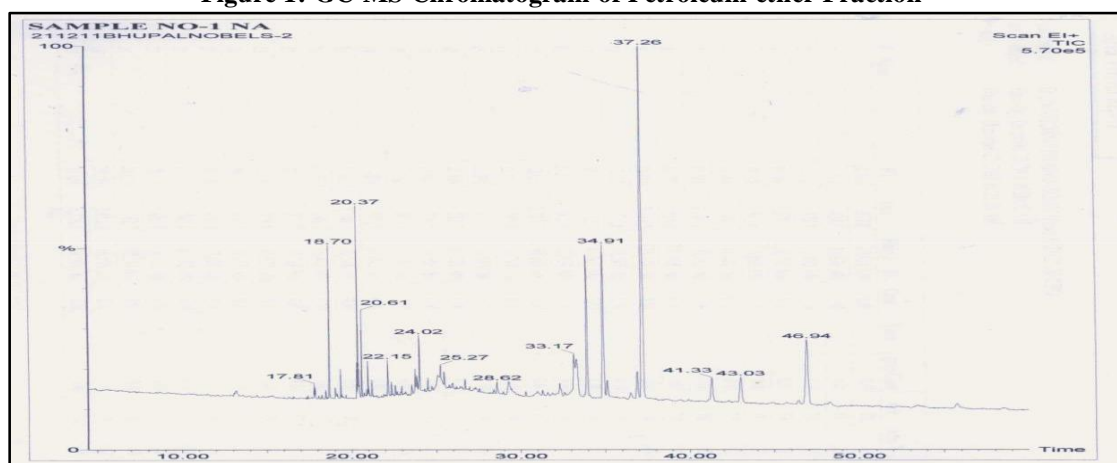


Table 2: List of Probable Compound of Petroleum Ether Fraction for Peak at 37.26 RT (NAT)

Peak #	Name of Compound	RT	Area	Height	Area %
1	Alpha-Comphenol	17.81	637.8	20,928	0.34
2	2-Methyl -4,6 quinolinediol	18.70	5,578.7	214,746	3.01
3	Octacosane	20.37	9,636.0	270,418	5.20
4	1-methyl-2-Chlorobenzen	20.61	3,131.5	123,348	1.69
5	Furfural	22.15	2,201.3	50,108	1.19
6	2,3,5-Trimethyl naphthalene	24.02	3,100.4	76,518	1.67
7	2,3-Dihydro benzofuran	25.27	729.6	18,522	0.39

RT- Retention Time

Phyto-components identified in the Petroleum ether Fraction of the entire plant of *Nyctanthes arbortritis linn* by GC-MS

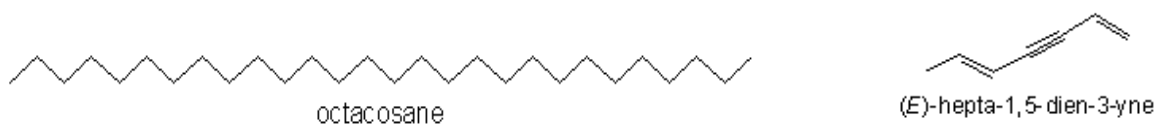
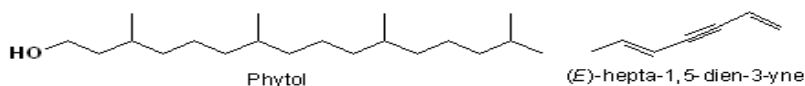


Table 3: List of Probable Compound of Chloroform Fraction for Peak at 37.22 RT (NAT)

Peak #	Name of Compound	RT	Area	Height	Area %
1	Phytol	17.81	176.9	7,334	0.20
2	2-Methyl -4,6 quinolinediol	18.70	3,087.4	114,707	3.48
3	Octacosane	20.37	3,766.9	111,273	4.25
4	1-Methyl -2- Chlorobenzen	20.61	1,925.7	74,689	2.17
5	Furfural	22.15	1,284.5	28,377	1.45
6	2,3,5-Trimethyl naphthalene	24.02	2,195.7	48,267	2.47
7	Tetracotane	25.51	748.2	18,323	0.84
8	Alpha tocopherol	26.73	297.6	8,880	0.34
9	1,5-Heptadiene-3yne	33.17	2,116.7	26,779	2.39
10	Betulin	33.96	11,435.2	142,515	12.89
11	1-Butoxy-2-ethyl-1- Hexene	34.91	14,741.3	156,967	16.61
12	Tetradecane	37.22	18,846.5	186,492	21.24
13	2-Methylpropyl Phenol	41.35	3,687.8	25,493	4.16
14	Oxirane	43.03	4,241.6	29,012	4.78
15	2-Methylbenzoic acid	46.94	7,567.0	42,806	8.53

RT- Retention Time

GC-MS



3.3. Study for Methanol Fraction of *Nyctanthes arbortritis linn*.

Figure 3: GC-MS Chromatogram of Methanol Fraction

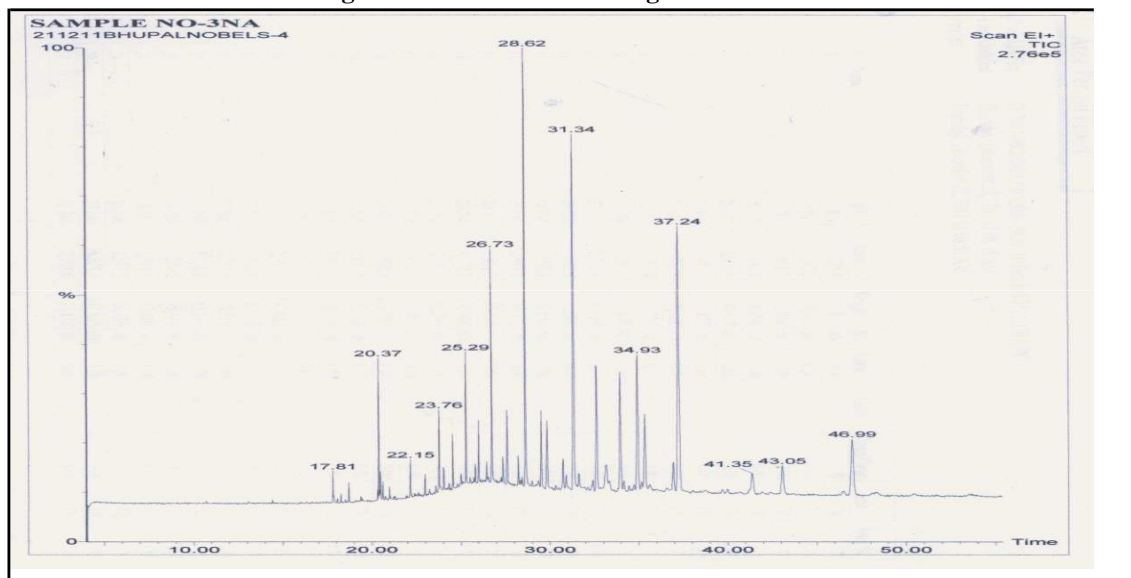
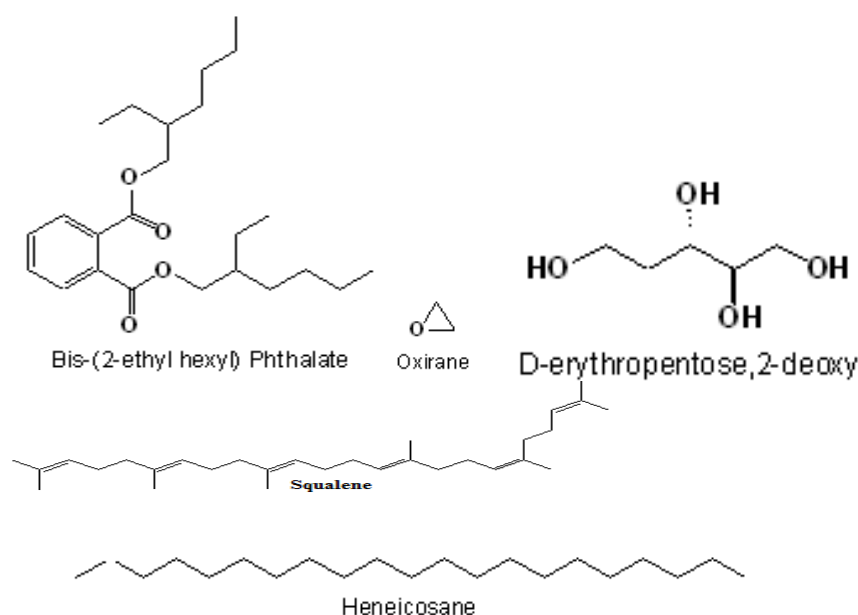


Table 4: List of Probable Compound of Methanol Fraction for Peak at 28.62 RT (NAT)

Peak #	Name of Compound	RT	Area	Height	Area %
1	Alpha-Comphenol	17.81	727.3	17,812	0.72
2	2-Methyl -4,6 quinolinediol	20.37	2,090.5	79,137	2.07
3	Furfural	22.15	767.4	21,276	0.76
4	Squalene	23.76	1,716.9	45,729	1.70
5	Bis(2ethylhexyl) phthalate	25.29	2,593.6	74,022	2.57
6	Heneicosane	31.34	12,994.1	197,882	12.89
7	1-Butoxy-2-ethyl-1- Hexene	34.93	7,223.5	75,344	7.17

RT- Retention Time

Phyto-components identified in the methanol fraction of the entire plant of *Nyctanthes arbortritis* linn. by GC- MS



4. Discussion

Among the identified Phytochemical of different fraction of *Nyctanthes arbortritis* linn: Petroleum ether, Chloroform and methanol fraction different type bioactive chemical constituents useful future study for nematicide, fungicide, anti-helminthes, anti-inflammatory, anti-diarrhea, anti-microbial, anti-oxidants, analgesics, antibacterial, anti-cancer, anticoronary, insectifuge, anti-androgenic, anti-arthritis all activity was observed in different database.

Acknowledgements

The authors are grateful to the Sicart (sponsored by Department of science & Technology, Govt. of India, New Delhi) for analysis of GC-MS.

References

1. Wallander E, Albert VA. Phylogeny and classification of Oleaceae based on RPS16 and TRNL-F sequence data. *American Journal of Botany* 2000; (87): 1827-1841.
2. Nawaz AHMM, Hossain M, Karim M, Khan M, Jahan R, Rahmatullah M. An ethnobotanicals Survey of Jessore district in Khulna Division Bangladesh. *American-Eurasian Journal of Sustainable Agriculture*, 2009; (3): 238-243.
3. Nair R, Kalariya T, Chanda S. Antibacterial activity of some selected Indian Medicinal Flora. *Turkish Journal of Biology*, 2005; (29): 41-47.
4. Narendhirakannan RT, Smeera T. *In-vitro* antioxidant studies on ethanolic extracts of leaves and stems of *Nyctanthes arbortritis* L. (Night-flowering jasmine) *International Journal of Biological and Medical Research*, 2010;(1):188-192.
5. Kumar S, Gupta P, Sharma S, Kumar D. A review of immune-stimulatory plants. *Journal of Chinese Integrative Medicine*, 2011 ;(9): 117-128.
6. Kannan M, Singh AJAR, Kumar TTA, Jegatheswari P, Subburayalu S. Studies on immune-bioactivities of *Nyctanthes arbortritis* (Oleaceae). *African Journal of Microbiology Research*, 2007; (1): 088-091.
7. Gadgoli C, Shelke S, Crocetin from the tubular calyx of *Nyctanthes arbortritis*. *Natural Product Research*, 2010; (24): 1610-1615.