



Received on 10 July, 2013; received in revised form, 27 September, 2013; accepted, 15 December, 2013; published 01 January, 2014

PRELIMINARY PHYTOCHEMICAL STUDIES ON FRUITS OF *TERMINALIA SPECIES* (COMBRETACEAE), USED BY THE LOCAL TRIBALS OF ANDHRA PRADESH

K. Rajasekhar, S. Ramesh and R.R. Venkata Raju*

Phytomedicine Division, Dept of Botany, Sri Krishnadevaraya University, Anantapur-515 033, Andhra Pradesh, India

Keywords:

Combretaceae, *Terminalia species*, phytochemical studies, Tribal communities

Correspondence to Author:

Prof. R. R. Venkata Raju

Phytomedicine Lab, Dept of Botany,
S. K. University, Anantapur- 515
003, Andhra Pradesh, India

E-mail: rrvenkataraju@yahoo.com

ABSTRACT: The present paper deals with preliminary phytochemical screening of *Terminalia species* (Combretaceae), used by the local tribal communities for different human and veterinary ailments. The personal interviews conducted with local herbal practitioners and review of literature yielded 5 species of *Terminalia* as an effective remedy for diabetes, dysentery, diarrhoea, asthma, rheumatic pains etc. The fruits of *Terminalia* species used for maximum number of human and veterinary ailments than leaf and stem bark. Ethyl acetate, methanol and water extracts of fruits was conducted for preliminary phytochemical screening which were used as drug for different ailments and composition of various groups of constituents was discussed.

INTRODUCTION: Andhra Pradesh is the 4th largest state and 5th largest by population in India, which has longest coast line (972 km), and lies between 12^o 41' and 22^o N latitude and 77^o and 84^o 40' E longitudes. In every ethnic group there exists a traditional health care system, which is prevalent and popular among the community. The indigenous adivasi society has always been associated with nature for their needs with respect to health care system. The tribal communities have given first and foremost importance to their health care and mostly depending on their surrounding plant resources. The *Terminalia* species, widely used as crude drugs by the local people ^{1, 2, 3, 4}, possess significant taxonomic diversity, hence present paper gains importance. *Terminalia pallida* is endemic to Sheshachalam hills of Chittoor district.

METHODOLGY: Information collected from the local herbal practitioners on the usage of plant crude drugs for various diseases. Based on the information, the intensive field forays were conducted in the forests and road sides in Andhra Pradesh, and the specimens were collected.

The voucher specimens were identified with the help of regional floras ^{5, 6, 7, 8} and conformed by comparing with authentic specimens in Sri Krishnadevaraya University Herbarium (SKU), Anantapur, Madras Herbarium (MH), Coimbatore and Central National Herbarium (CAL), Kolkata, and the same were deposited in Sri Krishnadevaraya University Herbarium (SKU), Anantapur, Andhra Pradesh, India.

The samples were collected in bulk quantities for conducting preliminary phytochemical screening. The collected samples were shade dried, powdered about (100 g) and successively extracted with ethyl acetate, methanol and water using Soxhlet apparatus for 6 hours. The extracts were filtered and concentrated under reduced pressure to dryness.

QUICK RESPONSE CODE 	DOI: 10.13040/IJPSR.0975-8232.5(1).246-48
	Article can be accessed online on: www.ijpsr.com
DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.5(1).246-48	

The extracts were subjected for phytochemical screening using standard procedures^{9, 10, 11, 12, 13}.

RESULTS AND DISCUSSION: The present paper provides information on preliminary phytochemical evaluation^{14, 15, 16} of *Terminalia* species. The fruit samples of *Terminalia* species have been used by tribal's as an effective crude drug for their ailments, hence selected for chemical analysis. The solvent extracts were subjected for screening and the positive reaction was observed for 28 different groups of compounds (**Table 1**). The frequency and distribution of various chemical constituents were analyzed to indicate the species wise richness (**Table 2**).

The preliminary phytochemical analysis revealed that alkaloids, flavonoids, saponins, steroids, triterpenoids and volatile oils were recorded as the most predominant secondary metabolites (5 spp, 100%), followed by anthocyanins, Anthracene glycosides, carbohydrates, proteins, gallic tannins, phenols (4 spp, 80%), dihydrochalcones, flavones, flavonols (3 spp, 60%), reducing compounds, aucubins, lignans, Anthraquinones and coumarins (2 spp, 40%) while Polyoses, anthocyanidins, emodins, fatty acids, flavones were noticed in single species (20%) only. Interestingly iridoids

and polyurinooids were absent in all test species. Flavonoids are the major group of phenolic compounds reported for their antimicrobial^{17, 18}, anti-inflammatory¹⁹, anti-typhoidal and anti-viral²⁰, while gallic acid reported for hepatoprotective and antioxidant¹⁹.

The test species have been used for diabetes as they contain potential therapeutic properties as evidenced in literature. *T. chebula* is believed to possess anti hypoglycemic, anti-diabetic and anti-inflammatory properties^{19, 20, 21}.

The occurrence and distribution of various phytochemical compounds revealed that maximum number of secondary metabolites were found in *Terminalia bellirica* (20) followed by *T. chebula* (18), *T. gella* (15), *T. pallida* (14), while minimum were noticed in *T. alata*. The critical analysis of the data in the light of literature^{22, 23, 24} resulted interesting information on the formation of drugs and mode of administration. The comprehensive data was provided to indicate the distribution of various groups of compounds in the respective solvent extracts. The fractionation and characterization of active principle involved in healing property is being attempted in the laboratory.

TABLE 1: DISTRIBUTION OF DIFFERENT PHYTOCHEMICAL COMPOUNDS IN FRUIT EXTRACTS - PHYTOCHEMICAL SCREENING

Pt	Sol	Al	AN	ANC	ATG	AQ	AU	C	CC	CO	EM	FA	FV	FVS	FNL	FNS	DC	GT	IR	LN	PH	PO	PU	PR	RC	SN	ST	TT	VO
Fr	E	+	-	-	-	-	+	+	-	-	-	T	-	+	+	-	-	-	-	-	-	-	-	-	-	-	+	-	+
	M	-	+	-	-	-	+	+	-	-	-	+	+	+	+	-	-	-	T	-	+	-	-	-	-	-	+	+	-
	W	+	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-
Fr	E	+	-	-	-	+	-	+	-	+	-	-	T	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
	M	+	+	-	+	-	+	-	+	+	-	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	-
	W	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	-	+	-	-	+	+	+	+	+	+	+	+	-
Fr	E	+	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+
	M	+	+	+	+	-	-	+	-	+	-	-	+	-	-	+	+	+	T	+	-	-	-	+	+	+	+	+	-
	W	+	+	+	+	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+
Fr	E	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+
	M	+	+	-	+	+	-	+	-	-	-	+	+	-	+	-	-	-	-	-	+	-	-	+	+	+	+	+	+
	W	+	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	+	-	-	+	-	-	-	-	-	+	+	+
Fr	E	+	-	-	-	-	-	-	-	-	-	-	T	-	-	-	-	-	-	-	-	-	-	+	-	-	-	+	+
	M	T	-	-	-	-	-	-	-	-	+	-	-	-	-	-	+	+	T	+	+	-	-	+	-	-	-	-	+
	W	+	-	-	+	-	-	-	-	-	+	-	+	-	-	+	+	-	-	-	-	-	-	+	T	+	+	+	+

Note: 1. *T. alata*; 2. *T. bellirica*; 3. *T. chebula*; 4. *T. gella* 5. *T. pallida*; Fr : Fruit, Pt : Part, Sol : Solvent, Al : Alkaloids, AN : Anthocyanins, ANC : Anthocyanidins, ATG : Anthracene Glycosides, AQ : Anthraquinones, Au : Aucubins, C : Carbohydrates, CA : Carotenoids, CC : Catecholic compounds, CO : Coumarins, EM : Emodins, FA : Fatty acids, FV : Flavonoids, FVS : Flavones, FNL : Flavonols, FNS : Flavonones, DC : Dihydrochalcones, GT : Gallic tannins, IR : Iridoids, LN : Lignans, Ph : Phenols, PO : Polyoses, PU : Polyurinooids, P : Proteins, RC : Reducing compounds, SN : Saponins, ST : Steroids, TT : Triterpenoids, VO : Volatile oils.

TABLE 2: THE FREQUENCY AND DISTRIBUTION OF DIFFERENT CHEMICAL CONSTITUENTS IN *TERMINALIA SPECIES*

S. no	Compound	No of species	% of richness
1	Alkaloids	5	100
2	Anthocyanins	4	80
3	Anthocyanidins	1	20
4	Anthracene Glycosides	4	80
5	Anthraquinones	2	40
6	Acubins	2	40
7	Carbohydrates	4	80
8	Catechelic compounds	2	40
9	Coumarins	2	40
10	Dihydro chalcones	3	60
11	Emodins	1	20
12	Fatty acids	1	20
13	Flavonoids	5	100
14	Flavones	1	20
15	Flavonols	3	60
16	Flavonones	3	60
17	Gallic tannins	4	80
18	Lignans	2	40
19	Phenols	4	80
20	Polyoses	1	20
21	Proteins	4	80
22	Reducing compounds	2	40
23	Saponins	5	100
24	Steroids	5	100
25	Triterpenoids	5	100
26	Volatile oils	5	100
27	Poly uronoids	0	0
28	Iridoids	0	0

ACKNOWLEDGEMENTS: The authors are thankful to the University Grants commission, New Delhi for financial assistance and also to the forest officers, government of Andhra Pradesh for their help during field trips.

REFERENCES:

- Jain, S. K, 1991. *Dictionary of Indian Folk Medicine and Ethnobotany*. Deep Publications, New Delhi, India.
- Sahe, A. and Sahu, S. C. 2012. Seasonal Correlation of diseases and Ethnomedicinal plants used by tribals of Asansol Subdivision (Burdwan District) of West Bengal, India. *American-Eurasian J. Sustainable Agriculture*. 6 (1): 55-59.
- Alagesaboopathi, C. 2012. Ethnobotanical Studies on Useful Plants of Sirumalai Hills of Eastern Ghats. Dindigul District of Tamil Nadu, Southern India. *Int. J. Biosciences*. Vol. 2 No. 2: 77-84.
- Agarwal, K. and Varma, R. 2012. Some Ethnomedicinal Plants of Bhopal District used for treating stone diseases. *Inter. J. Pharmacy and Life Sciences*. 3 (1): 1356-1362.
- Gamble, J. S. 1935. *Flora of presidency of Madras*. Vol. I. Botanical Survey of India, Calcutta, India.
- Venkata Raju, R.R. and T. Pullaiah. 1995. *Flora of Kurnool*. Bishen Singh Mahendra Pal Singh. Dehra Dun.
- Pullaiah, T. and S. Sandya Rani 1999. *Trees of Andhra Pradesh*. Regency Publication, New Delhi, India.
- Subba Rao G. V. and G. R. Kumari 2002. *Flora of Visakhapatnam District*, Andhra Pradesh. Vol. I. Botanical Survey of India, Calcutta, India.
- Amarasingham, P.P., Bisset, N.G., Millard, P. H. and M.C. Woods 1964. Phytochemical survey of Malaya part III. Alkaloids and Saponins. *Econ. Bot.* 18: 270-278.
- Das, A. K. and A. K. Bhattacharjee 1970. A systematic approach to phytochemical screening. *Trop. Sci.* 12: 54-58.
- Gibbs, R. D. 1974. Chemotaxonomy of flowering plants, I-IV. Monteral and London.
- Harborne, J.B 1991. *Phytochemical methods*. Chapman and Hall, London.
- Kulakarni, Y. A. Gokhale. S. B. Yele, S. U. Surana, S. J. and Tatiya, A. U. 2011. Pharmacognostic studies and preliminary phytochemical investigations on the bark of *Persia macrantha* (Nees). *Kosterm (Lauraceae)*. *Ind. J. of Nat. and Resources*. Vol. 2 (2): 211-217.
- Goswamy, D. V. Patil, M. J. Anuj Modi and Tiwari, R. 2010. Pharmacognostic and phytochemical investigation of stem bark of *Tectona grandis* Linn. *Int. J. of Phar. and Bio*. Vol. 1(2): 1-8.
- Gupta, A., Mishra, A. K., Bansal, P., Singh, R., Kumar, S. and Gupta, V. 2010. Phytochemistry and Pharmacological activities of *Haritaki-A Review*. *Journal of Pharmacy Research*. Vol. 3 (2): 417-424.
- Koteswara Rao, J., Seetharami Reddi, T. V. V. and Aniel Kumar, O. 2011. Ethnobotany of stem bark of certain plants of Visakhapatnam district, Andhra Pradesh. *Current Biology*. 2 (5): 01-06.
- Toda, M., Okubu, S., Ohnishi, R. and T. Shimamura 1989. Antibacterial and bactericidal activity of Japanese green tea. *Japanese Journal of bacteriology*, 45: 561-566.
- Fernandez, M.A., Garcia, M.D and M.T. Saeng 1996. Antibacterial activity of the phenolic acids fraction of *Scrophularia frutescens* and *S. sambusifolia*. *Journal of Ethnopharmacology* 53: 11-14.
- Ashwini, R., Gajalakshmi, S., Mythili and A. Sathiyavelu 2011. A Pharmacological Review of *Terminalia chebula*. *Journal of Pharmacy Research*, 4(9): 2884-2887.
- Bernard, D.L., J. H. Huffman, L. R. Meyerson and R.W. Sidwell. 1993. Mode of inhibition of respiratory syncytial virus by plant flavonoids. *Chemotherapy* 39: 212-227.
- Chang, C. L. and Lin, C. S. 2010. Chemical composition, antioxidant activity and neurogrowth effect of *Terminalia chebula* Retzius extracts. Submitted for publication in *LWT-Food Science and Technology*. LWT-D-10-00966.
- Biswas, A., Bari, M. A., Roy, M. and Bhadra, S. K. 2010. Inherited folk pharmaceutical knowledge of tribal people in the Chittagong Hill tracts, Bangladesh. *Indian Journal of Traditional knowledge*. Vol. 9 (1): pp. 77-89.
- Kirtikar, K. R. and B. D. Basu 1975. *Indian Medicinal plants*. Jayyed Press. Delhi.
- Lather, A., Gupta, V., Garg, S., Singh, A. and Sachdeva, K. 2011. Pharmacological potential of the plants used in treatment of piles-A Review. *Journal of Natura Conscientia*. 2(1), pp. 255-265.
- Suryaprakash, D. V., Sreesatya, N., Sumanjali, A. and vangelapati, M. 2012. Pharmacological review on *Terminalia chebula*. *International Journal of Research in Pharmaceutical Biomedical sciences*. Vol. 3(2): 679-683.

How to cite this article:

Rajasekhar K, Ramesh S and Venkata Raju RR: Preliminary phytochemical studies on fruits of *Terminalia* species (Combretaceae), used by the local Tribals of Andhra Pradesh. *Int J Pharm Sci Res* 2013; 5(1): 246-48. doi: 10.13040/IJPSR.0975-8232.5(1).246-48

All © 2013 are reserved by International Journal of Pharmaceutical Sciences and Research. This Journal licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.

This article can be downloaded to **ANDROID OS** based mobile. Scan QR Code using Code/Bar Scanner from your mobile. (Scanners are available on Google Playstore)