



AN OVERVIEW ON THE PHYTOMEDICINAL APPROACHES OF FICUS SEMICORDATA

Virender Kaur^{1*}, Tirath Kumar² and Kumud Upadhyaya³

^{1*}Institute of Pharmacy, NIMS University, Shobha Nagar, Jaipur- Delhi Highway, Jaipur, Rajasthan, India, 303121.

^{2,3}Department of Pharmaceutical Sciences, Kumaun University, Bhimtal Campus, Nainital, Uttarakhand, India, 263136.

Article Received on
28 Jan 2016,

Revised on 19 Feb 2016,
Accepted on 11 Mar 2016

DOI: 10.20959/wjpps20164-6397

*Correspondence for

Author

Virender Kaur

Institute of Pharmacy,
NIMS University, Shobha
Nagar, Jaipur- Delhi
Highway, Jaipur, Rajasthan,
India, 303121.

ABSTRACT

This paper describes the botanical features of *Ficus semicordata* (Moraceae), its wide variety of chemical constituents, its uses in traditional medicine as remedies for many disorders related to well being. *Ficus semicordata* is a small to medium sized fodder tree of genus *Ficus*. It bears edible fruit. In the traditional system of medicine various parts of the plant such as bark, root leaves, fruits, and latex are used in leprosy, diarrhea, headache, fever, earache, ulcer and gastric problems, boils. The present review is an effort to give a detailed survey of literature on its Pharmacognosy, phytochemistry, traditional and pharmacological uses which may be beneficial for testing efficacy and potency of herb.

KEYWORDS: *Ficus semicordata*, Drooping Fig, earache, leprosy, Traditional and Pharmacological Uses.

INTRODUCTION

Ficus (Moraceae) comprises one of the largest genera of angiosperms with more than 800 species of trees, shrubs, hemiepiphytes, climbers, and creepers in the tropics and subtropics worldwide.^[1] This genus is an important genetic resource due to its high economic and nutritional values and also an important part of the biodiversity in the rainforest ecosystem. It is also a good source of food for fruit-eating animals in tropical areas.^[2] The genus is divided into six subgenera based on preliminary morphology. The monoecious subgenus *Urostigma* is the largest with about 280 species all inclusive, and most of them display distinctive

hemiepiphytic habits. *Ficus* includes 23 species of hemiepiphytes and lithophytes which produce aerial and creeping root systems.^[3]

Figs, the fruits and trees of the *Ficus* genus, are among the oldest and most successful species of higher plants on earth. Humans and our relatives have eaten the fruits of these trees from the earliest times, and utilized them and other parts of the tree—its leaves, its latex, its bark, and its roots for medicinal purposes.^[4] Figs and fig trees throughout the world and the *Ficus* genus were also very likely one of the earliest and best sources of cultivated medicine as well as of food for people, and for their domesticated animals.^[5]

Ficus semicordata commonly known as Drooping fig, Bhui golar, Khanayo, Khaina is also known as *Ficus cunia* or *F. conglomerate*. It is found in India, southern China, Nepal, Bangladesh, Bhutan, Myanmar, Thailand, Vietnam and Malaysia. Plant parts used for medicinal purpose are leaves, Latex, Bark, Roots and Fruits. Drooping Fig is a small to medium sized tree, up to 15 m tall, with an irregular crown. Trunk is up to 2 m in circumference, without aerial roots. Bark is dark-grey, young twigs covered with white or pale-brownish short hairs. Leaves are carried on 1-1.5 cm long stalks. Leaf blade is variable, mostly elliptic to oblong, lance shaped, 10-30 cm long, 5-10 cm broad, base highly unequal-sided with a 3-4-nerved rounded large lower lobe overlapping the stalk. Leaf margin is entire or coarsely toothed. Tip is tapering, and the leaves are slightly rough on both sides or hairy beneath. Figs are spherical to pear-shaped, 1.2-2 cm in diameter, pink or dull reddish brown with white spots, hairy, on leafless branches. The branches are pendulous and are often prostrate on the ground. The figs often mature underground, hence the Hindi common name *bhui golar*. Flowering: May-October.^[6, 7]



Figure 1 : *Ficus* Figs

The leaves are dorsiventral, hypoginuous, hypostomatic and have hairs on both surfaces. The relevant anatomical features are: cystolithic hairs, silica present as incrustations on the epidermal cell walls and as deposits inside the cell, hydathodes on the ventral epidermis,

spongy parenchyma with palissade arrangement and reduced intercellular spaces, idioblasts with druses distributed all over the mesophyll and high stomata density. Some morphological characters as cauliflory and whitish spots on the ventral surface corresponding to the hydathodes areas bring *F. semicordata* near *F. auriculata* Lour., another exotic species of Indian origin.^[7]

Quantification of Total Phenolic and alkaloidal content: The quantified phenolic content of *Ficus semicordata* leaves extracts were found ranging from 16.25±0.22 to 97.02±0.17 (mg/gm). The ethanolextract have more phenolic content 97.02±0.17 (mg/gm) than other extracts.^[8] The quantified alkaloid content was ranging from 18.91±0.16 to 45.68±0.55 (mg/gm). The methanolic extract has more alkaloid content 45.68±0.55 (mg/gm) than other extracts.^[9]

Phytochemistry: The presence of steroids, terpenoids, flavonoids, glycosides, tannins, carbohydrates and saponins is reported.^[10] The dried leaves of *Ficus semicordata* have shown the presence of condensed tannins (+)-catechins, flavonoids quercetin, quercitrin^[11], fatty acid derivatives, mono- and sesquiterpenoids, and shikimic compounds. As in the known fig volatiles identified from other species, mono- and sesquiterpenoids were among the most abundant compounds in the odour components of *F. semicordata*. One benzenoid compound, 4-methylanisole, represented more than 90% of the total quantity of compounds emitted by figs of both sexes.^[12] The compounds detected for each type of floral scent emitted by figs are divided into classes based on general biosynthetic origin.^[13] Fatty acid derivatives: Dodecane Tetradecane Pentadecane Terpenes : Monoterpenoids α -Thujene α -Pinene Sabinene β -Pinene β -Myrcene Limonene 1,8-Cineole (*Z*)- β -ocimene (*E*)- β -ocimene γ -Terpinene Terpinolene Linalool Perillene Sesquiterpenoids: α -Ylangene α -Copaene β -Panasinsene β -Cubebene β -Elemene α -Gurjunene β -Caryophyllene α -Humulene Alloaromadendrene γ -Muurolene Germacrene D β -Selinene α -Selinene α -Muurolene (*E,E*)- α -farnesene δ -Cadinene Shikimic compounds 4-Methylanisole 1,4-Dimethoxybenzene, Indole.^[12]

Table 1: Chemical constituents identified in *F. semicordata*.^[12]

Plant part used	Compound	Class
Fig	4-Methylanisole	Shikimic acid
	1,4-Methoxybenzene	Shikimic acid
	Indole	Shikimic acid
	α -Thujene	Acyclic monoterpenes
	α -Pinene	Acyclic monoterpenes
	Sabinene	Acyclic monoterpenes
	β -Pinene	Acyclic monoterpenes
	β -Myrcene	Acyclic monoterpenes
	1,8-Cineole	Acyclic monoterpenes
	γ - Terpinene	Acyclic monoterpenes
	Terpinolene	Acyclic monoterpenes
	(Z)- β --Ocimene	Acyclic monoterpenes
	(E)--Ocimene	Acyclic monoterpenes
	Linalool	Acyclic monoterpenes
	Perillene	Acyclic monoterpenes
	Limonene	Cyclic monoterpenes
	α -Cubebene	Sesquiterpenes
	α -Ylangene	Sesquiterpenes
	α -Copaene	Sesquiterpenes
	Panasinsene	Sesquiterpenes
	β -Cubebene	Sesquiterpenes
	β -Elemene	Sesquiterpenes
	α -Gurjunene	Sesquiterpenes
	β -Caryophyllene	Sesquiterpenes
	α -Humulene	Sesquiterpenes
	Alloaromadendrene	Sesquiterpenes
	Germacrene D	Sesquiterpenes
	β -Selinene	Sesquiterpenes
	α -Selinene	Sesquiterpenes
	γ -Muurolene	Sesquiterpenes
	Germacrene A	Sesquiterpenes
	(E,E) α -Farnesene	Sesquiterpenes
δ -Cadinene	Sesquiterpenes	
Leaves	Gallocatechin	Flavonoids
	Epigallocatechin	Flavonoids
	Catechin	Flavonoids
	Rutin	Flavonoids
	Quercetin	Flavonoids
	Quercetrin	Flavonoids
	Dodecane	Fatty acid derivatives
	Tetradecane	Fatty acid derivatives
	Pentadecane	Fatty acid derivatives

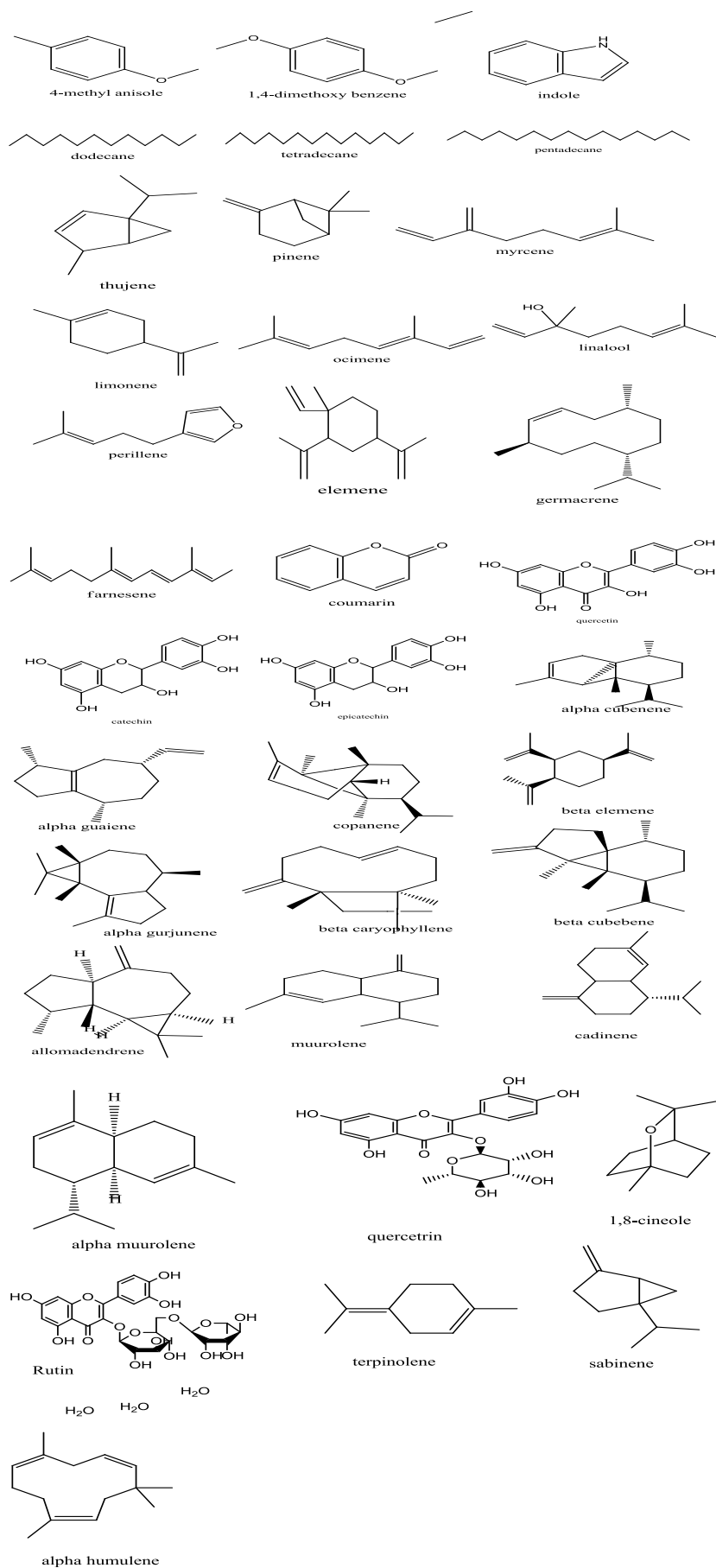


Figure 2:- Chemical constituents identified in *F. semicordata*

Traditional uses

Ficus semicordata is a small to medium sized fodder tree and figs are edible.^[14-33] The latex of the plant is used to cure boils. A bath from the fruit and bark is considered as cure for leprosy. Latex is drunk to cure fever.^[34-37] Raw fruits are eaten in diarrhea.^[38] Young fruit juice is applied in forehead to relieve headache.^[39] Young twigs are fed to cattle for facilitating the discharge of placenta.^[40] Fume of twigs is used in earache.^[41] Bark of *Ficus semicordata*, *Schima wallichii*, *Syzygium cumini*, *Phyllanthus emblica* and *Mangifera indica* are pounded and given in ulcer and gastric problems.^[41] Root is taken to cure headache.^[42] It is commonly used as fodder for goats and cattle.^[43] Study showed that the 70% ethanolic extract leaves possess good antioxidant activity.^[44] Bark soup after boiling in water is taken against dysentery and liver complaints.^[45, 46] Leaf decoction in combination with other plant extract is taken orally to get relief from jaundice.^[47]

Root juice of *Ficus semicordata* is given in menstrual disorder^[48] Ripe figs are edible and good for constipation and indigestion.^[48] Milky latex is given in fever^[49] Bark of *Ficus semicordata* is used in toothache and diarrhea.^[50] Milky latex of *Ficus semicordata* is used in treatment of baldness.^[51] The *in-vitro* antibacterial activity of hexane, ethyl acetate, ethanol (70%v/v) and methanol extracts of *Ficus semicordata* leaves were evaluated. The selected plant extracts produced concentration dependent zone of inhibition against tested bacterial strains. The extracts showed more activity against gram negative organisms than gram positive organisms. The extracts showed better activity at highest concentrations i.e. at 600 and 1200 µg/100µl. Among the four types of *Ficus semicordata* leaves extracts, the methanolic extract showed better activity than remaining extracts at 1200 µg concentrations against gram negative bacteria.^[52]

Table 2: Traditional and current uses of *F. semicordata*.

Uses	Part	Reference
Boils	Latex	[34-37]
Baldness	Bark, Latex	[51]
Constipation and Indigestion	Fruit, root, and leaf	[48]
Leprosy	Fruit, bark	[34-37]
Antidiarrheal	Raw Fruits	[38, 50]
Headache	Fruit juice	[39,42]
Discharge of placenta	Twigs	[40]
Ear ache	Twigs	[41]
Fodder	Fruit, root, and leaf	[14-33, 43]
Ulcer and gastric problems	Bark	[41]
Antioxidant	Leaves	[44]

Dysentery and liver complaints	Bark	[45,46]
Jaundice	Leaves	[47]
Menstrual disorders	Root	[48]
Toothache	Bark	[50]
Antipyretic	Milky latex	[49]
Antibacterial	leaves	[52]

Ficus semicordata has emerged as a good source of traditional medicine for the treatment of various ailments such as leprosy, diarrhea, tooth ache, headache, fever, earache, ulcer and gastric problems, boils. It is a promising candidate in pharmaceutical biology for the development/formulation of new drugs and future clinical uses. However, the vast traditional uses and established pharmacological activities of *F. semicordata* suggest that an enormous scope still exists for its phytochemical exploration using bioassay-guided isolation. The results of future research in the above-mentioned areas will afford a persuasive support for the future clinical uses of *F. semicordata* in contemporary remedy.

Acknowledgement The authors are thankful to the Department of Pharmaceutical Sciences, Kumaun University, Bhimtal Campus, Nainital, Uttarakhand, India for given facilities to complete the review.

REFERENCES

1. Frodin DG. History and concepts of big plant genera. *Taxon* 2004; 53(3): 753–76.
2. Rønsted N, Salvo G, and Savolainen V. Biogeographical and phylogenetic origins of African fig species (*Ficus* section *Galoglychia*) *Molecular Phylogenetics and Evolution* 2007; 43(1): 190–201.
3. Rønsted N, Weiblen GD, Savolainen V and Cook JM. Phylogeny, biogeography, and ecology of *Ficus* section *Malvanthera* (Moraceae). *Molecular Phylogenetics and Evolution* 2008; 48(1): 12–22.
4. Lansky EP, Paavilainen HM. Traditional Herbal medicine for modern times, “Fig The Genus *Ficus*”. CRC Press, Taylor and Francis Group, LLC, Boca Raton, Florida, USA 2011; 1-3.
5. Flaishman MA, Rodov V, and Stover E. The fig: Botany, horticulture, and breeding. *Hortic Rev.* 2008; 34: 113–96.
6. <http://www.flowersofindia.net/catalog/slides/Drooping%20Fig.html>
7. Neves, L., Leaf anatomy of *Ficus semicordata* B. Ham. Ex. J.E. Smith. *Bradea*, 1991; 5(50): 479-96.

8. Singleton V, Orthofer R, Lamuela-Raventos RM. Analysis of total phenols and other oxidation substrates and antioxidants by means of folin-ciocalteu reagent. *Methods Enzymol.* 1999; 99: 152-58.
9. Fazel Shamsa, Ectrophotometric determination of total alkaloids in some Iranian medicinal plants. *Thai J. Pharm. Sci.* 2008; 32: 17-20.
10. Rao Samvasivarao BG, Quantification of phytochemical constituents and in vitro antioxidant activity of *Ficus semicordata* extracts. *International Journal of Pharmacy and Pharmaceutical sciences* 2012; 4(2): 619-22.
11. Nguyen VT, Tran VS, Nguyen MC, Nguyen BT. Study on the chemical constituents of *Ficus semicordata*. *Tap Chi Hoa Hoc* 2002; 40: 69–71.
12. Knudsen JT, Eriksson R, Gershenzon J. Diversity and distribution of floral scent. *The Botanical Review* 2006; 72: 1–120.
13. Chen C, Song Q, Proffit M, Bessière J-M, Li Z, Hossaert-McKey M. Private channel: a single unusual compound assures specific pollinator attraction in *Ficus semicordata*. *Functional Ecology* 2009; 23: 941–50.
14. Singh SC. Some wild plants of food value in Nepal. *Tribhuvan University Journal* 1968; 4 (1): 50-6.
15. Bajracharya D, Rana SJB, Shrestha, AK. A general survey and biochemical analysis of fodder plants found in Nagarjun hill forest of Kathmandu valley, *Journal of Natural History Museum* 1978; 2: 105-16.
16. Maskey K. and Shah BB, Sugar in some Nepalese edible wild fruits. *Journal of Nepal Chemical Society* 1982; 2: 23-30.
17. Shrestha P. Research note: contribution to the ethnobotany of Palpa area. *Contribution to the Nepalese Studies* 1985; 12(2): 63-74.
18. Shrestha K. Report on edible wild plants from Pokhara and its northern region. *Journal of Natural History Museum* 1990; 11: 85-98.
19. Karki MB. Application of growth and yield modeling for improving fodder tree management in Central and Western Nepal. *Banko Janakari* 1994; 4(2): 157-66.
20. Khan MH. Documentation of indigenous knowledge in Chepang community of ShaktikhorVDC, Chitwan, Nepal. In *Proc. of the National Workshop in Nepal: Ethnobotany for conservation and community development*. Edited by K.K. Shrestha, P.K. Jha, P. Shengji, A. Rastogi, S. Rajbhandary & M. Joshi. *Ethnobotanical Society of Nepal, Kathmandu, Nepal.* 1997.

21. Siwakoti M, Siwakoti S, Varma SK. Ethnobotanical notes on wild edible plants used by Satar tribes of Nepal. *Tribhuvan University Journal* 1997; 20: 57-64.
22. Thapa B, Walker DH, Sinclair FL. Indigenous knowledge of the feeding value of tree fodder. *Animal Feed Science Technology* 1997; 67: 97-114.
23. Bhatt LR. Ethno botanical study in a village at Rukum district, Nepal. *Banko Janakari* 1999; 9(2): 40-43.
24. Nepal M. Ethno botany of the Rai and Sherpa community in the Makalu Barun Conservation Area, East Nepal. Central Department of Botany, Tribhuvan University, Kathmandu, Nepal 1999: 150.
25. Karki L. Documentation of indigenous knowledge on the utilization of plant resource by the Chepang community in Dhading district, Nepal. Central Department of Botany, Tribhuvan University 2001: 106.
26. Kunwar RM. Participation and benefits to rural people in community forestry: a case from Makwanpur district, Central Nepal. Indian Institute of Forest Management, Bhopal, India 2002: 93.
27. Oli BR. Local knowledge on plant utilization among the major ethnic communities in the eastern Churiya Nepal. Central Department of Botany, Tribhuvan University, Kathmandu, Nepal 2001: 137.
28. Manandhar NP, Acharya SK. The application of indigenous knowledge of fodder trees in Kalikasthan, Rasuwa district, Nepal. In: *Applied ethnobotany: case studies from the Himalayanregion*. Edited by A. Aumeeruddy-Thomas & P. Shengi. People and Plants working paper, WWF, UK 2003: 17-18.
29. Nepal BK, Sapkota PP. Resource analysis and indigenous knowledge on plants use: a case study of Humla district, Nepal. *Nepal Journal of Plant Sciences* 2005; 1: 57-63.
30. Pandey B. Environmental impacts of Kaligandaki A hydroelectric project on vegetation resource in the dam and reservoir area. Central Department of Botany, Tribhuvan University, Kathmandu, Nepal. 2001; 85.
31. Rajbhandary S, Dhakal D. Indigenous knowledge on fodder plants of Sudel village, Bhaktapur, Nepal. *NUTA Journal* 2003; 2.
32. Shrestha K. Kunwar RM. Plants. In *Babai river valley: fish and biodiversity survey*,Riyal Bardia National Park, Nepal. ZSL conservation report no. 3. Edited by S. Oliver. London:The Zoological Society of London. 2003; 119.
33. Uprety Y. Ethno botanical study on Bankariya ethnic group in Makawanpur district. Central Nepal. University Grant Commission, Kathmandu, Nepal .A report. 2005; 46.

34. Riyal Bardia National Park, Nepal. ZSL conservation report no. 3. Edited by S. Oliver. London: The Zoological Society of London. 2005; 119.
35. Karki L. Documentation of indigenous knowledge on the utilization of plant resource by the Chepang community in Dhading district, Nepal. Central Department of Botany, Tribhuvan University. 2001; 106.
36. Chaudhary RP, Joshi RM, Budha P, Kunwar RM, Makalu Barun Landscape Project (Biodiversity component). Nepal Biodiversity Landscape Project, Kathmandu, Nepal. 2001; 87.
37. Panthi MP, Chaudhary RP. Angiosperm flora of Arghakhanchi district and adjoining areas, West Nepal. Journal Natural History Museum 2002; 21 Suppl 1-4: 7-32.
38. Bhattarai GP. Diversity and indigenous uses of flowering plant resources in the Churiya forests of Parsa Wildlife Reserve and adjoining areas. Central Department of Botany, Tribhuvan University 2002; 110.
39. Manandhar NP. Folklore medicine of Dhading district, Nepal. *Fitoterapia*, 1992; 63(2): 163-77.
40. Dangol DR, Gurung SB. Ethnobotanical study of Darai tribe in Chitwan district, Nepal. In: Proceeding of III National Conference on Science and Technology, Royal Nepal Academy of Science and Technology, Kathmandu, Nepal 2000; 1194-213.
41. Mueller-Boker U. Ethnobotanical studies among the Chitwan Tharus. Journal of Nepal Research Centre 1993; 9: 17-56.
42. Manandhar NP. Ethnobotanical note on folk lore remedies of Baglung district Nepal Contribution to the Nepalese Studies 1993; 2(2): 183-96.
43. Amatya SM. A new variety of *Ficus semicordata* (Moraceae) from Nepal. www.biodiversitylibrary.org 1996; 323-26.
44. Rao BG, Samvasivarao, Quantification of phytochemical constituents and in vitro antioxidant activity of *Ficus semicordata* extracts. *International Journal of Pharm and Pharmaceutical Sci* 2012; 4(2): 619-22.
45. Singh HB, Singh RS, Sandhu JS. Herbal medicine of Manipur: a color encyclopaedia. 1st ed. Daya publishing house, New Delhi 2003; 1-55.
46. Khumbongmayum AD, Khan ML, Tripathi RS, Ethno medicinal plants in the sacred groves of Manipur. *Indian Journal of Traditional Knowledge* 2005; 4(1): 21-3.
47. Shanker R. Jaundice and its traditional cure in Arunachal Pradesh. *Journal of Pharmaceutical and Scientific Innovation* 2012; 1(3): 93-7.

48. Dhami N. Ethnomedicinal Uses of Plants in Western Terai of Nepal: A Case Study Of Dekhatbhuli Vdc of Kanchanpur District, Medicinal Plants in Nepal: An Anthology of Contemporary Research, 2008; 164-76.
49. Doley Bhabajit, Gajurel PR, Rethy P, Buragohain R. Use of medicine by ethnic communities of Arunachal Pradesh, India, Journal of Medicinal Plant Research 2014; 8(24): 857-63.
50. Phondani PC, Maikhuri RK. Ethno botanical Uses of Plants among the Bhotiya Tribal Communities of Niti Valley in Central Himalaya, India, Ethnobotany Research & Applications 2010; 8: 233-44
51. Singh A G. Medicinal plants as a source of antipyretic agent in terai region of western Nepal. Int J Appl Sci Biotechnol 2013; 1(3): 118-26.
52. Rao B, Ganga Prasad D, Narender E. Phytochemical Screening And In Vitro Antimicrobial Activity of Different Extracts From Ficus Semicordata Leaves, Inveni Rapid: Pharm Biotech & Microbio. 2011.