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**PRELIMINARY PHYTOCHEMICAL SCREENING AND GC-MS ANALYSIS
OF METHANOLIC LEAF EXTRACT OF *Manilkara roxburghiana* (Wight)
DUBARD FROM SILAMBUR SACRED GROVE, TAMILNADU**

J. Deepa and K. Saravanakumar*,

Department of Botany, Annamalai University, Annamalainagar – 608 002, Tamilnadu, India.

Abstract

A valuable Indian ethnomedicinal plant, *Manilkara roxburghiana* (Wight) Dubard was investigated in the present study to determine the phytochemical constituents present in various extracts of the leaves through GC-MS (Gas Chromatography-Mass Spectrometry) analysis. Powdered leaf plant materials were subjected to successive extraction with organic solvents such as methanol by Soxhlet extraction method. In the present study, a total of 23 different compounds were identified by GC-MS analysis using methanol extract, all the identified compounds were medicinally valuable for the treatment of various human ailments. In addition, all the phytochemical compounds were needed for further investigations on toxicological aspects for the development of new lead of therapeutic interest.

Key words: *Manilkara roxburghiana*, Methanolic extract, Preliminary screening and GC-MS analysis.

1. Introduction

The plant kingdom represents an enormous reservoir of biologically active compounds with various chemical structures and these phytochemicals, often secondary metabolites present in smaller quantities in higher plants, include the alkaloids, steroids, flavonoids, terpenoids, tannins, and many others (Nonita *et al.*, 2010). Modern medicine has evolved from folk medicine and traditional system only after through chemical and pharmaceutical screening (Boopathi and Sivakumar, 2011). Medicinal plants are the richest bio-resources of folk medicines and traditional systems of medicine; and food supplements, nutraceuticals, pharmaceutical industries and chemical entities for synthetic drugs (Ncube *et al.*, 2008). The efficacy depends on the

use of proper plant part and its biological potency which in turn depends upon the presence of required quantity and nature of secondary metabolite in a raw drug (Vinoth *et al.*, 2011; Savithramma *et al.*, 2012). Herbal medicines have become more popular in the treatment of many diseases due to popular belief that green medicine is safe, easily available and with less side effects (Savithramma *et al.*, 2011). Phytochemical studies have attracted the attention of plant scientists due to the development of new and sophisticated techniques. These techniques played a significant role in the search for additional resources of raw material for pharmaceutical industry (phytochemicals) (Mongole *et al.*, 2010). Hence, GC-MS analysis was carried out in the present study with methanolic leaf extract of *Manilkara roxburghiana* to investigate the chemical constituents present in it.

*Corresponding author: **K. Saravanakumar**

E-mail: bavishmuruganatham1984@gmail.com

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2. Materials and methods

Collection of plant materials and preparation of the extract

The fresh leaves of *Manilkara roxburghiana* (Wight) Dubard were collected from the sacred grove of Silambur (Lat, 11.35 °N; Long, 79.31°E), Ariyalur District, Tamil Nadu, India. The specimen was botanically identified and confirmed by Rapinat Herbarium, St. Joseph's College, Tiruchirappalli. The preserved plant specimens were submitted to the Department of Botany, Annamalai University, Annamalainagar, Tamilnadu for further reference. The leaves were chopped into small pieces, shade-dried and coarsely powdered by using a pulverizor. The powdered leaf was then subjected to successive extraction with organic solvents such as hexane chloroform and ethanol by Soxhlet method. The extracts were then collected and distilled off on a water bath at atmospheric pressure and the last trace of the solvents was removed in vacuo and stored at 4 °C. The extracts were dissolved in dimethylsulphoxide (5 % DMSO) to make the final concentrations at the time study. They were used for GC-MS analysis.

Preliminary phytochemical screening

A small portion of the dry leaf extracts were subjected to preliminary phytochemical screening to detect the presence of various phytoconstituents present in *Manilkara roxburghiana* (Trease and Evans, 1983; Harbourne, 1973).

Gas Chromatography- Mass Spectrometry (GC-MS) analysis

GC-MS analysis was performed with GC-MS Clarus 500 Perkin Elmer Equipment. Compounds were separated on Elite-5 capillary column (Crossbond 5% Phenyl 95 % dimethylpolysiloxane). Oven temperature was programmed as follows: isothermal temperature at 60 °C then increased to 200 °C at the rate of 10 °C/min, then increased up to 280 °C at the rate of 5°C/min. held for 9 min. Ionization of the sample components was performed in the Electron energy (70 eV). The helium was used as gas carrier (1ml/min), and 1.0 µl of sample was injected. The detector was Mass detector Turbomass gold Perkin Elmer.

Table -1: Compounds identified in methanolic leaf extract of *Manilkara roxburghiana*

S. No.	Peak Name	Retention Time (min)	Peak Area	% Peak area
1.	<u>Name:</u> 2H-Azepin-2-one, hexahydro-1-methyl- <u>Formula:</u> C ₇ H ₁₃ NO <u>MW:</u> 127	4.63	28708	0.0992
2.	<u>Name:</u> 3,4-Furandiol, tetrahydro-, cis- <u>Formula:</u> C ₄ H ₈ O ₃ <u>MW:</u> 104	6.34	137304	0.4744
3.	<u>Name:</u> 2-Propyl-1-pentanol <u>Formula:</u> C ₈ H ₁₈ O <u>MW:</u> 130	6.55	1730096	5.9771
4.	<u>Name:</u> 2-Octanone <u>Formula:</u> C ₈ H ₁₆ O <u>MW:</u> 128	6.94	513893	1.7754
5.	<u>Name:</u> 5,9-Dodecadien-2-one, 6,10-dimethyl-, (E,E))- <u>Formula:</u> C ₁₄ H ₂₄ O <u>MW:</u> 208	7.92	333359	1.1517
6.	<u>Name:</u> 1,2-Benzenediol <u>Formula:</u> C ₆ H ₆ O ₂ <u>MW:</u> 110	10.93	384297	1.3277



7.	<u>Name:</u> Hydroquinone <u>Formula:</u> C ₆ H ₆ O ₂ <u>MW:</u> 110	12.88	673763	2.3277
8.	<u>Name:</u> 2-Methoxy-4-vinylphenol <u>Formula:</u> C ₉ H ₁₀ O ₂ <u>MW:</u> 150	13.11	179842	0.6213
9.	<u>Name:</u> Phenol, 2,6-dimethoxy- <u>Formula:</u> C ₈ H ₁₀ O ₃ <u>MW:</u> 154	13.96	42546	0.1470
10.	<u>Name:</u> 1,2,3-Benzenetriol <u>Formula:</u> C ₆ H ₆ O ₃ <u>MW:</u> 126	15.08	11835200	40.8878
11.	<u>Name:</u> Propanedioic acid, propyl- <u>Formula:</u> C ₆ H ₁₀ O ₄ <u>MW:</u> 146	17.69	44548	0.1539
12.	<u>Name:</u> D-Allose <u>Formula:</u> C ₆ H ₁₂ O ₆ <u>MW:</u> 180	21.78	9668330	33.4018
13.	<u>Name:</u> 1,3,5-Benzenetriol, dihydrate <u>Formula:</u> C ₆ H ₆ O ₃ <u>MW:</u> 126	22.54	904600	3.1252
14.	<u>Name:</u> 4-((1E)-3-Hydroxy-1-propenyl)-2-methoxyphenol <u>Formula:</u> C ₁₀ H ₁₂ O ₃ <u>MW:</u> 180	24.18	49804	0.1721
15.	<u>Name:</u> n-Decanoic acid <u>Formula:</u> C ₁₀ H ₂₀ O ₂ <u>MW:</u> 172	24.52	291869	1.0083
16.	<u>Name:</u> Hexadecanal <u>Formula:</u> C ₁₆ H ₃₂ O <u>MW:</u> 240	26.32	316670	1.0940
17.	<u>Name:</u> 3-t-Butyl-oct-6-en-1-ol <u>Formula:</u> C ₁₂ H ₂₄ O <u>MW:</u> 184	26.96	153522	0.5304
18.	<u>Name:</u> 2,6,10-Trimethylundeca-1,3-diene <u>Formula:</u> C ₁₄ H ₂₆ <u>MW:</u> 194	27.41	94227	0.3255
19.	<u>Name:</u> Tridecanoic acid, methyl ester <u>Formula:</u> C ₁₄ H ₂₈ O ₂ <u>MW:</u> 228	28.56	132375	0.4573
20.	<u>Name:</u> n-Hexadecanoic acid <u>Formula:</u> C ₁₆ H ₃₂ O ₂ <u>MW:</u> 256	29.67	420466	1.4526
21.	<u>Name:</u> Phytol <u>Formula:</u> C ₂₀ H ₄₀ O <u>MW:</u> 296	33.05	156621	0.5411
22.	<u>Name:</u> Squalene <u>Formula:</u> C ₃₀ H ₅₀ <u>MW:</u> 410	47.78	853531	2.9487



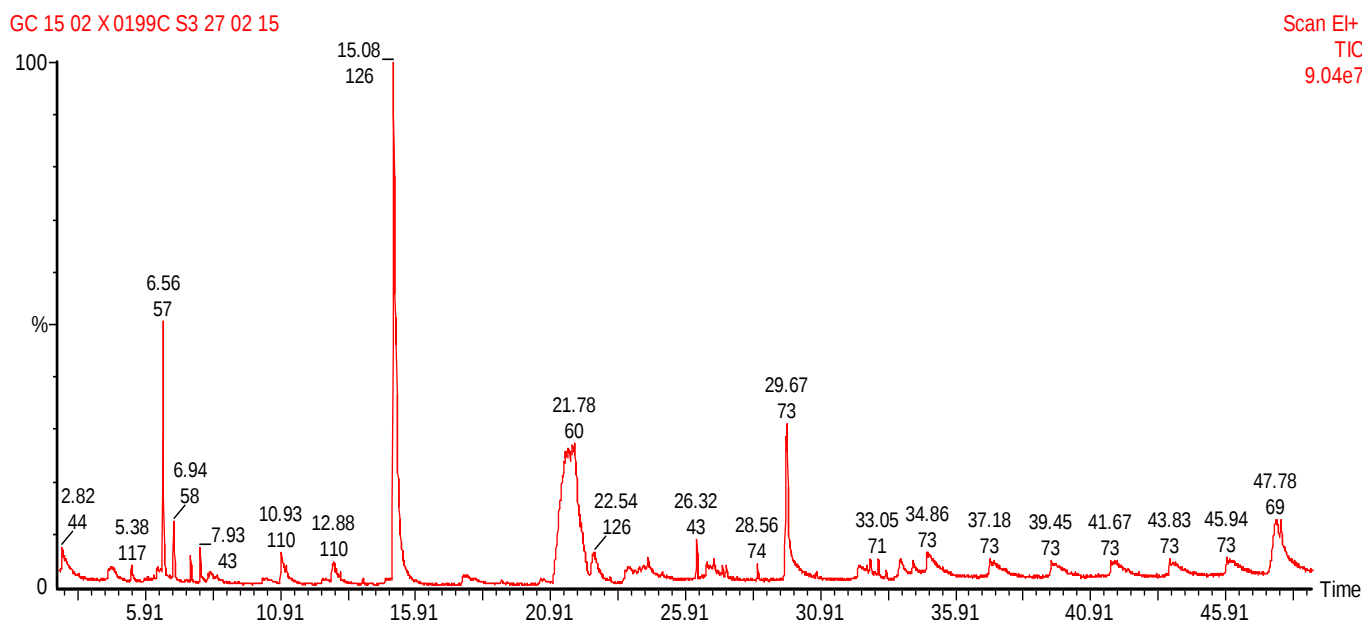


Fig – 1: GC-MS analysis of methanolic leaf extract of *Manilkara roxburghiana*

The total running time for GC was 36 min and software Turbomass 5.2.0 was used in this GC-MS study.

Identification of compounds

All the compounds were identified from methanol extracts based on direct comparison of the retention times and their mass spectra with the spectra of known compounds stored in the spectral database, NIST (Version year 2005).

3. Result and Discussion

The chemical constituents identified by the GC-MS analysis on various extracts of the leaves of *Manilkara roxburghiana* were enumerated along with Molecular Formula (MF), Molecular Weight (MW), Retention Time (RT), peak area, and peak area (%) was presented in Table - 1. In the methanolic leaf extract, totally 22 compounds were identified of which 2, 3-Benzenetriol (40.88 %), was found as major compound followed by other compounds namely, D-Allose (33.40 %), 2-Propyl-1-pentanol (5.97 %), 1, 3, 5-Benzenetriol, dehydrate (3.12 %), Squalene (2.94 %) and Hydroquinone (2.32 %) respectively along with other minor constituents.

4. Conclusion

In the present study, it has been concluded that the plant *Manilkara roxburghiana* is a potential source of biologically active compounds with pharmaceutical value. Further, the compounds identified were needed further study on the toxicological aspects including clinical trials to develop safe drug for the treatment of various human ailments.

5. References

- 1) Boopathi, A. C and R. Sivakumar. 2011. Phytochemical screening studies on the leaves and stem of *Andrographis neesiana* wight – An endemic medicinal plant from India. *World Applied Science Journal*, 12 (3): 307 - 311.
- 2) Mungole, A. J., R. Awati, A. Chaturvedi and P. Zanwar. 2010. Preliminary phytochemical screening of *Ipomoea obscura* (L) – A hepatoprotective medicinal plant. *International Journal of Pharm Tech Research*, 2: 2307 - 2312.
- 3) Ncube, N. S., A. J. Afolayan and A. I. Okoh. 2008. Assessment techniques of antimicrobial properties of natural compounds of plant origin: Current methods and future trends.



African Journal of Biotechnology, 7: 1797 - 1806.

- 4) Nonita, P. P and Mylene, M. U. 2010. Antioxidant and cytotoxic activities and phytochemical screening of four Philippine medicinal plants. *Journal of Medicinal Plant Research*, 4: 407 - 414.
- 5) Savithramma, N., M. Linga Rao and S. Ankanna. 2012. Preliminary phytochemical screening of some important medicinal plants. *International Journal of Ayurvedic and Herbal Medicine*, 2 (1): 139 - 145.
- 6) Savithramma, N., M. Linga Rao and D. Suhrulatha. 2011. Screening of medicinal plants for secondary metabolites. *Middle-East Journal of Science and Research*, 8: 579 - 584.
- 7) Vinoth, S., P. Rajesh Kanna, P. Gurusaravanan and N. Jayabalan. 2011. Evaluation of phytochemical, antimicrobial and GC-MS analysis of extracts of *Indigofera trita*. *International Journal of Agricultural Research*, 6 (4): 358 - 367.

