International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Index Copernicus Value (2016): 79.57 | Impact Factor (2017): 7.296

Phytochemical Compound Analysis of *Tinospora Cordifolia* by GC-MS Method

D. Rathi[1], Dr. PL. Balasubramanian[2]

[1]Assistant Professor, Department of Siddha, Tamil University, Tamilnadu, India

[2]Research Scholar, Department of Siddha, Tamil University, Tamilnadu, India

Abstract: ***The aim of the study was to carried out for identification of bioactive compounds from the whole plant methanol extract of Tinospora cordifolia by GCMS analysed by IIFPT (Iso/IEC 17025:2005). Referred standard protocol using NIST Library. The GCMS analysis revealed the presence of various compounds used for various disease.***

Keywords: GC-MS, *Tinopora cordifollia*, Phytocomponents

1. Introduction

The *Tinospora cordifolia* has been subjected to chemical investigation extensively and number of chemical constituents belonging to the different groups viz terpenoid, alkaloids, lignans, steroids have been analysed.

Herbal plants produce and contain a variety of chemical substances with varied physiological effects. They are huge reservoir of various chemical substances with potential therapeutic properties [1]. Herbal plants are being increasingly utilized to treat a wide variety of clinical diseases [2]. Herbs have been used by all cultures throughout history and thus, herbal medicine is the oldest form of health care known to mankind. It was an integral part of the development of modern civilization. Many drugs commonly used today are of herbal origin. Higher plants as source of medicinal compound continue to play a dominant role in maintenance of human health since antiquities [3].

The primary benefit of using plant derived-medicine is that they are relatively safer than synthetic alternatives, offering profound therapeutic benefits and affordable treatment [4]. However, it must be noted that not all medicinal plants are safe for consumption in the crude form.

Herbalism is a traditional medicinal or folk medicinal practice based on the use of plants and plant extracts. Herbal medicines are popular remedies for diseases used by a vast majority of the world‘s population,This study mainly focused on the bioactive compound ethonal extract Argemone mexicane plant seeds[4] known as ‘Mexican prickly poppy’ and ‘Satyanashi’ is a common name. It is an erect, prickly annual herb, up to 1.2 meter in height, naturalized throughout India up to an altitude of 1,500 meter.

2. Materials and Method

Extracted plant material powder by maceration method
One liter of double distilled water was mixed with 100g of powdered Tinospora cordifolia stem, filtered twice with Whatman no.1 and then with nitrocellulose membrane. The extracted liquid was subjected to water bath vaporization to remove the water. For water bath evaporation, liquid extract material was be placed into a beaker and subjected to water bath evaporation at 60ºC temperature for 7-10 h daily for 2-3 days until a semisolid state of extracted liquid is obtained. The semisolid extract produced was kept in the deep freezer at-20ºC overnight and then subjected to freeze drying. Extract obtained by this method was then weighted and stored at 22ºC in desiccators until further use. The rat were fed with powdered plant material extract with sterile tap water. Phytochemical screening of the extract of Tinospora cordifolia was also carried out.

The root of *Tinospora cordifolia* were first washed well and dust was removed from the plants. Plant was washed several times with distilled water to remove the traces of impurities from the root. The dried plant at room temperature and coarsely powdered. The powder was extracted with 70% ethanol for 48 hours. A semisolid extract was obtained after complete elimination of alcohol under reduced pressure. The extract was stored in refrigenerator used. The different concentrations (20mg/ml, 40mg/ml, 60 mg/ml and 80 mg/ml) respectively of plant extract used in this study. The stem, leaves and roots of Tinospora cordifolia were isolated, chopped into small pieces and dried roots were powered and this powder was used for the preparation of extract by heat distillation process as detailed by Agarwal et al.The extract was assigned a code name TCrE.

3. Analysis of Samples

The given sample was extracted with methanol and analyzed through Gas Chromatography – Mass Spectrometry/ Mass Spectrometry for identification of different compounds (Indian Institute of Food Processing Technology, Ministry of Food Processing Industries, Government of India, Food Testing Laboratory [Nabl Accredited Laboratory As Per Iso/Iec 17025:2005] Fssai Referral Laboratory.

Table 1: Show the bioactive compound

S.NO	RT	Name of the compound	Molecular Formula	Molecular Weight	Peak Area %
1	4.94	Isopinocarveol	$C_{10}H_{16}O$	152	0.64
2	7.94	α-ylangene	$C_{15}H_{24}$	204	1.01
3	8.09	1 H-3a,7-Methanoazulene, octahydro-1,4,9,9-tetramethyl-	$C_{15}H_{26}$	206	1.35
4	8.60	Caryophyllene	$C_{15}H_{24}$	204	2.07
5	9.12	trans-Z-α-Bisabolene epoxide	$C_{15}H_{24}O$	202	1.32
6	9.38	Benzene, 1-(1,5-dimethyl-4-hexenyl)-4-methyl	$C_{15}H_{22}$	204	9.35
7	9.56	trans-α-Bergamotene	$C_{15}H_{24}$	204	3.16
8	9.73	β-Bisabolene	$C_{15}H_{24}$	204	10.92
9	9.90	β-Cubebene	$C_{15}H_{24}$	204	11.53
10	10.45	cubedol	$C_{15}H_{26}O$	222	0.91
11	10.45	.(+)-Sativen	$C_{15}H_{24}$	204	0.99
12	10.78	Methyl 4,7,10,13-hexadecatetraenoate	$C_{17}H_{26}O_2$	262	0.81
13	11.80	Alloaromadendrene oxide-(1)	$C_{15}H_{24}O$	220	1.06
14	11.30	α-acorenol	$C_{15}H_{26}O$	222	1.32
15	11.70	7-epi-cis-sesquisabinene hydrate	$C_{15}H_{26}O$	222	0.49
16	12.13	2,5-Octadecadiynoic acid, methyl ester	$C_{19}H_{30}O_2$	290	1.31
17	12.71	Phenol, 2-methyl-5-(1,2,2-trimethylcyclopentyl)-, (S)-	$C_{15}H_{22}O$	218	2.55
18	14.97	5-Isopropyl-2,8-dimethyl-9-oxatricyclo[4.4.0.0(2,8)]decan-7-one	$C_{14}H_{22}O_2$	222	3.38
19	15.58	Hexadecanoic acid, ethyl ester	$C_{18}H_{36}O_2$	284	1.92
20	17.79	17-Octadecynoic acid	$C_{18}H_{32}O_2$	280	0.89
21	17.96	Z,Z,Z-4,6,9-Nonadecatriene	$C_{19}H_{34}$	262	1.34
22	20.51	n-Propyl cinnamate	$C_{12}H_{14}O_2$	190	20.13
23	26.71	Dasycarpidan-1-methanol, acetate (ester)	$C_{20}H_{26}N_2$	326	1.78
24	28.86	Piperine	$O_2C_{17}H_{19}NO_3$	285	19.76

GC Programme

Column BR-5MS (5% Diphenyl / 95% Dimethyl poly siloxane), 30m x 0.25mm ID x 0.25mm df, Equipment Scion 436-GC Bruker, Carrier gas 1ml per min, Split 10:1, Detector TQ Quadrupole Mass Spectrometer, Software MS Work Station 8, Sample injected 2µl, Oven temperature Programme - 110° C hold for 3.50 min, Up to 200° C at the rate of 10 ° C/min-No hold, Up to 280 ° C at the rate of 5° C / min- 12 min hold, Injector temperature 280° C, Total GC running time: 40.50 min.

MS Programme

Library used NIST Version-2011, Inlet line temperature 290° C, Source temperature 250 ° C, Electron energy 70 eV, Mass scan (m/z) 50-500 amu, Solvent Delay 0 - 3.5 min, Total MS running time: 40.50 min.

The plant Argemone mexicana Linn belongs to the family papaveraceae is a widely distributed plant throughout the subtropical and tropical regions of the world. It is commonly

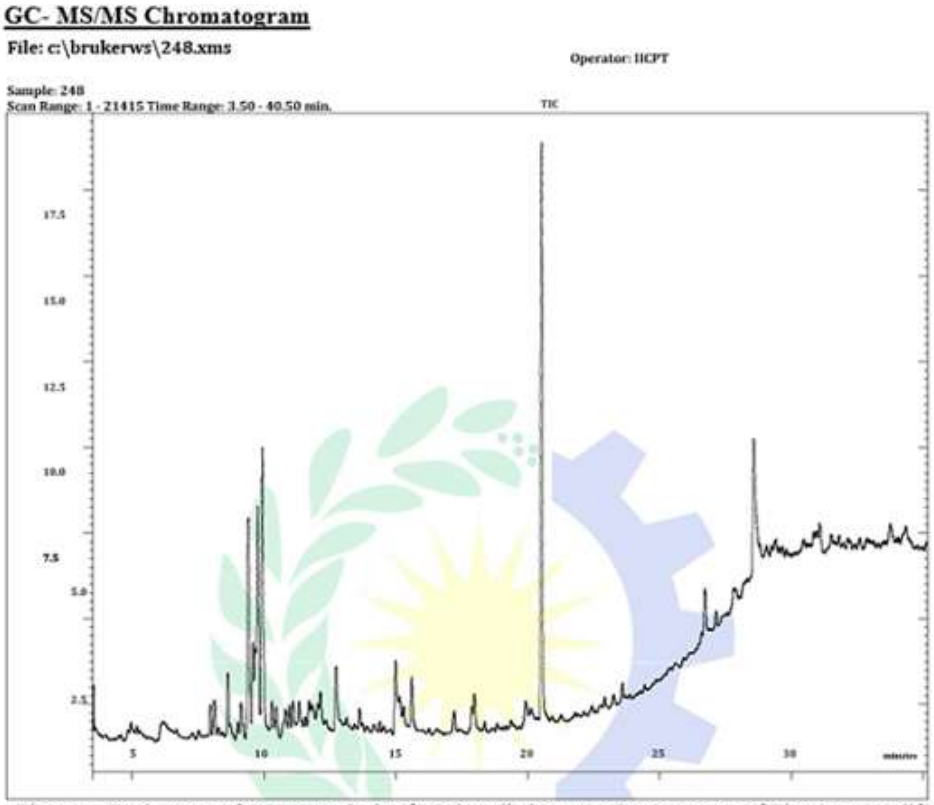

Figure -1, Peak report of GCMS analysis of Methanolic leaves and stem extract of Tinospora cordifolia

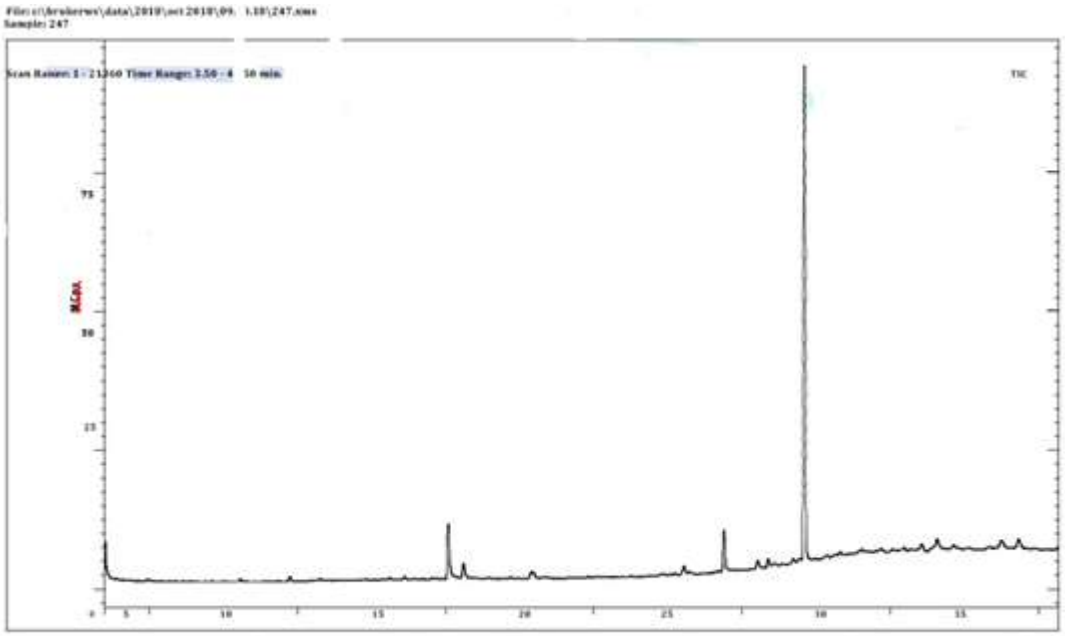

Figure -2: Peak report of GCMS analysis of Methanolic leaves and stem extract of Tinospora cordifolia

4. Finding and Discussion

Thirty six components in stem, leaves and root were identified in *Tinospora cordifolia* by Gas Chromatogram-Mass spectrometry (GC-MS) analyzed. GC MS Studies of Tinospora *cordifolia* indicates that the prevailing components were the presence of various bioactive components justifies the use of the whole plant for various ailments by traditional practitioners. The active principles with their retention time (RT), molecular formula, molecular weight (MW) and concentration (%) are presented.

The prevailing components were The GC-MS analysis revealed the presence of various components like Isopinocarveol, α-ylangene, 1H-3a,7-Methanoazulene,octahydro-tetramethyl-Caryophyllene,trans-Z-α-Bisabolene epoxide, Benzene, 1-(1,5-dimethyl-4-hexenyl)-4-methyl- trans-α-Bergamotene,β-Bisabolene,β-Cubebene cubedol Sativen Methyl hexadecatetraenoate, Alloaromadendrene oxide-(1) α-acorenol , epi-cis sesquisabinene hydrate Octadecadiynoic acid, methyl ester, Phenol, 2-methyl trimethylcyclopentyl)-,(S)-Isopropyl-2,8-dimethyl-9-Oxatricyclo decan-7-one, Hexadecanoic acid, ethyl ester, Octadecynoic acid

Nonadecatriene n-Propyl cinnamate, Dasycarpidan-1-methanol, acetate (ester) Piperine (Table-1, Figure-1).

This study explores the goodness of the leaf and stem of the plant *Tinospora cordifolia* which has a commendable sense of purpose and can be advised as a plant of phytopharmaceutical importance. Rotundene , Hexadecanoic acid, ethyl ester, Octadecadienoyl chloride, (Z,Z) Tricyclo tetradecan-6-one, 4-ethenyl-3-hydroxy-2,4,7,14-tetramethyl, Columbin, Pseudosolasodine diacetate, Squalene Methylcortisol, Stigmasta-5,22-dien-3-ol, acetate, (3β)-Stigmasterol, 7,10,13-Eicosatrienoic acid, methyl ester,(Table-2, Figure-2). This study explores the goodness of the root of the plant *Tinospora cordifolia* which has a commendable sense of purpose and can be advised as a plant of phytopharmaceutical importance.

5. Summary and Conclusion

Knowledge of chemical constituents of plants is important and desirable because such information will be important for synthesis of chemical substances. It could be well qualified for application in pharmaceutical industry. The GC-MS analysis of methanolic extract of experimental plant showed the presence of pharmacologically active compounds such as antioxidant and antihyperlipidemic. This plant can be saved through biotechnological approaches and its quality can be improved through secondary metabolites production and thus it can be used as a source for developing new drugs and commercialization. Further investigations on preclinical and clinical trials of these extracts could become a part of standard drug designing and treatment protocols for hyperlipidemic and hence a promising and powerful weapen for hyperlipidemic treatment.

6. Acknowledgement

The one of the author D.Rathi are grateful to Dr. P.Senthamil Selvan,PhD, Department of Biochemistry, Apollo Hospitals (P) Ltd, Greams road,off Greams lane, Chennai-600006, Tamil Nadu for preparation of manuscript. Grateful thanks are extended to the secretary andcorrespondent, Principal, Dean of Science, Tamil University, Thanjavur, Tamilnadu,

References

[1] Ashis G. Herbal folk remedies of Bankura and Medinipur districts, West Bengal. Indian Journal of Traditional Knowledge 2003; 2:393-396.
[2] Rajpara N, Patel A, Tiwari N, Bahuguna J, Antony A, Choudhury I, Ghosh A, Jain R, Bhardwaj AK (2009) Mechanism of drug resistance in a clinical isolate of Vibrio fluvialis: involvement of multiple plasmids and integrons. Int J Antimicrob Agents34:220–225
[3] Roberts MC (1996) Tetracycline resistance determinants: mechanisms of action, regulation of expression, genetic mobility, and distribution. FEMS Microbiol Rev 19:1–24
[4] 12.Rotblatt and Ziment (2002) Resistant bactria 0f some microorganisms. Pp 87-98
[5] 13.Sahu MC, Dubey D, Rath S, Debata NK, Padhy RN. Multidrug Resistance of Pseudomonas aeruginosa as known from surveillance of nosocomial and community infections in an Indian teaching hospital. J Publ Health 2012; 20: 413-423.
[6] Dahanukar SA, Kulkarni AR, Rege NN. Pharmacology of medicinal plants and natural products. Indian Journal of Pharmacology 2000; 32:S81-S118.
[7] M. Gupta, U. Mazumder, T. Kumar, P. Gomathi, R. Kumar, Antioxidant and hepatoprotective effects of *Bulhinia racemosa* against paracetamol and carbon tetrachloride induced liver damage in rats, *Iran J. Pharmacol Therapy* 3 (2004) 12-20.
[8] M. Suffnes and J. Dowos. Current stating of the NCI Plant and Animal product program, Journal of Natural prod. 45; (1982) 1-14.
[9] M.M. Iwu, African Medicinal Plants in the search for new drugs based on ethenobotanical, *Ciba foundation symposium* 185 (1994) 116-125.
[10] M.O. Amdur, J. Doull, C.D. Klaassen (eds), Casarett and Doull's Toxicology The Basic Science of Poisons 4th edition Pergamon Press, New York, U.S.A. 974 (1991) 12-24, 804-809.
[11] S.I. Humphrey, D.J. McKenna, Herbs and Breast feeding *Breast feeding Abstracts* 17(2) (1997) 11-12.
[12] J. V. Dacie, S. M. Lewis, Practical Hematology 4th
[13] W.M. Lewis and M.P.F. Elvin-Lewis, Medical Botany: Plants Affect Man's; John Wiley and son Inc. (1977). USA; 216-220.
[14] Ali S.S, Kasoju N, Luthra A, singh A, Bora U.(2008) Indian medicinal herbs as source of antioxidants. Food Res. Int., 41:1-15.
[15] Amons B, Binda CW, Gamaniel K(2001). Behaviour effects of *Tinospora cordifolia* in rats. Phytomed. 8.356-361.
[16] Hamburger M, Hoste Hmann K. (1991) Bioactivity in plants: the link between phytochemistry and medicine. Phytochemistry. 30; 3864E74.
[17] Khare CP. Indian Medicinal plants. Springer science and Business Media publisher, 2007, 428.
[18] Muthukumaran Pakkirisamy, Suresh Kumar Kalakandan, Karthikeyen Ravichandran (2017).Phytochemical Screening, GC-MS, FT-IR Analysis of Methanolic Extract of Curcuma caesia Roxb (Black Turmeric). *Pharmacognosy Journal*, 9, 6,952-956.