

Diversity and therapeutic potentiality of the family Lamiaceae in Karnataka State, India: An overview

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ABSTRACT

The objective of the present study was to review the potential medicinal plants of Lamiaceae distributed throughout the state of Karnataka, India. Lamiaceae, also called as mint family is one of the largest families including herbs or shrubs often with aroma. They are usually common in Mediterranean countries for the fact that some of them produce a high amount of essential oils that enables them to survive in hot summer seasons. Some of the plants belonging to this family are *Anisomeles*, *Colebrookea*, *Hyptis*, *Leucas*, *Pogostemon*, *Ocimum*, *Salvia* and so on. These are important for their medicinal properties, perfumery, culinary, vegetable and ornamental purposes and they are a rich source of biologically active compounds including strong aromatic essential oils, tannins, saponins and organic acids. The medicinal plants of the family possess a lot of medicinal uses having sedative, diuretic, tonic, antispasmodic, antifungal, antimicrobial, anti-inflammatory and antiseptic properties.

Key words: Lamiaceae, Medicinal properties, Chemical constituents.

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1. INTRODUCTION

The Lamiaceae family (or mint family) is one of the largest and most distinctive families of flowering plants, with about 220 genera and almost 4000 species worldwide. This family has an almost cosmopolitan distribution and is one of the major sources of culinary, vegetable and medicinal plants all over the world (Naghbi *et al.*, 2005). The largest genera are *Salvia*, *Scutellaria*, *Plectranthus*, *Hyptis*, *Thymus*, etc and the plants are frequently aromatic in all parts and include many widely used culinary herbs, such as basil, mint, rosemary, sage, savory, oregano, lavender, thyme and perilla. Some are shrubs, trees such as teak or rarely vines. Many members of the family are widely cultivated, owing not only to their aromatic qualities but also their ease of cultivation. Besides those grown for their edible leaves, some are grown for decorative foliage such as *Coleus* and some for food purposes (Raja, 2012).

The members of this family are found to inhabit nearly all climatic conditions. Biochemically, they are characterized by the presence of essential oils, which makes many members of this family as wealth of species with medicinal property and have great application in pharmaceutical, cosmetic and perfume industry (Sharma and Bhadange, 2013). The medicinal plants of Lamiaceae have an important value in the socio-cultural, spiritual and medicinal use in rural and tribal lives of the developing countries. They are known to be used by 70% to 80% of global population for their medicinal-therapeutic effects as estimated by WHO (Venkateshappa and Sreenath, 2013).

The Indian region is very rich in ethno-botanical heritage of Lamiaceae due to its rich cultural diversity. Rig Veda, the important and earliest available literary work emphasizes on the herbal medicinal knowledge of Lamiaceae members. Later on, Indian herbalists such as Maharshi Charaka and Sushruta made use of medicinal plants for curing various diseases. But during the past few centuries, there has been a rapid extension of allopathic medicinal treatment in India but still now the use of natural products as medicine, especially plant products are widely used in the societies of various rural tribal people (Arijit and Arpita, 2013). The chemical components of the members have diverse biological roles with therapeutic values and the phytochemicals present in plants are valuable source of food and medicine. They are known to have various biological activities such as antimicrobial, antifungal, antioxidant, etc. The important bioactive components in plants are usually the secondary metabolites such as alkaloids, flavonoids, tannins and other phenolic compounds (Rai *et al.*, 2013).

2. MATERIALS & METHODS

In the present work, the medicinal plants of Lamiaceae family distributed throughout the state of Karnataka which harbours one of the richest tropical forest areas in India are selected and their botanical names with nomenclature, description with important characteristics, chemical constituents and their general and traditional medicinal uses including therapeutic properties have been explained.

3. RESULTS & DISCUSSION

***Anisochilus carnosus* (L.f.) Wall. (= *Lavandula carnosus* L.f.)**

Anisochilus carnosus (L.f.) Wall is known as karpoorada gida in Kannada. They are erect herbs with 4 – angled stem and rugose leaves. Flowers are purple in strobilate spikes. Chemically the leaves are known to contain essential oil, luteolin and apigenin (Yoganarasimhan, 1996). The whole plant constitutes quinines, alkaloids, sterols, coumarins and proteins (Meenakshi *et al.*, 2012). The drug is known to cure stomachache (Kamble *et al.*, 2008). The leaves can be made into a paste and applied over the lesions in different skin diseases (Ignacimuthu *et al.*, 2006).

***Anisomeles indica* (L.) O. Kuntze. (= *Nepeta indica* L.)**

They are tomentose shrubs with quadrangular stems and bluish flowers in dense whorls forming terminal spikes. It is called Henu Karithumbe in Kannada. Roots contain stigmasterol and β - amyryl, fridelin, betulinic acid, ovatodiolide, anisomelic acid and anisomelin. Stem contains triterpenes and sterols. Leaves contain essential oil, fatty acids, triterpenes – ovatodiolide and iso – ovatodiolide. Whole plant contains diterpenoids – 4, 7 – oxycyclo anisomelic acid, 4 – methylene – 5 – hydroxy ovatodiolide (I), 4 – methylene – 5 – oxo anisomelic acid. The herb is used as an astringent and carminative. It is used in folk medicine in the treatment of diverse conditions such as inflammatory skin diseases, liver protection, intestinal infections, abdominal pain and immune system deficiencies. Leaves are useful in chronic rheumatism, psoriasis and other chronic skin eruptions (Baranwal *et al.*, 2012).

***Anisomeles malabarica* (L.) R.Br. (= *Nepeta malabarica* L.)**

Aromatic tomentose shrubs with purple flowers. Whole plant yield essential oil, anisomelic acid, ovatodiolide, diterpenes – malabaric acid, anisomelyl acetate, anisomelolide, crisilineol, betulinic acid and β – sitosterol (Yoganarasimhan, 1996). *Anisomeles malabarica* has been used as a folk medicine to treat amentia, anorexia, fevers, swelling, and rheumatism. The herb is reported to possess anticancer, anti-allergic, anti-anaphylactic, anti-bacterial anti-carcinogenic anti-inflammatory properties (Kavitha *et al.*, 2012). The paste of its stem can be mixed with coconut oil and applied over wounds and it facilitates healing (Ignacimuthu *et al.*, 2006).

***Basilicum polystachyon* (L.) Moench. (= *Moschosma polystachyum* L.)**

It is an erect much branched herbs and flowers are pale pink or lilac in racemes (Yoganarasimhan, 1996). The petroleum ether extract of leaves have shown the presence of phytosterols, alkaloids and carbohydrates, volatile oils in alcoholic extracts and gums and mucilage in water

extracts. The leaves are used in the treatment of epilepsy, palpitation of heart, neuralgia and as a sedative (Madhavan *et al.*, 2013). The alcoholic and aqueous extracts of leaves have shown significant anticonvulsant activity (Madhavan *et al.*, 2009).

***Colebrookea oppositifolia* Sm.** (= *Colebrookea ternifolia* Roxb.)

They are shrubs with white tomentum, leaves elliptic – lanceolate, and flowers white in panicle spikes. Aerial parts contain flavours (Yoganarasimhan, 1996). The plant also constitutes alkaloids, terpenoids, reducing sugars, saponins, tannin, carbonyls, flavonoids, phlobatannin, steroids, proteins and volatile oils. It has been used to cure epilepsy, urinary disorders and as antiseptic (Rupali *et al.*, 2014). Leaves are used in the treatment of wounds, bruises and fracture besides possessing antifertility activity; roots are used in the treatment of epilepsy; oil possesses fungitoxic property (Madhavan *et al.*, 2011).

***Plectranthus amboinicus* (Lour.) Spreng.** (= *Coleus amboinicus* Lour.)

The drug is known for its potential medicinal properties. In Sanskrit it is called Parnayavani. It is a large succulent herb with aromatic leaves, flowers small and pale purple. Leaves contain volatile oil, acids, crisimaritin and β – sitosterol – β – D – glucoside besides salvigenin, 6 – methoxy genkwanin, quercetin, chrysoeriol, luteolin, apigenin, eriodictyol and taxifolin (Yoganarasimhan, 1996). It contains an aromatic volatile oil called Carvacrol in small quantity. The leaves of drug (Parnayavani patra) have a pleasant odour and pungent taste, and are used for flavouring meat and salad. The drug Parnayavani is a diuretic herbal agent. The leaves of Parnayavani are expressed to obtain juice which is mixed with sugar and given as a powerful aromatic carminative. A decoction of the leaves is given for chronic coughs and asthma and also allied respiratory problems. Leaves are topically applied to headache and insect bite (Jangamavisa). The plant drug is used in certain nervous disorders as per Ayurveda as it pacifies the bio force known as Vata (Pandey, 2004).

***Hyptis suaveolens* (L.) Poit.** (= *Ballota suaveolens* L.)

They are erect aromatic herbs, leaves variable, ovate, villous beneath, flowers blue in axillary or terminal in globose clusters and nutlets are minute with dark brown or blackish color. Root, stem and leaves contain traces of hydrocyanic acid. Plant contains ethereal oil, diterpenes suaveolic acid and suaveolol. Seed contains fatty oil. Root contains triterpenoids. Leaves and flowers contain sterols (campesterol and fucosterol) (Yoganarasimhan, 1996). The plant is stimulant, carminative, antispasmodic, antirheumatic, antisuorific bath. It is also used for parasitical cutaneous diseases, infection of uterus, and as sudorific in catarrhal condition, headache, stomach, snuff to stop bleeding of the nose (Pachkore *et al.*, 2011). The leaves of *H. suaveolens* have been utilized as a galactagogue (Anonymous, 1964). Crude leaf extract is also used as a relief to colic and stomachache. Leaves and twigs are considered to be antispasmodic and used in antirheumatic and antisuorific baths (Kirtikar and Basu, 1991). The drug has an antiinflammatory, antifertility potential and also applied as an antiseptic in burns, wounds, and various skin complaints. The decoction of the roots is highly valued as appetizer and is reported to contain urosolic acid, a natural HIV-integrase inhibitor (Chatterjee and Pakrashi, 1997). It is also proved to be Hepatoprotective and cytoprotective (Ghaffari *et al.*, 2012).

***Lavandula bipinnata* (Roth) Kuntze.** (= *Bystropogon bipinnatus* Roth)

It is an erect, strongly fragrant, annual herb preferably growing on rocky hill slopes. Stem quadrangular, velvet hairy, bearing deeply divided, opposite leaves. Many sessile, blue flowers arranged in terminal spikes. The most important bioactive constituents present in this plant are steroids, terpenoids, carotenoids, flavanoid, alkaloids, tannins and glycosides. The essential oil yielding from it is highly effective and can be used in balms, perfumes, cosmetics and topical application. It is beneficial for anxiety, headaches, depression, cold and as breath freshner and mouthwash (Shinde and Kshirsagar, 2014). The essential oil has anti-bacterial activity and the plant acts as an antidote against poison. The roots are rubbed with water and the solution is applied over the sting of wild animals, also applied daily for boils and the leaf paste is applied on decayed tooth to reduce pain (Salve and Bhuktar, 2013).

***Leonotis nepetifolia* (L.) R. Br.** (= *Phlomis nepetifolia* L.)

They are undershrubs, leaves ovate – lanceolate, and flowers orange – red, bristly in verticillasters and nutlets are ovoid. Whole plant contains traces of alkaloid. Roots contain n – octacosanol, campesterol, β – sitosterol, glucopyranoside. Leaves contain labdane diterpene nepetaefolin, nepetaefolinol, leonotinin, methoxy nepetaefolin, bitter principle, fatty oil. Calyx and flowers contain a resin and resinic acid. Seeds contain volatile and fatty oil (Yoganarasimhan, 1996). The whole plant ash of *L. nepetifolia* is used externally to treat paralysis. The seed, flower and inflorescence are used as external application for burns. The application of paste of inflorescence mixed with groundnut oil is used for wound healing. Similarly, the paste of leaves is reported to be applied externally in excema. The ash of the whole plant mixed with mustard oil on external application relieves breast pain during post natal period and in joint pains. Decoction of stem is known to relieve jaundice. Internal consumption of the whole plant regulates the menstrual cycle. The paste of inflorescence fried in ghee is administered for treating cough (Pushpan *et al.*, 2012). Traditionally, it was used to treat kidney diseases, rheumatism, dysmenorrheal, bronchial asthma, diarrhoea, fever, influenza (Dhawan *et al.*, 2013).

***Leonurus sibiricus* L.**

They are herbs or undershrubs, leaves palmatifid, large, flowers are pink, red or blue in verticillaster and nutlets are smooth. Plant contains alkaloid leonurine, fatty oil, resin and resinic acid. Leaves contain cyclic peptide of 12 amino acids. Seeds contain alkaloid leonurinine and a

volatile oil (Yoganarasimhan, 1996). The drug is known to possess analgesic, anti-inflammatory (Islam *et al.*, 2005) and antibacterial activities (Ahmed *et al.*, 2006).

***Leucas aspera* (Willd.) Link. (= *Phlomis aspera* Willd.)**

It is an erect herb with diffuse quadrangular branches, leaves linear-lanceolate, flowers white in verticils and nutlets oblong. Plant contains sterols, alkaloids, galactose, oleanolic acid, ursolic acid and β – sitosterol. Aerial parts contain α – itosterol and β – sitosterol. Shoots contain long chain compounds – 1 – hydroxytetriacontan – 4 – one and 32 – methyl – tetriacontan – 8 – ol, dotriacontanol (Yoganarasimhan, 1996). The drug is known to possess anti fungal, anti-inflammatory, anti oxidant, prostaglandin inhibitory, antinociceptive, cytotoxic and bacteriostatic against *Staphylococcus aureus*, *Vibrio cholera*, *Salmonella typhi*, *Klebsiella aerogenes*, *Escherichia coli*, *Proteus vulgaris*, *Pseudomonas pyocyanea* and *Dys. flexneri* (Srinivasan *et al.*, 2011). Hot water extract of *Leucas aspera* is used orally as stimulant, anthelmintic, laxative, and diaphoretic also used to treat inflammation, dyspepsia, and jaundice. It is also used orally for the treatment of headache, asthma, and bronchitis. Entire plant extract is used orally to treat scabies, psoriasis, and snake bite. The plant *Leucas aspera* is externally used as an insect repellent. The flowers are crushed and aroma is inhaled in the opposite nostril for the relief of migraine. The juice of leaves is used orally for ear pain and for pus discharge from ear. The paste of leaves ground with chalk is applied to tooth cavity (periodontal) to prevent decay. The decoction of leaves is used nasally as an antivenin. Infusion of leaves is used externally to treat scabies. Leaf paste mixed with turmeric is used to heal wounds and boils (Das *et al.*, 2012).

***Leucas cephalotes* (Roth) Spreng. (= *Phlomis cephalotes* Roth)**

Leucas cephalotes (Roth) Spreng. is named Dronapushpi in Sanskrit. It is an erect bushy herb, leaves ovate – lanceolate, crenate – serrate, and flowers white in dense, globose, terminal whorls, nutlets smooth, brownish. Plant contains β – sitosterol, glucoside, labellic acid (Yoganarasimhan, 1996). Therapeutically, the decoction of dried aerial parts of plant is used orally for diarrhea. The decoction of entire plant is used orally to reduce fever. The flowers and leaves are applied externally as poultice to treat headache. The decoction of flower heads in Nepal is used orally to treat jaundice. The decoction of flowers in India is used orally as an emmenagogue. The juice of unripe fruits (India) is used externally to treat scabies. The dried leaves are used orally as a blood purifier (Das *et al.*, 2012). The herb is stimulant, diaphoretic and insecticide. The fresh juice is an external application in scabies. The flowers in form of syrup are used as remedy for cough and colds. It is laxative, anthelmintic, stimulant and febrifuge. The herb is useful in bronchitis, asthma, cough, jaundice, inflammation, dyspepsia, paralysis and leucoderma. The leaves are useful in fever and urinary discharges. A snuff of expressed juice of herb is given in coryza, catarrhal affections and headache. The decoction of the herb is used to ulcers as wash liquid. It is also applied externally to poisonous insect bites. The juice of this herb is applied as a collyrium (netranjana) in case of jaundice. The herb is used in the form of a decoction or infusion in the fevers especially in intermittent fevers; it is effective in malarial fever and influenza. It is used in worm affections, jaundice, biliousness, constipation, abdominal colic and menstrual disorders. It has a good cholagogue action and given in certain diseases of biliary affections (Pandey, 2004).

***Leucas indica* (L.) R. Br. ex Vatke**

It is a slender puberulous herb, leaves linear – lanceolate, flowers white in verticils, nutlets 3 – angled, brownish (Yoganarasimhan, 1996). The leaves of *L. indica* constitutes Phytosterols, triterpenoids, flavanoids, lactones, tannins, phenolic compounds, glycosides, fatty acid and fixed oils (Chandrashekhara and Rao, 2013). The flowers are used orally to treat typhoid fever. The leaves are pounded with garlic, pepper, and leaves of *Piper longum* and made into pills and used orally to treat typhoid fever. Leaves along with tender shoots of *Momordica charantia*, pepper, garlic, and common salt are pounded, in equal quantities, made into pills, and taken orally once a day for 9 consecutive days to treat pneumonia. The leaves with those of *Alternanthera sessilis* in equal quantity are pounded with “ghee” and the extract is applied to eyes, and paste made into pills, which are taken for 40 days orally to treat night blindness (Das *et al.*, 2012).

***Leucas lanata* Benth.**

They are woody softly villous herbs, leaves ovate, crenate, and velvety, flowers white, sessile in many flowered axillary whorls, nutlets oblong – obovoid, trigonous. Aerial parts contain amino acids and sterols (Yoganarasimhan, 1996). The plant juice is used orally for treatment of headache and stomach ache. Leaves are made into a paste and applied externally for cuts and wounds. A poultice of leaves is placed on affected area to promote exudation of pus from boils. The juice is used orally as an antidote for reptile poison (Das *et al.*, 2012).

***Leucas martinicensis* (Jacq.) R. Br.**

They are herbs or undershrubs, leaves ovate – lanceolate, serrate, flowers white, in globose verticils, nutlets obovoid – oblong, dark brown, shining (Yoganarasimhan, 1996). Hot water extract is used orally for gastroenteritis, cholera, malaria, syphilis, leprosy, diarrhoea and dysentery. The leaves are also used orally for pain during pregnancy. The infusion is used ophthalmically for proptosis, conjunctivitis and for corneal ulcers (Das *et al.*, 2012).

***Leucas stelligera* Wall. ex Benth.**

It is an erect softly pubescent or villous branched herb, leaves elliptic – lanceolate or oblong – lanceolate, obtusely serrate, tomentose, flowers white in dense, many flowered, axillary and terminal whorls, nutlets oblong – ovoid, brownish, shining (Yoganarasimhan, 1996). The plant is used orally in females as an emmenagogue (Das *et al.*, 2012).

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***Leucas zeylanica* (L.) R.Br.**

They are erect pubescent or hairy herbs, leaves ovate – lanceolate, distantly serrate, flowers white in terminal whorls, nutlet obovoid – oblong, dark brown or black, shining. Whole plant contains volatile oils (Yoganarasimhan, 1996). The plant is externally rubbed on abdomen of the mother after child birth (Das *et al.*, 2012).

***Mentha piperita* L.**

They are aromatic herbs, leaves ovate, serrate, and flowers purplish in terminal spikes. Leaves contain flavanoid glycosides mentoside, isorhoifolin, essential oil contains viridiflorol, 18 sesquiterpene hydrocarbons and flowers contain flavanoids (Yoganarasimhan, 1996). Therapeutically, peppermint oil vapour is used as an inhalant for respiratory congestion. Tea made with *M. piperita* leaves is used to treat coughs, bronchitis, inflammation of oral mucosa and throat. It has traditionally been used to treat a variety of digestive complaints such as colic in infants, flatulence, diarrhoea, indigestion, nausea, vomiting, morning sickness and anorexia and as a spasmolytic to reduce gas and cramping. Its oil is used in toothache, rheumatism, muscular pains, and to relieve menstrual pains. It has been pharmacologically tested and proved for its inhibitory activity on respiration, antitussive, anti emetic, anti spasmodic, analgesic, coolant, anti-inflammatory, anti microbial, radioprotective and local anaesthetic effects (Shah and D'Mello, 2004).

***Ocimum americanum* L.**

They are herbs with elliptic – oblong, serrate leaves, flowers white in long pubescent racemes. Whole plant contains essential oil. Seeds contain volatile oil, semi – drying fixed oil. Essential oil consists of E – methyl cinnamate, caryophyllene monoxide, sesquiterpene alcohols of the copane series, neolignan ocimin (Yoganarasimhan, 1996). The plant has carminative, diaphoretic and stimulant properties. A decoction of leaves is used for cough, cold, dysentery, bronchitis and a mouth wash for relieving tooth ache (Bhasin, 2012).

***Ocimum basilicum* L.**

It is a large aromatic herb or undershrub, flowers rose or white in whorls distantly placed in racemes. Plant yields volatile oil consisting of Mecinnamate methyl – chavicol, linalool, cineole, ocimene, borneol, sambulene, safrole, epibicyclosiquiphellandrene (Yoganarasimhan, 1996). The plant is stomachic, stimulant, carminative, anti-pyretic, diaphoretic, expectorant, diuretic and also useful in heart, brain and blood diseases asthma, inflammations and enlarged spleen The infusion of seeds is given in gonorrhoea, diarrhoea and chronic dysentery (Bhasin, 2012).

***Ocimum gratissimum* L.**

They are erect, aromatic undershrubs, leaves elliptic – lanceolate, flowers in racemose whorls, nutlets subglobose, brown. Contains essential oil having thymol, eugenol, ocimene, cadinene and (-) perillyl alcohol, leaves contains ocimol and gratissimin (Yoganarasimhan, 1996). The plant has bitter sharp taste and is useful in diseases of brain, heart, liver and spleen, strengthens the gums and removes foul breath. It is diaphoretic, stomachic, laxative and is good for the treatment of fever (Bhasin, 2012).

***Ocimum tenuiflorum* L.**

It is commonly called as Tulasi and is an aromatic pubescent herb, leaves elliptic – oblong, serrate or entire, flowers purplish, nutlets smooth. Plant contains alkaloids, glycosides, saponins and tannins. Leaves contain volatile oil, ascorbic acid. Seeds contain fixed oil. Leaf wax contains n – alkanes. Essential oil consists of eugenol, caryophyllene, camphene, α – pinene, etc (Yoganarasimhan, 1996). The leaves on steam distillation yield a bright yellow volatile oil possessing a pleasant odour characteristic of the plant. The fatty acid composition of the oil is as follows: palmitic 6.9, stearic 2.1, oleic 9.0, linoleic 66.1 and linolenic 15.7 per cent. The drug Tulasi is antipyretic, aromatic, carminative, diaphoretic and expectorant. It is used in anorexia, cough, hiccup, pleurisy, respiratory disorders and leprosy. The drug is given in traditional medicine in catarrh, coryza, cold, fever, influenza, fevers specially simulating symptoms of malaria. Seeds jelly is given in diarrhoea and dysentery in children. Ethnobotanically it is much used in cold and fever as household remedy. The juice of leaves possesses diaphoretic, antiperiodic, stimulating and expectorant properties. It is used in catarrh and bronchitis, applied to the skin in ringworm and other cutaneous diseases and dropped into ear to relieve earache. An infusion of the leaves is used as a stomachic in gastric disorders of children. The seeds are mucilaginous and demulcent and are given in the disorders of genito-urinary system. The seed oil is reported to inhibit *in vitro* growth of *Mycobacterium tuberculosis* and *Micrococcus pyogenes var. aureus*, since the oil possesses antibacterial and insecticidal properties. It has marked insecticidal activity against mosquitoes (Pandey, 2004).

***Origanum vulgare* L.**

It is commonly called as maruga and they are aromatic branched herbs, leaves ovate, entire or toothed, flowers purple or pink in corymbose cymes, nutlets smooth, brown. Plant contains carvacrol, kaempferol, phenolic compounds, essential oil having α – thujene, camphene, β – pinene, myrcene, α – phellandrene, α – terpinene and ocimene. Origanum oil is carminative, stomachic, diuretic, tonic; used in diarrhea and colic; also applied in chronic rheumatism, toothache and earache, given in whooping cough and bronchitis due to spasmolytic action (Yoganarasimhan, 1996). It has been used in folk medicine to treat colds, coughs, gastrointestinal problems and a variety of other conditions, and reportedly has antibacterial, antifungal and antimicrobial properties due to the phenol carvacrol (Anonymous, 2005).

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***Platostoma africanus* Beauv.**

They are slender erect herbs, leaves ovate, serrate, flowers blue or lilac, nutlets brown or black, ovoid, minutely reticulate. Plant yields essential oil consisting of sesquiterpenes and diterpenes (Yoganarasimhan, 1996). Therapeutically, Leaf juice is used for treatment of snake bite, gastroenteritis and microbial infections. Leaves used to treat waist pain, as pain-killers; antiabortifacient; febrifuge and naso-pharyngeal affections. The root is used as a febrifuge and for the treatment of arthritis and rheumatism (Borokini and Omatayo, 2012). *P. africanus* has been proved for its antioxidant and anti-inflammatory potential as well (Aladendunye *et al.*, 2008).

***Plectranthus barbatus* Andr**

They are sparsely branched rhizomatous herbs with stout, cylindrical, woody stem, villous with long hairs, leaves elliptic – oblong, crenate, pubescent, flowers pale purple, large and showy in whorls of 6 to 10, arranged in spike like raceme. Roots contain labdane diterpenoids (I, II and III), diterpenes – colenol B, colenol C and deoxycolenol besides coleosol, forskolin (colenol), coleside, yields essential oil and caffeic acid. Leaves contain diterpenoid methylene quinone – coleon E, coleon F, diterpenoid barbatusin, 3 β – hydroxy – 3 – deoxybarbatusin, cyclobutatusin. *P. barbatus* is widely used in different countries for various ailments. In traditional Indian system of medicine, it has been used for treating heart diseases, abdominal colic, respiratory disorders, insomnia, convulsions, asthma, bronchitis, intestinal disorders, constipation, epilepsy and angina. The roots are also used in treatment of worms and to alleviate burning in boils. When mixed with mustard oil, the root is applied to treat eczema and skin infections (Yashaswini and Vasundhara, 2011). *Plectranthus barbatus* contains an essential oil that exhibits anti-allergic activities through passive cutaneous anaphylaxis inhibition. The leaves when burnt a little and placed on the skin of the neck relieve stiffness). *Plectranthus barbatus* is also used in the treatment of bone dislocations. It has potential cytotoxic and anti-tumour promoting activity and can be used in the treatment of cancer (Lukhobaa *et al.*, 2006).

***Plectranthus mollis* (Ait.) Spreng.**

It is a succulent, erect coarse herb or undershrub, leaves ovate – cordate, serrate, flowers blue in cymes or racemes, nutlet oblong, brownish. Plant yields essential oil and sitosterol (Yoganarasimhan, 1996). *Plectranthus mollis* is used in India as a respiratory stimulant and vasoconstrictor. It is a recognized febrifuge and is reported to exhibit relaxant activity on smooth and skeletal muscles, a cardiac depressant and a cure for haemorrhage. It is used for the treatment of mental retardation, have cytotoxic and anti-tumour promoting activity and can be used in the treatment of cancer. It has been used against snakebites. The leaves are fried in mustard oil and then massaged all over the body as an insect repellent (Lukhobaa *et al.*, 2006).

Pogostemon auricularius* (L.) Hassk. Syn. *P. cablin

It is a hirsute herb with leaves elliptic – oblong, serrate, flowers pale violet in dense verticils on long simple racemes (Yoganarasimhan, 1996). The plant contains Patchouli alcohol, 3-octanone, Benzaldehyde, dimethylphenol, octanoic-acid, Pogostol, 4-methyl-pentanoic-acid, b-elemene, epiguaipyridine, Ombuine, nor-patchoulinol, a-bulnesene b-patchoulene, epoxy-caryophyllene, p-vinyl-phenol, Seychellene, a-bulnesene oxide, b-pinene, Eugenol, pachypodol, nor-patchoulinol, a-bulnesone, Bulnesol, eugenol cinnamic aldehyde, Patchouli-pyridine, a-guaiene, Cadinene g-patchoulene, Patchouli-pyridine, Methylchavicol, a-guaiene oxide, Camphene, guaicol, pentanoic-acid, Limonene a-patchoulene, caryophyllene, guaipyridine, phenol, Pinene a-pinene, caryophyllene-oxide, heptanoic-acid, pogostol, p-methoxycinnamaldehyde, anethole, cinnamaldehyde, humulene, pogostone, 1,10-epoxy-alpha-bulnesene, anisaldehyde, cis-2- pentyloxypropylcarboxylic -acid, limonene, rhamnetin, 1-alpha, 5-alpha-epoxy- alpha-guaiene, Apigenin, cycloseychellene, nonanoic-acid, seychellene, 1-beta,5-beta-epoxy-alpha-guaiene, apigenin-7-o-beta-d-(-6"- p-coumaroyl)-glucoside, d-patchoulene, nordehydropatchoulo, tannin, 2-methyl-butyrac-acid, apigenin-7-o-beta- glucoside, dehydracetic-acid, norpatchoulenol, trans-2- pentyloxypropylcar boxylic-acid, 2-methylhexanoic-acid, azulene, dhelwangan, o-cresol. Patchouli oil can be attributed to its properties like anti- depressant, antiphlogistic, antiseptic, aphrodisiac, astringent, cicatrisant, cytophylactic, deodorant, diuretic, febrifuge, fungicide, insecticide, sedative, tonic, cicatrisant, cytophylactic, deodorant, stimulant, euphoric. Because of its primary antiseptic properties, it is used to treat athlete's foot, dandruff, wounds and scars. It gives relief from constipation and acts as an antidote against insect bites temporarily. The pharmacological studies prove the anti viral, anti fungal, anti-mutagenic, antiemetic and cytotoxic potentials of *P. auricularius* (Chakrapani *et al.*, 2013).

***Pogostemon benghalensis* (Burm.f.) O. Ktze.**

They are aromatic shrubs with 4 – angled branches, leaves ovate, truncate, crenate – serrate, flowers purple in dense verticils on long whitish – pubescent panicle spikes, nutlet minute. Bracts contain oil. Essential oil of leaves contain β – pinene, β – caryophyllene, saffrole, 1, 8 – cineole, myrtenal, thujone, terpinolene and eudesmol (Yoganarasimhan, 1996). Besides its essential oil it contains an astringent resin, an alkaloid and a yellow varnish of a slightly bitter taste. The whole plant contains α -pinene, camphene, methyl heptanone, linalool, linalyl acetate, citronella, geranyl acetate, δ -3- carene, geraniol, limonene and p-cymene. Essential oil contains limonene, α -phellandrene, β -caryophyllene, χ -cadinene, β -bisabolol, α - elemene, β -elemene, α -murolene, α -copane, α -patchulene, χ - patchulene and δ -guaiene. The major components were azulene-2-ol (32%), octatriene (6.5%), beta patchoulene(6.4%), germacrene D (5.1%), germacrene B (5.0%), Beta caryophyllene(3.9%), delta-cadinene (3.3%)and T-cadinol(3.1%). Whole parts are used in wounds which help in healing. It is used in herbal medicine as an aphrodisiac, antidepressant and antiseptic. The ethno-botany of the plant reveals that the plant leaves are also useful in the treatment of kidney stone. The oil is used in aromatherapy to treat skin complaints. The oil may also be used for varicose veins and

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haemorrhoids. It shows antibacterial activity against *E. coli*. Fresh leaves are used as poultices to clean wounds and promote their healing. Its essential oil is antifungal and styptic. The leaves are also reported to be used in fevers. Root used in Haemorrhage especially in uterine haemorrhage (Ashwini *et al.*, 2013).

***Pogostemon heyneanus* Benth.**

They are shrubs with quadrangular branches, leaves ovate or ovate – lanceolate, crenate, sparsely hairy above, pubescent on nerves beneath, flowers white in globose verticils. Leaves yield essential oil containing patchoulene, patchouli alcohol and eugenol. Essential oil contains alkaloids – patchoulipyridine and epiguapyridine, helwangan, sesquiterpene vochellene. The herb is diuretic and carminative. The decoction of leaves is given in cough and asthma and that of roots in dropsy. The powdered leaves are used as a sternutatory (Yoganarasimhan, 1996).

***Pogostemon pubescens* Benth.**

It is an erect herb with glabrous quadrangular branches, leaves ovate – lanceolate, serrate, pubescent beneath, flowers purple in dense verticils. Plant contains sesquiterpenoid lactone epoxyparvinolide. Leaves used as a stimulant and styptic; their juice used in colic and as a febrifuge. Roots are stimulant and antihemorrhagic (Yoganarasimhan, 1996).

***Pogostemon purpurascens* Dalz.**

It is undershrubs, leaves in unequal pairs, irregularly serrate, appressedly – hairy, flowers white with purplish upper lip in verticils. Whole plant contains sesquiterpenoid lactone parvinolide (Yoganarasimhan, 1996). Leaves are used as a stimulant and styptic, their juice is used in colic and as a febrifuge. They are used to clean wounds and for promoting granulation. Roots are used in uterine haemorrhage, snake-bite and scorpion strings (Valke).

***Salvia aegyptica* L.**

They are bushy undershrubs with stiff, hairy, 4 – angled branches, leaves variable, linear – lanceolate, stiff, crenate, hairy, flowers small in long racemes, nutlets bluish – black, smooth. Mucilage contains sugars. Seeds are demulcent, used in diarrhea and haemorrhoids (Yoganarasimhan, 1996).

***Salvia coccinea* Buchoz ex Etlinga.**

They are slender herbs with quadrangular stem, leaves ovate or cordate, crenate, and flowers scarlet in distant whorls. Aerial parts contain diterpenoid salviacocchin, n – hentriacontanol, β – sitosterol and trolepenes along with dehydrouvaol and uvaol are found. The decoction is used in renal troubles and lumbago; also for relief from tubercular cough (Yoganarasimhan, 1996). *Salvia coccinea* has proven antioxidant potential (Yadav and Mukundan, 2011). The aqueous leaf extract is medicinally used in inflammatory diseases such as ischemia, thermal or physical injury, infectious agents and antigen-antibody interactions (Venkateshappa and Sreenath, 2013).

***Salvia officinalis* L.**

They are undershrubs with white tomentose stems, leaves oblong, entire, petiolate, flowers blue, purple or white in simple racemes. Roots contain royleanone. Leaves contain flavones – 5 – methoxy salvigenin, aromatic triterpene, pristene, diterpene picrosalvin and luteolin. Plant contains essential oil and tannin. Essential oil contains salvin, α – pinene, β – pinene, camphor, myrcene, cineole and farnesene. Seeds contain α – amyryl, β – amyryl, β – sitosterol, its glucoside, a trihydroxytriterpens and water soluble protein. Seed oil contains fatty acids and β – sitosterol. The essential oil called 'Sage oil' is used in the treatment of thrush and gingivitis and as a carminative. Infusion of leaves used as a gargle in sore throat; hot infusion diaphoretic. It is prescribed in disorders of women (Yoganarasimhan, 1996). *Salvia officinalis* has proven antioxidant potential (Yadav and Mukundan, 2011).

***Salvia plebeian* R.Br.**

It is an erect herb with densely pubescent 4 –angled grooved stems, leaves oblong – lanceolate in paniculate interrupted spicate racemes, nutlets ovoid. Plant contains four flavanoids, seeds contain lignin secoisolariciresinol di-12-methyl-tetradecanoate (Yoganarasimhan, 1996). The plant possesses antiangiogenic, antinociceptive, anti inflammatory, antifungal, antioxidant activities. The aqueous and ethanol extracts have inhibited the growth of human gastric carcinoma cell lines suggesting its immuno modulatory potential. It was reported to act against hepatocyte injury and has also been used to treat urinary tract infections, exhibit significant diuretic, antipyretic, anti inflammatory and antidynous activities (Li *et al.*, 2013). *Salvia plebeian* was used by the tribals of Melghat (MS) for its anthelmintic, diuretic, astringent and demulcent properties. It was also used in diarrhea, menorrhagia and as memory enhancer (Rupali *et al.*, 2014).

***Scutellaria discolor* Colebr.**

It is a suffruticose herb, leaves mainly radical or a few basal, elliptic – orbicular, cordate, crenate, flowers blue on terminal racemes, nutlets minute. Root contains flavanones and chalcones (Yoganarasimhan, 1996). The plant is prescribed to have a wide range for stimulating nerve weakness causing perturbation of autonomic nervous system consequent to epilepsy, insomnia, hysteria, anxiety and in relieving sprains, cramp, aching, twitching of muscles and cough fever. It has a proven antimicrobial and antioxidant activity as well (Devi and Singh, 2014).

4. CONCLUSION

They are mainly small herbs or shrubs which are rich in the medicinal properties that involves in the natural medicine and pharmacopoeia. The medicinal plants of Lamiaceae play an important role in the field of ethno-botany, ethno-pharmacology, preservation of health and management of diseases providing knowledge to the researchers. In this review, the detailed information and description of plants chosen from the state of Karnataka endowing with a rich flora shows the potential therapeutic values of the medicinal plants of the family and proves to be a rich source of biologically active compounds. Many studies demonstrated have shown the significant anti-inflammatory, antipyretic, antimicrobial, antispasmodic, anti-rheumatic, antiseptic, antioxidant activities of the extracts and particular phyto constituents isolated from different species of the genus have proved to treat many skin diseases, urinary diseases, toothaches, epilepsy, ulcers, diarrhoea, etc.

Figure 1: Filed photographs of some Lamiaceae plants recorded from Karnataka State.



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