Hamelia patens a potential plant from Rubiaceae family: A Review

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Abstract: Traditional medicine is used to sustain people's health, as well as to prevent, diagnose, improve or indulgence physical and mental illnesses all over the world. Plants have since ever been a rich basis of medication among the human civilizations. In India there exist numerous highly civilized communities residing near or in the holy lap of nature. The people of such civilizations frequently depend on plants for their daily needs as well as for their medication also. Medicinal plants are believed to be with healing powers, and people have used them for various centuries. Aimed to modern drug discovery, traditional medicinal plants have been studied and developed which is followed the ethno botanical lead of native cures used by traditional medical systems. The therapeutic activities of mainly plants are due to the presence of one or more of such components like alkaloids, tannins, saponins and cardiac glycosides. The phytochemical screening discovered the presence of saponins, tannins, steroids, alkaloids, flavonoids, phenols and glycosides. Therefore, the research of plants and their uses (especially medicinal purposes) is one of the most primary human concerns and has been practiced in the planet.

Keywords: Alkaloids, cardiac glycosides, therapeutic activity, flavonoids, saponins.

1. Introduction

Medicinal plants are alleged to be with healing powers, and people are used them for many centuries. Main objective of ethno botanical research is to record the indigenous uses of plant resources. Now, 80% of the world's population depends on traditional medicines for its primary health care needs[1]. Plants remedies are often used as an alternative to allopathic medicines[2]. Local people have discovered the therapeutic activity of medicinal plants against certain diseases through their indigenous experiences transferred to them from their ancestors. A large number of plants are being used in medicine for therapeutic or prophylactic purposes. The therapeutic properties of medicinal plants are attributed owing to the presence of active substances such as alkaloids, flavonoids, glycosides, vitamins, tannins, and coumarins[3].

1.1 Concept of Ayurveda

Ayurvedic system comprising of traditional medicine have served as a source of alternative medicine, new pharmaceutical and health-care products and hence provides an insight to the vast number of plants with activities such as immunostimulation, tonic, neurostimulation, anti-ageing, antibacterial, antiviral, anti-rheumatic, anticancer and adaptogenic etc[4]. Natural medicinal herbs have existed in one or another way in different cultures and civilizations of each and every country[5]. The utilization of these natural

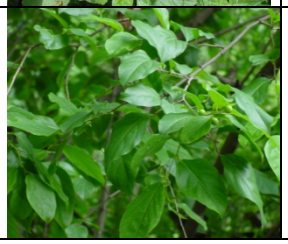
medicinal herbs in different treatments is being practiced for thousands of years in traditional Indian system of medicine termed as Ayurveda[6]. Ayurveda being the most ancient and vital tradition practiced until date in India has proved its roots both philosophically, as well as experimentally[7].

1.2 Modern drug discovery

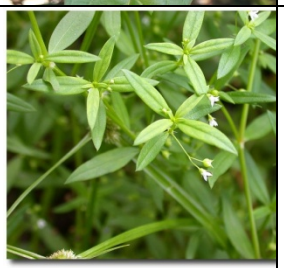
Aimed to modern drug discovery, traditional medicinal plants have been studied and developed which is followed the ethnobotanical lead of indigenous cures used by traditional medical systems[8-9]. Indian herbal industries with considerable research in the field of pharmacognosy, phytochemistry, pharmacology and clinical therapeutics have explored these ayurvedic herbs, which are now designed into numerous herbal formulations, which have entered the international pharmacopeia through the study of ethnopharmacology and traditional medicine.

Rubiacea family plants play great role in the pharmacy to innovative drugs and used in conventional medicine to treat chronic and even communicable diseases[10]. *Hamelia patens*, is an ornamental plant belong from *Rubiaceae* family.

Table-1: Ethanomedicinal uses of *Rubiacea* family plant

S. No.	Plant Name	Common name	Plant picture	Plant part use	Ethanomedicinal property	References
1.	***Anthocephalus chinensis***	Kadam		Bark	Used in tonic, febrifuge, antidiuretic and astringent.	11
2.	***Borreria articularis***	Madanaghanti		Root	It cures stomach pain.	12
3.	***Borreria stricta***	Peechi		Leaves	It cures ear pain. Seeds as stimulant flowers are used as antipyretic and analgesic.	13,14,15

4.	***Catunaregam nilotica***	Dandy		Fruits	Use in diarrhea and dysentery. The roots are frequently prescribed as paste in headache cases.	16
5.	***Catunaregam spinosa***	Gehela		Fruits	It can lighten and consequently remove the scars of pimples.	17
6.	***Dentella repens***	creeping lickstoop		Leaves	It improve the eyesight and in constipation is prescribed as laxative.	18
7.	***Gardenia gummifera***	Dekamali		Stem and bark	Use in treat toothache, dyspepsia and to disinfect the septic wounds.	19-20
8.	***Gardenia jasminoides***	Gandhraj		Roots	purgative, an effective cure for indigestion and nervous disorders	21
9.	***Haldina cordifolia***	Kadami		Bark	Febrifuge, antiseptic and aphrodisiac.	22

10.	***Hamelia patens***	Firebush, Red-head		Leaves	It curing dysentery	23
11.	***Hedyotis verticillata***	Salasik-lupa		Flower	Use in skin diseases like athlete foot	24
12.	***Ixora arborea***	rangan, kheme, ponna, chann tanea		Root and flower	Use in menstruation and urinary problems of females.	25-26
13.	***Ixora coccinea***	Rugmini		Roots and flowers	It is curative for dysentery and ulcer.	27
14.	***Meyna spinosa***	Muyna		Leaf	It kill intestinal worms, with black pepper to cure diphtheria.	28-29
15.	***Mitragyna parviflora***	Kaim		Root, bark	To cure diabetes and applied in muscular pain and leaf paste in case of swelling due to sprain.	30

16.	***Morinda coreia***	Indian Mulberry, Aal		Leaves	Applied to wounds and juice of leaves to gout.	31
17.	***Mussaenda glabrata***	White Mussaenda, Virgin Tree, Buddha's Lamp		Root, leaves, flower	Roots are given with cow's fresh milk in white leprocy. Leaves are useful to cure jaundice. Whole plant is useful and curative for diabetes patients. Flowers are used to cure swellings and conjunctivitis and asthma also.	32
18.	***Oldenlandia corymbosa***	Diamond Flower, corymbose hedyotis, flat-top mille graines, old world diamond-flower, daman pappar		Whole plant and leaves	Plant is given in jaundice, hepatic diseases and as anthelmintic. Leaves as paste in burning sensation of soles and palms.	33
19.	***Oldenlandia umbellate***	Indian madar		Root and leaves	Treat Bronchial disorders.	34
20.	***Paederia scandens***	Gandhali, Skunk Vine, Chinese fever vine, Lesser Malayan stinkwort, stink vine		Whole plant and leaves	Used as anti arthritis, anti-spasmodic, astringent,carminative, anti emetic, emollient, expectorant. It is also indicated in asthma, diarrhea, diabetes, gout and seminal weakness. Root ash is applied in various skin diseases. Leaf paste in a composition is taken leucorrhoea	35

21.	***Pavetta crassicaulis***	Assamese, Sam-suku		Root, bark and leaves	Given in visceral problems and dropsy. The bark is used on the victims of epilepsy. Decoction and boiled leaves are used to cure hemorrhoids	36
22.	***Rubia cordifolia***	Patudtud, Heart-leaved madder, Madder		Whole plant	Use in antidysentric, anthelmintic, astringent, carminative, expectorant and is used in cough, hepatic obstructions, indigestion, jaundice, ulcers, fracture, mental agony, obstructions in urinary passage and paralytic affections.	37
23.	***Spermadictyon suaveolens***	Forest champa, Padera, Padwa, Mahabal, Barcha		Root	Used in treatment of diabetes and rheumatoid arthritis.	38
24.	***Thecagonum biflorum***	sonare mugura		Whole plant and leaves	It is used for malarial fever and body pain, Leaf is boiled with mustard oil and is dropped in ear to cure purulent discharges.	39

Ethanomedicinal uses of *Hamelia patens*

In traditional medicine, *H. patens* is used as diuretic and for the empirical treatment of pain, inflammation, rheumatism, diabetes, wound healing, gastritis, stomach ache, snake and scorpion bites, fever and others[40,41,42,43]. However, the toxicity and antinociceptive effects of *H. patens* remain to be studied. Plant derived drugs come into use in the modern medicine through the uses of plant material as indigenous cure in folklore or traditional systems of medicine.

2. Plant Morphology

Firebush is a fast-growing, evergreen shrub or grows in full sun and shed[44] Height of *Hamelia patens* is 6 to 12 feet and it can spread 5 to 8 feet. Leaves can be quite varied and whorled and

margins are undulate .*Hamelia patens* can be grow in all type of soil such as wet, acidic, alkaline, sand, loam and clay They are usually 3 to 8 inch long and 1 to 4 inch wide. Flowering arises periodically throughout the year but with less spontaneity in the coldest one or two months of winter[45]. Firebush can be proliferated by fresh and new seeds. The fruit is in oval shape and edible. Ripen fruit resembling to berries they are juicy, berries go throughout vary in color from green, to red and lastly to purple or blackish[46-47].

2.1 Plant Description

Common Names: Firebush and Scarlet Bush, Red head

Kingdom - Plantae
Division – Magnoliophyta
Class - Magnoliopsida
Family – Rubiaceae
Genus – Hamelia
Species – *Hamelia Patens*[48]

Figure 1 – *Hamelia Patens* plant

Figure 2 – Flower of *Hamelia Patens*

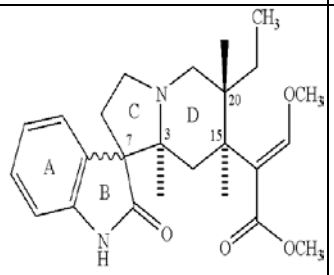
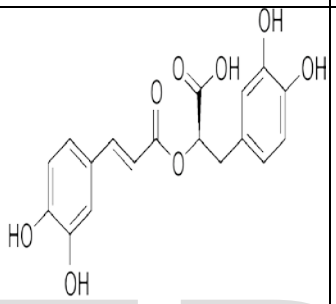
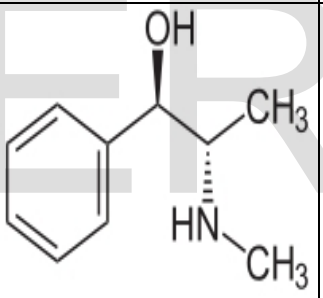
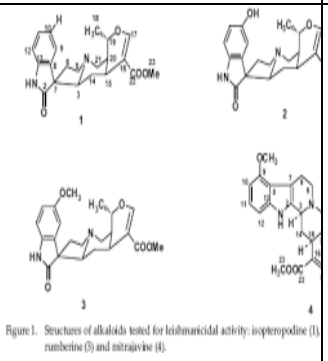
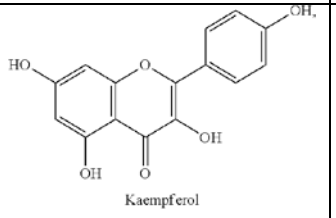
2.3 Species of *Hamelia patens*

Hamelia axillaris, Hamelia barbata,Hamelia calycosa, Hamelia chrysantha, Hamelia cuprea, Hamelia longipes,Hamelia macrantha,Hamelia magnifolia, Hamelia ovate, Hamelia pepillosa,Hamelia patens, Hamelia rostrata, Hamelia rovirosae, Hamelia sanguine, Hamelia ventricosa,Hamelia xerocarpa,Hamelia xorullansis.

Table-2: Pharmacological activity review of *Hamelia patens*.

S. No.	Plant part used	Extract	Assay	Activity	References
1.	Leaves	Chloroform	Croton oil induced in mice	Anti-inflammatory	Sosa et al. (2002)
2.	Leaves	Crude extract	E1 Salvador	Wound healing activity	Beloz et al. (2003)
3.	Leaves	Hexane	Antimicrobial activity performed on *Escherichia coli, Enterococcus faecalis, pseudomonas aeruginosa* and *staphylococcus aureus* bacteria.	Antimicrobial activity	Camprose et al. (2003)
4.	Leaves	Hydroalcoholic	By using 1,1-diphenyl-2-picrylhydrazyl (DPPH) assay.	Antioxidant activity	Ramos et al. (2003)
5.	Root and Bark	Methanolic	On the tumor cell lines such as nasopharynx carcinoma, laryngeal carcinoma, cervix adenocarcinoma (HeLa) and cervix carcinoma cells and one noramal cell line that is canine kidney	Cytotoxic activity	Mena-Rajon et al. (2009)
6.	Leaves	Ethanolic	On the adult earth worm *pheretima posthuma*	Anti- helmintic activity	Khandelwal et al. (2012)
7.	Stem root	Ethanolic	Antifungal activity with *Aspergillus flavus* and *Aspergillus fumigates*	Antifungal activity	Khandelwal et al. (2012)
8.	Leaves, flower, Fruits	Distilled water	Antifungal activity tested against *Aspergillus fumigatus* NCBT 112, *Candida albicans* NCBT 140, *Fusarium oxysporum* NCBT 156 and *Rhizoctonia solani* NCBT 194	Antifungal activity	Abubacker et al. (2013)

Table-3: Phytochemical activity of *Hamelia patens*

S. No.	Plant part used	Extract	Bioactive compound	Structure of bioactive compound	Assay	References
1.	Aerial part of leaves	Ethanol	Oxindole alkaloid		chromatography analysis with benzene and ethyl acetate	Borges et al. (1979)
2.	Leaves	Methanol	Flavanone glycoside rosamarinic acid, narirutin, tetrahydroxy flavanone		sequential column chromatography and semi preparative HPLC	Aquino et al. (1990)
3.	Leaves	Methanol	Ephedrine I-ephedrine hydrochloride		By the spectroscopic analysis (13-C-NMR, IR,UV and mass)	Chaudhuri and Thakur (1991)
4.	Leaves	Ethanol	isopteropodine, palmirine, rumberine and mitrajavine	 Figure 1. Structures of alkaloids tested for leishmanicidal activity: isopteropodine (1), rumberine (3) and mitrajavine (4).	Assess in vitro for antileshmanial activity	Suarez et al. (2011)
5.	Leaves	Ethyl alcohol	flavonoids - kaempferol and epicatechine.	 Kaempferol	By Chromatography and preparative HPLC	Suarez et al. (2011)

4. Conclusion

Rubiaceae is an basically tropical woody family. It comes with the six largest angiosperm families having 637 genera and 10700 species. Ethno botanical data shows that most of the members of the family have enormous medicinal value and are being used since ages for the cure of various human ailments. After thorough investigation and literature search it was observed that less work has been done on *Hamelia patens* plant especially on its leaves. In traditionally the plant *Hamelia patens* has a large demand due to its treatment of many chronic and acute diseases with great benefits. This study attempts to high lighten the Therapeutic potential of *Hamelia patens* and their constituents in the prevention or therapy of disease. From this study we can conclude that the results reviewed in the study are aimed at attracting the attention of researchers seeking new drugs from *Hamelia patens* and its chemical compounds. The isolated compounds can hopefully be considered in future for more clinical evaluations and possible applications and as adjuvant to current medications.

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