

A Comprehensive Review on *Pogostemon benghalensis* (Burm. F.) O. Kuntze

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ABSTRACT

Pogostemon benghalensis (Burm. F.) O. Ktze is an important aromatic herb. The tribal use it's flowers, leaves, roots and shoots. All the parts of the plant namely root, leaves, shoots, stem and bark are used as medicine, neutraceutical, manure for paddy crops and miscellaneous purpose such as scenting woolens, wardrobes, to keep off moths, etc. Leaves and flowers are made into garlands and chaplets. The leaves are used to distil patchouli oil or Dilem oil which has an odour reminiscent of cedar wood. The oil is used as a stimulant and styptic. Since the ancient time plant is being used as medicines, agrochemicals and pharmaceutical by large number of tribal and rural people. Almost all parts of the plant are helpful to treat different kinds of ailments; very few of these claims have been reported and scientifically studied. These observations are striking for further studies on modern scientific lines.

INTRODUCTION

The aromatic plant of *Pogostemon benghalensis* (syn. *Pogostemon parviflorus* Benth., *Origanum benghalensis* Burm.f., *Pogostemon plectranthoids* Desf.) is a very common member of Lamiaceae family and it occurs in open riverine forest, but is also cultivated in almost all parts of India, Bangladesh, Sri Lanka, Nepal (Burma), Myanmar, Thailand and China. ^[1] *Pogostemon benghalensis* is reported to possess antibacterial, antifungal, antitubercular, anti rheumatic, etc. activities ^[1,2]. Almost all the parts of the plant namely root, leaves, shoots, stem and bark are used as medicine, manure for paddy crops and other miscellaneous purpose such as scenting woolens, wardrobes, to keep off moths ^[2]. The leaves and flowers are made into garland and chaplets. The dried shoots are reported to be used for flavoring country liquor. The juice of the leaves is applied to repel leeches. The herb is frequented by bees and is an important source of honey, known as *Pangal* honey in Maharashtra ^[2,3].

Botanical Description

Pogostemon benghalensis (Lam.) Kuntze is one among 70 species belonging to the genus *Pogostemon*. It is locally called as (Bengali – Jui-lata, Jin, Bakoha; Telgu – Gondri, Polu; Oriya – Poksunga; Gariwal & Kumaun – Lupa; India – Pangala) ^[2,3]. Herb with strong, solid, angular stem. Leaves opposite; petiole 2.5 cm long; blade ovate, 13 cm x 6 cm, base cuneate, margin double dentate, apex acuminate. Fruit composed of 4 nutlets; nutlet obovoid, 1.2 mm long, finely punctate. Inflorescence a verticillaster, arranged in a terminal false spike, about 7 cm long, at base branched into more than 2 lateral spikes; calyx inflated, tubular, about 4 mm long, hairy outside, glabrous inside, with 5 ciliate teeth of about 1 mm length; corolla tubular, up to 8.7 mm long, 2-lipped, upper lip 3-lobed; stamens 4, inserted at different heights in the corolla tube, filaments 5–7 mm long. It much resembles *P. plectranthoides* Desf., but its narrower corolla tube and less crowded inflorescence are distinctive ^[2,3].

Microscopy ^[4]

Leaf surface: The epidermal surface in *P. benghalensis* is mostly rough and uneven and has appressed multicellular simple based trichomes which have striate surface pattern.

Calyx surface: *P. benghalensis* has short, medium and long multicellular non-glandular trichomes and also have glandular hairs which are slightly raised from surface.

Nutlet surface: *P. benghalensis* have Reticulate pattern.



Figure 1: *Pogostemon benghalensis* (Burm. F.) O. Ktze Plant



Figure 2: *Pogostemon benghalensis* (Burm. F.) O. Ktze inflorescence



Figure 3: *Pogostemon benghalensis* (Burm. F.) O. Ktze Leaf

Phytochemistry

The plant *Pogostemon benghalensis* is the aromatic plant hence essential oil is characteristic of plant. The leaves are used to distil a kind of patchouli oil which has an odour reminiscent of cedar wood. Besides its essential oil it contains an astringent resin, an alkaloid and a yellow varnish of a slightly bitter taste. Sesqui terpene lactone, caryophyllene-9-B-10-olide has been isolated from the whole plant [1].

Essential oil compositions of the leaf: Few monoterpene hydrocarbons, a moderate content of sesquiterpenes and high content of aliphatic hydrocarbons^[1].

Essential oil compositions of inflorescences ^[1,5]: The inflorescences oil are rich in transcaryophyllene (8.52%), germacrene B (4.50%), d-cadiuene (4.37%), b-ocimene (4.30%), c-elemene (3.54%), caryophyllene oxide (3.27%), curzerene (1.70%), a-humulene (1.68%), a-guaiene (1.54%) and germacrene (1.28%), whereas leaf oil is rich in cadinene isomer (2.615%), elemol (1.458%), a bulnesene (2.184%), c-elemene (2.118%) and germacrene D (1.190%).

The compositions of both oils varied qualitatively and quantitatively.

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%).

Claims and Reports

Whole part and shoot are used in wound ^[1,6]. Aerial part exhibits Antifungal activity ^[1].

Unani. B.G et.al reported it is used in herbal medicine as an aphrodisiac, antidepressant and antiseptic. The ethnobotany 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 hemorrhoids. It shows antibacterial activity against E.coli. It also having nutritive value ^[7].

Leaves: Fresh leaves are used as poultices to clean wounds and promote their healing. Its essential oil is antifungal^[1]. It is also used as styptic ^[1].

S.B. Padal et.al reported leaves are used in fever. ^[8] Chandra B.N. et.al reported leaf juice administered for fever ^[9].

Kamble et.al reported putting leaf juice on dried gum of *Sturculia urens*, fried with til oil, becomes black is taken in empty stomach for treating piles ^[10].

Leaves and shoots are used as Blackish blue Dye.

Nath A and Maiti G.G. reported one of the familiar recipe Shuktani which in regular practice among the *Sylheti Bengali* community of Barak valley of southern Assam, which is used for several treatment as stomach disorders like diarrhea, dysentery, indigestion, etc. and as a recipe for women as post parturition treatment, weakness and lactation. For this recipe Shuktani is prepared by different parts of 35 species of angiosperm which are consisting of the leaves of the 23 species are used one out of that is fresh leaves of *Pogostemon benghalensis* (Burm. F.) O. Ktze ^[11].

Stems: Ashes of stems are reported to be used as manure for paddy crops ^[2].

Roots: Root used in Haemorrhage especially in uterine haemorrhage^[1].

DR Dangol evaluated root juice used in fever ^[12].

S Bhattaraj, RP Choudhary and RSL Taylor reported, about 100g root of *Ageratum conyzoides* is mixed with 100 g of *Pogostemon benghalensis* root and boiled in cup of water. Half cup of decoction is drunk once a day before going to bed for typhoid fever until recovery ^[13].

The tribal used root juice as a remedy for the snake bite of Phursa snake and other snake bites. Fresh root or poultice of the leaves is applied on the bites.

Plant extract is used for the treatment of food poisoning, vomiting and stomach troubles ^[14].

The plant extract is also useful for respiratory tract infection.

Acetone extract is Insecticidal, insect repellent [1].

SUMMARY AND CONCLUSION

In the present review we have congregated information pertaining botanical, phytochemical, nutritional, traditional claims and recent studies. The plant is having immense potential and appears to have a broad spectrum of activity against several ailments. Various parts of the plant explored for antifungal, antibacterial, aphrodisiac, antidepressant, antipyretic, antimalarial and antiseptic activities. The leaves and inflorescence of the plant are used to distil a kind of patchouli oil which has an odour reminiscent of cedar wood. This oil is used in aromatherapy to treat skin complaints and it is also useful for varicose vein and hemorrhoids. There are traditional claims for usefulness of the fresh leaves of the plant for the treatment of kidney stone & the root is useful in the treatment of snake bite. It has been observed that almost 63 % of the leaf oil and 35 % of the inflorescence oil constitutes are not yet identified. If these claims and observations are studied in detail the plant will definitely prove as a good remedy for the different types of ailments.

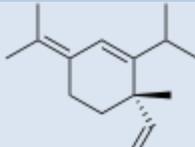
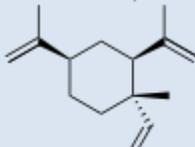
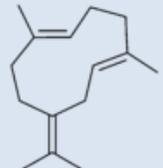
Table 1: Physical properties of *Pogostemon benghalensis* essential oil

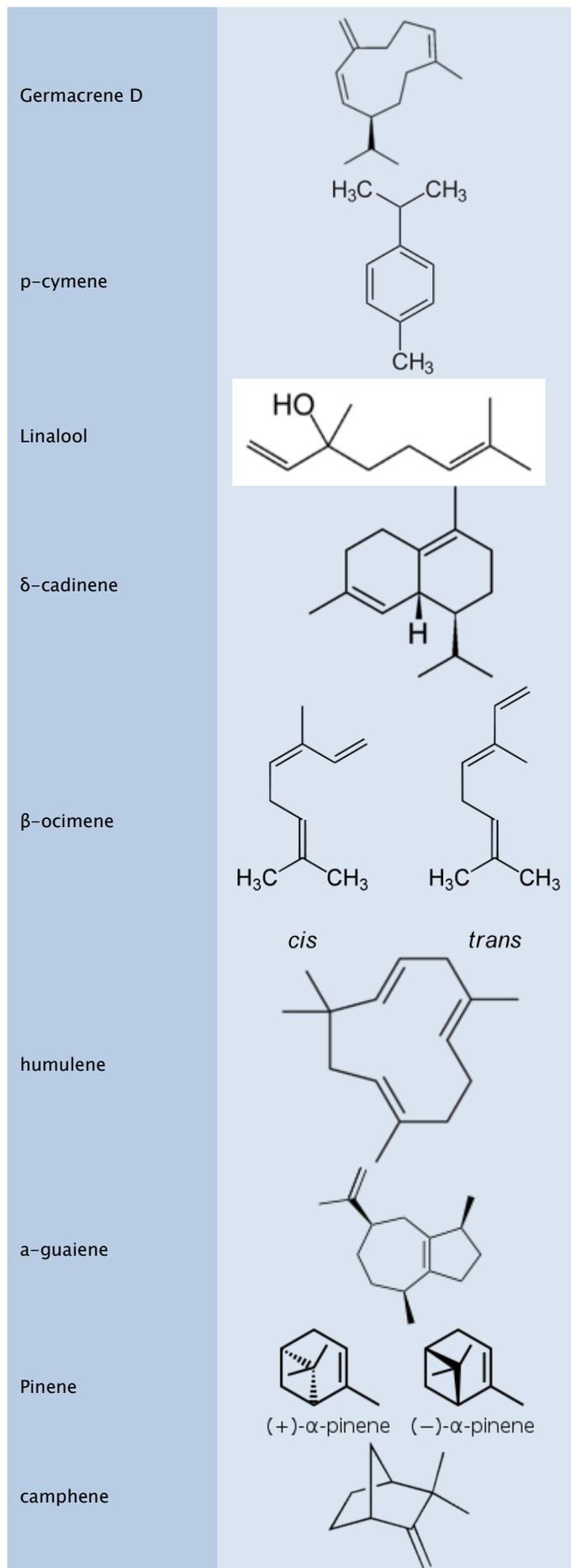
Colour of oil	Amber pink.
Odour	Strong Aromatic with flowery top note.
Flavour	Pleasant with a fruity after taste.
Solubility	In 2 volume 80% alcohol.
Density	1.008
Refractive index	1.504
Acid value	9.7
Ester value	42.92
Acetyl value	50.8

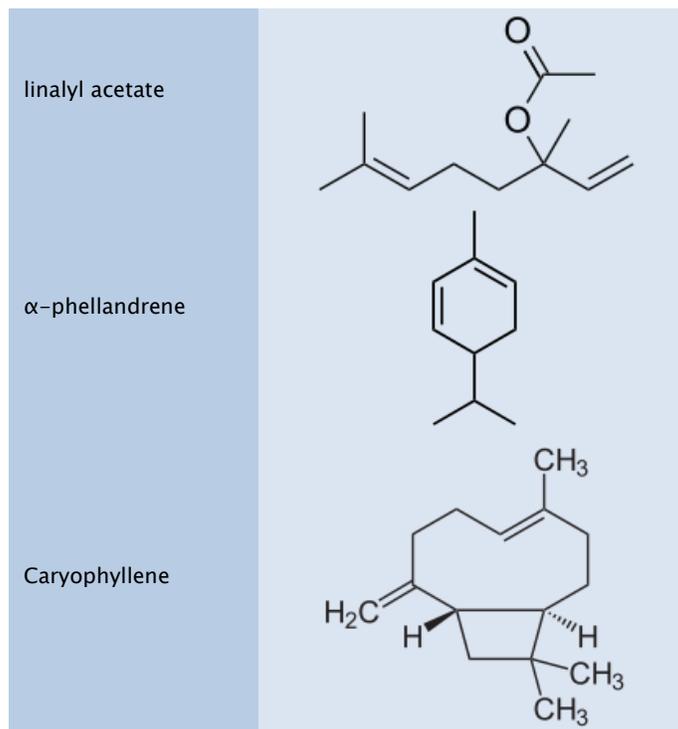
Table 2: Taxonomy, Geographical distribution and Ayurvedic description

Plant Taxonomical classification	Kuntze
Kingdom	Plantae
Phylum	Eudicota
Class	Angiospermae (Flowering plants)
Order	Lamiales
Family	Lamiaceae
Genus	Pogostemon
Species	Benghalensis

Table 3: Essential oil compositions of inflorescences with structures

Name of constituents	Structures
α -elemene	
β -elemene	
Germacrene B	





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