Available online at www.pelagiaresearchlibrary.com

Pelagia Research Library

Asian Journal of Plant Science and Research, 2013, 3(4):150-154

ISSN : 2249-7412
CODEN (USA): AJPSKY

Phytochemical and chromatographic studies in the latex of *Ficus racemosa* Linn

Ritu Mishra* and Ashok Kumar Tiwari

Arogyadham, JRD Tata Foundation for Research in Ayurveda and Yoga Sciences, Deendayal Research Institute, Chitrakoot, Satna (M.P.)

ABSTRACT

India being a rich and varied flora of medicinal plants since the Vedic period. The present study deals with the scientific validation of Ficus racemosa Linn. with special reference to its pharmacognostical and phytochemical investigations. This is commonly known as gular, fig and is known to have medicinal properties, also even used as home remedies in the rural and the remotest parts of the India. Latex (milky juice) in administered in haemorrhoids boils, alleviates, the adenitis, particular in childrens and also aphrodiasiac. Latex is applied externally on chronic infected wounds to alleviate edema, pain and to promote the healing; therefore an attempt has been made to carried out the detailed quality control and assurance of the drug followed by HPTLC profiles, botanical identification, physiochemical analysis, preliminary phytochemical studies and fluorescence analysis of drug to get authentic therapeutic value.

Keywords: *Ficus racemosa***,** HPTLC, Phytochemistry, Pharmacological studies**.**

INTRODUCTION

Medicinal plants are important component of natural resources viz. food, gum, fiber, tannin, resin, herbal medicine etc. The importance of herbal medicine that about 80% of the developing world's population depends on traditional medicine for their primary health care. All natural drugs are functioning properly and whose mind, body and spirit are cheerful.

Ficus racemosa Linn. syn. *Ficus glomerata* Roxb. (family-moraceae). The plant is a large deciduous tree distributed all over India from outer Himalayan ranges, Punjab, Khaisa, mountain, Chota Nagpur, Bihar, Orissa, West Bangal, Rajasthan, Deccan and common in South India. It is found throughout the year, grows in evergreen forests, moist localities and bank of streams, deciduous forests, to the elevation of 1800 meter above sea level, often cultivated in villages for shade and its edible fruits. It is commonly known as Gular fig, Cluster fig in English, Gular in Hindi and as Udumbara in Sanskrit [1, 2, 3, 4].

The tree is up to 18 meter high, leaves ovate, ovate-lanceolate or elliptic, sub acute, entire and petiolate (Fig.1). Figs subglobose or pyriform, red when ripe, borne in large clusters, on short, leaf less branches merging from the trunk and main branches [5]. The tree is without aerial roots, unlike its many family members.

Ficus racemosa (Ma–Due-Au Thum Porn) an herbal plant , has long been used in many countries for the management of several disease including diabities. It is popular indigenous system of medicine like Ayurveda ,

Siddha , Unani and homeopathy. The latex (milky juice) is administered in haemorrhoids, boils, alleviates the edema in adenitis, parotitis, orchitis, traumatic swelling, toothache, vaginal disorders, diarrhoea particular in childrens and also aphrodisiac. Latex is applied externally on chronic infected wounds to alleviate edema, pain and to promote the healing [6, 7, 8, 9, 10]. The latex is reportedly used for treating piles. Latex along with sugar or Batasa is recommended in sperm debility. [11, 12, 13, 14, 15].

MATERIALS AND METHODS

Latex Collection

The dried latex of *Ficus racemosa* were collected from Chitrakoot (Bagdara Ghati) forest, Majhagawan, Satna (M.P.) and District Mirzapur (U.P.) forest in May 2013 and authenticated from Deendayal Reasearch Institute, Satna (MP). Voucher specimen is preserved in the herbarium of our Institute. The latex was then shade dried and powdered.

Physico-chemical analysis

Air dried plant material was used for the quantitative determination of ash and extractive values according to standard procedure of Indian Pharmacopoeia [16] and WHO/QCMMPM [17]. Fluorescence analysis of the extract(s) was carried out according to standard procedure [18]. Powdered latex was subjected to analysis under ultra violet light after treatment with various reagents and chemicals like sulphuric acid, nitric acid, dilute hydrochloric acid and sodium hydroxide.

Preliminary phytochemical screening

Preliminary phytochemical evaluation was carried out by using standard procedure [19].

Fluorescence analysis

The latex powder was treated with different chemicals and seen under the normal light and UV radiations at 254 and 365 nm wavelengths as per the standard procedure. The colour development under the day light was also observed for the presence of various phytochemical compounds.

High Performance Thin Layer Chromatography (HPTLC)

For HPTLC, 5 g of coarsely powdered drug in 250 ml stoppered conical flask & extracted with 100 ml ethanol for 24 hours by maceration technique with occasional shaking. The extract was extracted and volume was raised up to 100 ml in a volumetric flask. 25 ml of the extract was taken from the above stock solution and concentrated on a water bath to similarly, ethanol extracts were prepared for two samples *of Ficus racemosa* as reference. TLC of extracts of all the samples and the reference ingredients was carried out on Silica Gel 60 F_{254} precoated plates (0.2 mm thickness; from Merck India Limited). Camag Linomat 5 applicator was used for band application and Desaga Video documentation Unit 3 was used for documentation of fingerprinting. The mobile phase used was Toluene: Ethyl acetate: Formic acid (5.5: 4:0.5). The plate was developed over a distance of 10 cm in a saturated development chamber **(**Twin trough chamber **(**10×10 cm with SS lid, and visualized under visible light, 254nm and 366nm. After spraying with 5% methanolic-sulphuric acid followed by heating at 105^0C for 5-7 min [20, 21].

RESULTS AND DISCUSSION

Physiochemical analysis

Air dried material was used for quantitative determination of phytochemical values. Total ash, acid insoluble ash, water soluble and alcohol soluble extractive were determined for five times as per WHO recommendations. Alcohol soluble extractive value was found to be very high when compared to other extractable matter in the drug (Table 1).

Preliminary phytochemical screening

The preliminary phytochemical test was performed on the extracts of plant of *Ficus racemosa* Linn. They show the presence of the alkaloids, carbohydrate, flavonoids, saponin, resin, protein and tannin (Table 2).The fluorescence analysis is a tool for the determination of constituents in the plant that gives a definite idea of the chemical nature. Thus the fluorescence analysis of the powder was carried out and data is presented in the Table 3.

Table 1: Physical evaluation of latex powder of *Ficus racemosa* Linn

Sr. No.	Parameters	Samples	
		A - Sample	B - Sample
1.	Loss on drying at 105°C (%)	7.89	7.75
2.	Total Ash (%)	3.90	4.00
3.	Acid-insoluble ash (%)	2.30	2.35
4.	Water-insoluble ash (%)	3.00	3.10
5.	Alcohol-soluble extractive (%)	63.45	63.65
6.	Water-soluble extractive (%)	22.33	22.45
7.	pH (10%) aqueous solution:	5.56	5.60

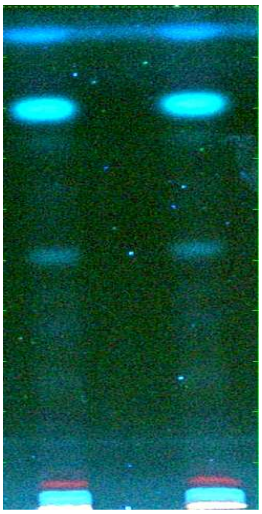
Note - A - Chitrakoot (Bagdara Ghati) forest, B - Mirzapur (U.P.) forest

Table 2: Preliminary phytochemical screening of extracts of latex powder of *Ficus racemosa* Linn
(+ present, -absent).

Sr. No.	Parameters	Samples	
		A - Sample	B - Sample
1.	Carbohydrate	+	+
2.	Alkaloid	-	-
3.	Flavonoid	-	-
4.	Tannin	+	+
5.	Protein	+	+
6.	Resin	+	+
7.	Saponin	+	+

Table 3: Fluorescence analysis of leaf powder of *Ficus racemosa* Linn

Sr. No.	Treatment	Samples -A and B		
		Day light	UV light at 254 nm	UV light at 366nm
1.	Powder as such	Brown	Brown	Brown
2.	Powder + KOH	Dark Yellow	Blue	Blue
3.	Powder + HCl	Brown	Blues Brown	Brown
4.	Powder + H_2SO_4	Dark Yellow	Brown	Brown
5.	Powder + NaOH	Dark Yellow	Brown	Black
6.	Powder + HNO_3	Brown	Blue	Blue



A B

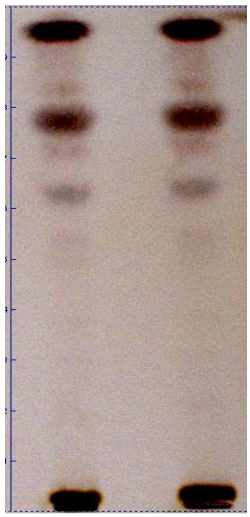
Figure 1.1

A B

Figure 1.2

A B

Figure 1.3



A B

Figure 1.4

Figure 1.1-TLC profile of *Ficus racemosa* latex observed under 366 nm A - Chitrakoot (Bagdara Ghati) forest, B - Mirzapur (U.P.) forest
Figure 1.2-TLC profile of *Ficus racemosa* latex after spraying with 5% methanolic sulphuric acid reagent observed under 254 nm
Figure 1.3-TLC profile of *Ficus racemosa* latex after spraying with 5% methanolic sulphuric acid reagent observed under 366 nm
Figure 1.4-TLC profile of *Ficus racemosa* latex after spraying with 5% methanolic sulphuric acid reagent observed under visible light

Table 4: R_f values in TLC finger prints of latex of *Ficus racemosa* at 366nm (befor derivatization)

R_f value	Samples	
	A	B
R_f 1 (sky blue)	0.52	0.52
R_f 2 (white)	0.81	0.81
R_f 3 (blue)	0.95	0.95

A - Chitrakoot (Bagdara Ghati) forest, B - Mirzapur (U.P.) forest

Table 5: R_f values in TLC finger prints of latex of *Ficus racemosa* at 254 nm (after derivatization)

R_f value	Samples	
	A	B
R_f 1 (yellow)	0.63	0.63
R_f 2 (yellow)	0.77	0.77
R_f 3 (red)	0.95	0.95

Table 6: R_f values in TLC finger prints of latex of *Ficus racemosa* at 366nm (after derivatization)

R_f value	Samples	
	A	B
R_f 1 (blue)	0.07	0.07
R_f 2 (sky blue)	0.38	0.38
R_f 3 (brown)	0.54	0.54
R_f 4 (white)	0.63	0.63
R_f 5 (yellow)	0.77	0.77
R_f 6 (yellow)	0.87	0.87
R_f 7 (red)	0.95	0.95

Table 7: R_f values in TLC finger prints of latex of *Ficus racemosa* at visible light (after derivatization)

R_f value	Samples	
	A	B
R_f 1 (brown)	0.63	0.63
R_f 2 (brown)	0.77	0.77
R_f 3 (black)	0.95	0.95

CONCLUSION

The study of Pharmacognostical features of *Ficus racemosa* Linn. had shown the standards which will be useful the detection of its identity and authenticity. The other study viz. physiochemical analysis, preliminary phytochemical test, fluorescence analysis and High Performance Thin Layer Chromatography (HPTLC) add to its quality control and quality assurance for proper identification.

Acknowledgement
Authors are grateful to Dr. Bharat Pathak, General Secretary, Deendayal Research Institute, Arogyadham, Chitrakoot, for providing the infrastructure and support to conclude this type of research work successfully.

REFERENCES

[1] *The Wealth of India – A Dictionary of Indian Raw Materials*, Publication and Information Directorete, CSIR, New Delhi, **1956**, 4, 35-36.
[2]Atal CK, Kapur BM, *Cultivation and Utilization of Medicinal Plants*, Regional Research Laboratory, CSIR, Jammu-Tawi, **1982**, 514-519.
[3]*The Ayurvedic Pharmacopoeia of India*, Ministry of Health & Family Welfare, Government of India, Department of ISM &H, The Controller of Publications, New Delhi, **2000**, I (II), 217-218.
[4] Mishra R, Tiwari AK, Singh S,Tripathi RC, *Life Science Bulletin*, **2012**, 9(1): 156-160.
[5]Cooke T, *The Flora of Presidence of Bombay*, Botanical Survey of India, Calcutta, **1967**, 2,154.
[6] Paarakh PM, *Nat Prod Radiance*, **2009**,8, 84-90.
[7]Chopra RN, Chopra IC, Verma BS, *Supplement to Glossary of Indian Medicinal Plats*, CSIR, New Delhi, **1992**, 29.

[8]Chopra RN, Chopra IC, Handa KL, Kapur LD, *Indigenous Drugs of India*, U. N. Dhur & Sons Pvt Ltd., Cacutta, **1958**,415-416.
[9]Sharma PC, Yelne MB, Dennis TJ, *Database on Medicinal plant used in Ayurveda*, Documentation and Publication Division, Central Council For Research in Ayurveda and Siddha, New Delhi, **2001**,537-547.
[10]Gupta DP, *The Herbs, Habitate, morphology and pharmcognosy of medicinal plants*, Published and Distributed by Smt. Prem Lata Gupta, Indore, Madhya Pradesh, **2008**, 217-218.
[11]Shiksharthi AR, Mittal S, *International Journal of Recent Advances in Pharmaceutical Research*, **2011**,4, 6-15
[12] Bheemachari J, Ashok K, Joshi NH, Suresh DK, Gupta VRM, *Acta Pharmaceutica Sciencia* ,**2007**,49,133 -138.
[13] Chandrashekhar CH, Latha KP, Vagdevi HM, Vaidya VP, *Int J Green Pharm*, **2008**, 2,100-103.
[14] Patil VV, Pimprikar RB, Sutar NG, *J Pharm Res*, **2009**, 2, 54-57.
[15] Mukherjee PK, Saha K, Murugesan T, Mandal SC, Pal M, Saha BP, *J Ethnopharmacol*, **1998**,60,85-89.
[16] *Indian Pharmacopoeia*, Government of Indian, Ministry of health and human welfare, New Delhi, India, Controller of publications, **1996**, 2, A53.
[17] World Health Organization. *Quality control methods for medicial plant materials*. WHO,Geneva,**1998**.
[18]Kokoski J, Kokoski R, Slame FJ, *Journal American Pharmacology Association*, **1958**, 47, 715.
[19]Kokate CK, *Practical Pharmacognosy*, Vallabh Prakashan, New Delhi, India, **1994,** 54.
[20]Lohar DR, *Protocol For Testing Ayurvedic , Siddha & Unani medicines*, Govt of India, Department of AYUSH, Ministry of Health & Family Welfare, PLIM, Ghaziabad, **2007**,40-108.
[21]*Quality Control Manual for Ayurvedic , Siddha & Unani medicines*, Govt of India, Department of AYUSH, Ministry of Health & Family Welfare, PLIM, Ghazibad, UP, **2008**, 1-99.