Nature of Pharmaceutical Technology (2014) :4(1):1-5.

OPEN ACCESS

ISSN 2231 - 0436
Article ID : npt150414101

Chemo taxonomical and essential oil compositions of Cordia myxa L.

M. Maridass

Received: 11 November 2013 / Accepted: 12 January 2014 / Published Online: 15 April 2014

Abstract

The medicinal uses of fruit of *Cordia myxa* L. suppress cough and chest complaints, and to treat a sore throat, as it has demulcent properties. The species of *Cordia myxa* L. is originate from the area stretching from the eastern Mediterranean region to eastern India, and was introduced long ago in tropical Africa, tropical Asia and Australia, and more recently also in the Americas. The content of essential oils of *Cordia myxa* fruits was analyzed by gas-chromatography coupled with mass spectrometry. The major constituents identified in essential oils of *Cordia myxa* fruits were Eugenol (29.12%), *β*-citronellol (12.90%), and *α*-humulene (9.91%).

Keywords: *Cordia myxa* L.; Boraginaceae; essential oils; GC-MS method

Citation : Maridass, M. 2014. Chemo taxonomical and essential oil compositions of Cordia myxa L. *Nature of Pharmaceutical Technology*,4(1):1-5.

Present Address
M. Maridass
Department of Zoology,
Pioneer Kumaraswamy College,
Nagercoil,Tamil Nadu– 629003,South India

Manuscript Type : **Research Article**
Received Manuscript : **Via Email**
Approved Letter : **Received** or Non Received
Funding Source: Support or **No Support**
Conflict of Interest : **Nil**
Manuscript Full Responses: **Authors**

Submission manuscripts info:
nptjournal@yahoo.com

Article ID : npt150414101

1. Introduction

The genus of *Cordia* belongs to the family Boraginaceae, about 300 species are distributed in the world-wide, most of the species found in the warmer regions of the World (Thirupathi *et al*., 2008). The species of *Cordia myxa* L. originates from eastern Mediterranean region to eastern India, and it was introduced long ago in tropical Africa, tropical Asia, Australia and Americas. The medicinal uses of fruits of *C. myxa* were cure cough and chest complaints, and to treat a sore throat, as it has demulcent properties (Oudhia, 2007). The pulp is also applied as an emollient to mature abscesses, to calm rheumatic pain and as an anthelminthic. Fruit pulp of is applied on ringworm and leaves are applied to wounds and ulcers. A macerate of the leaves is taken to treat trypanosomiasis, and is externally applied as a lotion to tse-tse fly bites. The powdered bark is applied to the skin in cases of broken bones before a plaster is applied, to improve healing. Bark powder is used externally in the treatment of skin diseases. Bark juice together with coconut oil is taken to treat colic (Oudhia, 2007). Earlier studies of pharmacological activities of antiinflammatory (Al Awadi *et al*., 2001) and gastroprotective (Inas *et al*., 2011) were reported the fruits of *Cordia myxa* L. The aim of this study was to identify the essential oils constituent of *Cordia myxa* fruits analysis by GC-MS method.

2. Materials and Methods

2.1 Collection of Plant Materials

The plant materials of *Cordia myxa* L. were collected from Palayamkottai,Tirunelveli district, Tamilnadu.

2.2 Extraction and distillation of essential oils

250gms of fresh fruits of *Cordia myxa* L. were hydro distilled from Clevenger apparatus for 1hr. The essential oil was dried over anhydrous Na_2SO_4, stored in a dark glass bottle and kept at 4^oC until analysis.

2.3 GC-MS analysis

Essential oils was analyzed and performed by GC-MS method by using a Perkin Elmer GC Claurus 500system and gas chromatograph interfaced to a Mass Spectrometer (GC-MS) equipped with Elite -1 fused silica capillary column (30m × 1µl was Mdf. Composed of 100% Dimethyl poly siloxane). For GC-MS detection, an electron ionization energy system with ionization energy of 70eV was used. Helium gas (99.999%) was used as the carrier gas at a constant flow rate of 1ml/min. and an injection volume of 2µl was employed (Split ratio of 10:1). Injector temperature was 250ºC. The oven temperature was programmed from 110ºC (isothermal for 2min.), with an increase of 10ºC/min to 200ºC, then 5ºC /min. to 280ºC, ending with a 9min. isothermal at 280ºC. Mass spectra were taken at 70eV; a scan interval of 0.5 seconds and fragments from 45 to 450Da. Total GC running time was 32 min. The relative percentage amount of each component was calculated by comparing its average peak area to the total areas. Software adopted to handle mass spectra and chromatograms was a Turbomass Ver5.2.0.

2.4 Identification of Chemical constituents

Essential oil constituents were identified by comparing their retention times with those of authentic compounds and the spectral data obtained from NIST libraries and comparisons with previous literature (NIST,1999; Mc Lafferty and Stauffer, 1994; Mc Lafferty and Stauffer, 1988; Hochmuth,2006; Adams, 2001).

3. Results and Discussion

3.1 Taxonomical Description

Dioecious shrub or small tree up to 13m tall; bole tortuous or straight; bark grey, cracked; branches spreading, forming a dense crown; branchlets hairy, later glabrous, with very prominent leaf scars. Leaves alternate, simple; stipules absent; petiole 0.4-4.7cm long; blade broadly ovate to orbicular, sometimes obovate, 4 -17cm × 3-21cm, base rounded to cordate or cuneate, apex rounded to obtusely acuminate, margins entire to toothed, glabrous above, glabrous to velvety hairy below. Inflorescence a lax terminal or short lateral panicle, 3-8.6cm long, many-flowered; bracts absent. Flowers unisexual, regular, white to creamy; pedicel 1-1mm long; male flowers with campanulate calyx 4.4-5.6mm long, 3-lobed, shortly hairy inside, glabrous outside, corolla tube 3.5-4.4 mm long, lobes 5, elliptical, *ca* 5 mm × 2 mm, reflexed, stamens inserted at

Article ID : npt150414101

corolla throat, exserted, filaments 1.5-3.5 mm long, ovary rudimentary; female flower with tubular-campanulate calyx 6-8.5 mm long, irregularly 3-4 toothed, densely hairy inside, glabrous outside, corolla tube 4.5-6.5mm long, lobes 4-6, elliptical to obovate, 5-7mm long, reflexed and rolled up, staminodes with sterile anthers, ovary superior, ellipsoid to obovoid, 4-celled, style 8-9mm long, with 4 stigmatic branches 4 -5mm long. Fruit a globular to ovoid drupe 2-3.5cm long, apiculate, enclosed at base by the accrescent calyx, yellow, apricot or blackish when ripe, pulp almost transparent, mucilaginous, sweet-tasting. Pyrene broadly ellipsoid to globose, *ca*12mm long deeply wrinkled, 1-2-seeded (Plate-1).

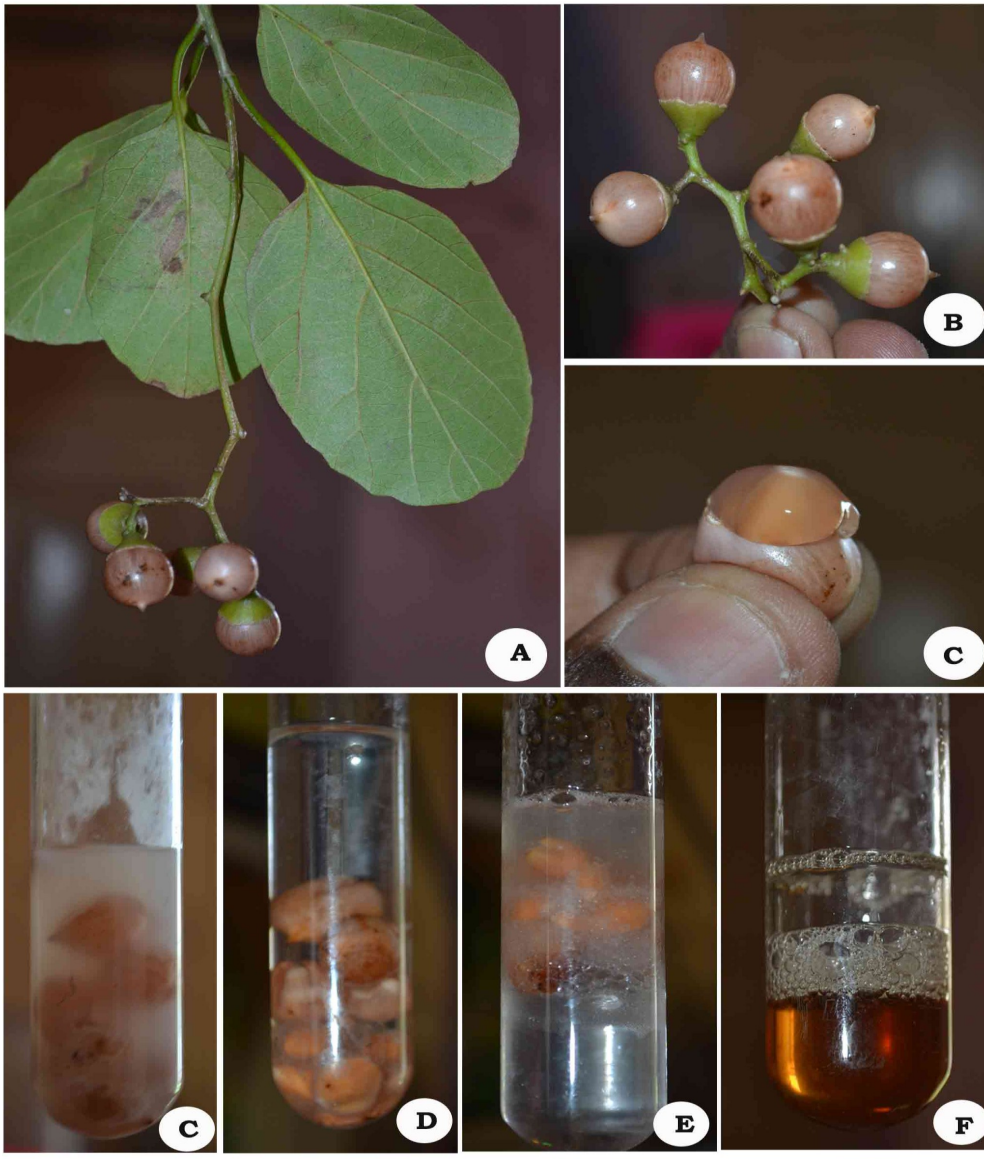
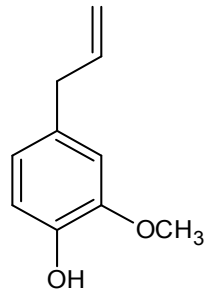


Photo-1: Chemotaxonomy of *Cordia myxa* L.

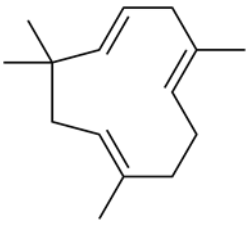
Article ID : npt150414101

3.2 Chemical Composition

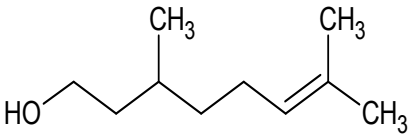
The essential oil from fruits of *Cordia myxa* has been studied for the first time. The acetone extract of *Cordia myxa* was dissolved in water to change the white color to colorless and chloroform extract was not dissolved in water (Plate-1). The yield of the essential oils of *Cordia myxa* was 0.98% (w/v). The essential oils constituents of *Cordia myxa* fruits were shown in table-1. The major constituents identified in essential oils of *Cordia myxa* fruits were Eugenol (29.12%), *β*-citronellol (12.90%), and *α*-humulene (9.91%).



Eugenol



α-humulene



β-citronellol

Gas chromatography-mass spectrometry (GC-MS) method is a useful tool for quantitative and qualitative analysis of a wide range of relatively volatile compounds, and the technique has been widely applied in medical, biological, and food research (Czaplińska, 2007).

The major constituents of Eugenol isolated from the fruits of *Cordia myxa,* which is medicinal uses for dental analgesic and antiseptic obtained from clove or other natural sources; applied topically to dental cavities and also used as a component of dental protective. Earlier studies, Sartoratto *et al*., (2004) who has reported in the essential oils constituents of eugenol isolated from *Ocimum gratissimum*. Earlier studies of eugenol constituents applied for in vivo method of safety and efficacy of the topical applied for the treatment of vaginal and oral diseases in vivo in rat model (Chami *et al*.,2004; Chami *et al*.,2005). The conclusion of the present study was additional source of Eugenol is present in the fruits of *Cordia myxa.*

Table-1: Chemical composition of Essential oils constituents of *Cordia myxa* L.

Rt time	Chemical Composition	Percentage	Identification Ref
8.11	a-pinene	0.56	GC, GC-MS
8.99	α-thujene	3.78	GC, GC-MS
11.24	b-citronellol	12.90	GC, GC-MS
12.04	linalool	2.98	GC, GC-MS
12.59	β-bourbonene	7.91	GC, GC-MS
12.98	Unknown	0.08	GC, GC-MS
13.45	α-muurolene	4.32	GC, GC-MS
15.34	Linalyl acetate	3.21	GC, GC-MS
16.34	β-farnesene	2.94	GC, GC-MS
16.91	b-pinene	4.98	GC, GC-MS
17.01	Eugenol	29.12	GC, GC-MS
19.31	β-elemene	5.67	GC, GC-MS
21.23	unknown	0.24	GC, GC-MS
24.71	Terpinen-4-ol	2.98	GC, GC-MS
26.01	Unknown	0.56	GC, GC-MS
30.01	Eucalyptol	2.89	GC, GC-MS
31.78	α-humulene	9.91	GC, GC-MS
32.00	trans-caryophyllene	3.65	GC, GC-MS
Total Composition		98.68	

4. Acknowledgement

The author is grateful to the University Grants Commission, New Delhi for the financial assistance of Post-doctoral Program.

5. References

Thirupathi, K., Kumar, S.S., Raju, V.S., Ravikumar, B., Krishna, D.R. and Mohan, G.K. 2008. A review of medicinal plants of the genus *Cordia*: Their chemistry and pharmacological uses. *J. Nat. Remed.,* 8: 1-10.

Oudhia, P., 2007. *Cordia myxa* L. [Internet] Record from PROTA4U. Schmelzer, G.H. & Gurib-Fakim, A. (Editors). PROTA (Plant Resources of Tropical Africa / Ressources végétales de l'Afrique tropicale), Wageningen, Netherlands. <http://www.prota4u.org/search.asp>.

Al Awadi, F.M., Srikumar, T.S., Anim, J.T. and Khan, I.2001. Anti-inflammatory effects of *Cordia myxa* fruit on experimentally induced colitis in rats. *Nutrition,* 17 (5): 391–396.

Inas, Z.A., Abdallah Hala, A.H., Khattab and Heeba,G.H. 2011. Gastroprotective Effect of *Cordia Myxa L*. Fruit Extract against Indomethacin-Induced Gastric Ulceration in Rats. *Life Science Journal*,8(3):433-445.

NIST/EPA/NIH Mass Spectral Library. Perkin Elmer Corporation, Norwalk, CT.

Mc Lafferty, F.W. and Stauffer, D.B.1994. Wiley Registry of Mass Spectral Data. *Mass Spectrometry Library Search System Bench-Top/PBM version 3.10d, Palisade, Newfield* 6th edition.

Mc Lafferty, F.W. and Stauffer, D.B.1988. *The Wiley/NBS Registry of Mass Spectral Data.* 4th edition. Wiley-Interscience, New York.

Hochmuth, D.2006. Mass Spectral Library "Terpenoids and Related Constituents of Essential Oils". In *Library of MassFinder 3.0*. Hamburg, Germany.

Adams, R.P.2001. *Identification of essential oil components by gas chromatography/quadrupole mass spectroscopy.* Allured Publishing. Carol Stream, IL, USA.

Czaplińska,J.K.2007. GC-MS Analysis of biologically active compounds in cosmopolitan grasses. *Acta Chromatographica*, 19:279-282.

Sartoratto, A., Machado,N.L.M., Camila Delarmelina, Figueira,G.M., Duarte,M.C.T., Rehder,V.L.G, 2004. Composition and antimicrobial activity of essential oils from aromatic plants used in Brazil. *Brazilian Journal of Microbiology*, 35:275-280

Chami, F., Chami, N., Bennis, S., Trouillas, J. and Remmal, A.2004. Evaluation of carvacrol and eugenol as prophylaxis and treatment of vaginal candidiasis in an immunosuppressed rat model. *Journal of Antimicrobial Chemotherapy*,54(5): 909-914.

Chami, N., Bennis, S., Chami, F., Aboussekhra, A. and Remmal, A.2005. Study of anticandidal activity of carvacrol and eugenol *in vitro* and *in vivo. Oral Microbiology and Immunology*, 20(2):106-111.