



Review Paper

**ETHNOMEDICINAL PLANTS USED IN THE TREATMENT OF
RESPIRATORY DISEASES AROUND WESTERN GHATS REGION OF
MAHARASHTRA, INDIA**

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Abstract

Western Ghats of India is rich in floristic diversity and endemism. The present review article represents some of the plants used medicinally for the treatment of respiratory diseases by the tribal people around western ghats region of maharashtra, India. The area is inhabited by a large number of tribes viz. kokna, Mahadev-kolis, warali, thakur and katkari etc. The tribals and the rural folks inhabiting these areas have an age old tradition of using specific medicinal plants for curing specific ailments. Respiratory diseases Asthma, COPD (Chronic Obstructive Pulmonary Disease) etc. are one of the biggest concerns for global health. Hence present study reports the ethno-medicinal uses of selected medicinal plants, widely used by these tribals to get cure from respiratory diseases. Key words: Asthma, ethnomedicinal plants, respiratory diseases, tribal communities.

INTRODUCTION

Ethnobotany

Plants, since time immemorial, have been used globally as a valuable and safe natural source of medicine [13]. Ethnobotany is a branch of economic botany which deals with the role of plants in the life of tribal people[1]. A number of tribal communities live in the remote areas of our country. In the dense forest pockets nature has been so kind that for thousands of years it has been possible for these tribals to live and rely on plants and plant products. They are dependent on plants for their basic needs such as food, shelter and clothing and essential amenity including medicines. The tribals have been using traditional medicine systems for centuries. This branch of ethnobotany is termed as Ethnomedicines[1].

Ethno-botany is a dynamic contemporary science with tremendous importance for the future due to conservation in the hilly parts by oral tradition. It is a traditional knowledge passed from one generation to second generation by way of oral tradition

and not documented till now. The diminishing forests resources may well hold unknown keys to conquering devastating new diseases, and people's native to the regions can often lead the way with their herbal knowledge[14]. The tribal people especially Vaidya, local people are quite aware of the uses of the plant species having medicinal value. Most of the traditional medicines are prepared from plants by using different organs of plants such as leaf, stem, roots & tubers etc. The traditional knowledge of medicinal plants of a particular region for curing various ailments and the indigenous practices used by the local people are easy to administer, economical and can be offered to the majority of people after establishing its efficacy for specific disease. In recent years, medicinal plants in general and traditionally used medicine sources in particular have attained much importance, in view of undesirable effects of allopathic medicines and environmental pollution. The World Health Organization (WHO 1978) has reported that 80% of the World's population relies on traditional forms of medicine, largely plant based, to meet the healthcare needs. In India it is estimated that out of ca 1600 species of flowering plants occurring in the country, at least 7500 species are used for medicinal purposes[13].

Respiratory diseases -

Even though research in respiratory medicine and related technology is in an advanced stage, respiratory diseases are still one of the perpetrators of global health and extending their domain with each passing day[2]. There are various respiratory diseases such as Asthma, Chronic Obstructive Pulmonary Disease (COPD), Chronic bronchitis, Emphysema, Lung cancer, Cystic fibrosis, Pneumonia & Covid-19 (SARS-CoV-2) etc. Among these asthma and COPD are major ones, which adversely affect a huge number of the population[2].

Asthma -

Asthma is characterized by reversible airway obstruction, airway hyperresponsiveness and airway inflammation. The pathological features include infiltration of lymphocytes and eosinophils into airway damage and loss of bronchial epithelium, mast cell degranulation, hyperplasia and collagen deposition in the epithelium sub-basement membrane area. Asthma pathology is associated with the release of numerous pro-inflammatory agents including lipid mediators, inflammatory peptides, chemokines and growth factors. The structural cells of airways like smooth muscle cells, endothelial cells, fibroblast and airway epithelial cells are also important sources for causing asthma. Allergic asthma exhibits an allergin induced immediate or early phase response with abrupt onset of bronchoconstriction and a secondary obstructive response, late phase response is associated with inflammation of the airways and airway hyperresponsiveness, which occurs into 24 hours after allergen exposure [2].

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) -

COPD is a disease state characterized by airflow limitation that is not fully reversible. COPD caused by a prolonged inhalation of irritants and toxins (eg. Cigarette smoke) into the airway and can directly into our lungs structures leading to chronic inflammation in the airways and alveolar structure of the lung. COPD includes chronic bronchitis, chronic bronchiolitis and emphysema. Chronic bronchitis is associated with hyper

lapsia and hypertrophy of mucus secreting glands within the large airways, submucosal inflammatory cells infiltration, edema, peribronchiolar fibrosis and increased smooth muscle contraction. Chronic cough is a common symptom of COPD patients. Chronic bronchiolitis refers to the presence of an inflammatory response in the respiratory bronchioles and is difficult to be defined clinically but may be recognised by the tests of small airway function. (ie. In airways of 2mm diameters are less). Emphysema in words destruction of the alveolar wall, enlargement of air spaces and loss of elastic recoil [2].

Tribal communities -

In Maharashtra various kinds of tribal communities are found. These communities are dispersed according to the forest area. The tribal communities which are found in the area around Maharashtra Western ghats region are Koli Mahadev, Thakur, Thakar, Warli, Kathodi, Katkari, Dongar koli, Kokna, Kokni, Kukna etc. In Indian forests on hilly regions where extreme poverty of tribes as well as inadequacy of modern health services is common, folk medicines play a key role in treating various ailments[17].

MATERIAL AND METHODS -

Study region -

Present review is based on the region of area around the Western ghats of Maharashtra state. Most of this region comes under the northern part of Western ghats. Geographically the state of Maharashtra is located in the western part of India. The Western ghats region of Maharashtra is located in the the western side of Maharashtra state. The study region is bounded by Konkan on Western side, Gujrat state on northern side, Nashik, Ahmednagar, Pune, Satara, Sangali & Kolhapur on eastern side & Goa on Southern side. Its topography is mountainous landscape towards the East and narrow coastal lowland towards the west. The distribution of flora in Western ghats is ecologically unique due to the micro climate conditions combined with geology and altitude [3].



Figure 1 :- Map of Maharashtra



Figure 2 :- Study region

Ethnomedicinal plants used for respiratory diseases -

Numerous plants are used by tribal people to get cure or relief from various respiratory diseases of the area around the Western ghats region of Maharashtra. Many of these

plants are used for multiple diseases & some plants are predominantly used for respiratory diseases. Among them, the plants which are commonly used for these diseases and worked out scientifically to some extent are being described below [2].

List of some ethnomedicinal plants used for respiratory diseases in area around Western ghats region of Maharashtra -

1. *Senna occidentalis* (L.) Link (Fabaceae)

Common name - Ran-takla

It is an annual herb that can grow up to 2m tall, leaves are compound, have sharp tip, flowers occur in live axils, sepals are green and petals are yellow.

Seeds are used for asthma[8].

2. *Solanum anguivi* Lam. (Solanaceae)

Common name - Ranwangi

A prickly undershrub, 1.5 - 2 m tall, prickles upto 10 mm long, leaves ovate to oblong ovate, acute, both surfaces stellately hairy and quickly on the nerves.

Fruit is used for asthma[8][11].

3. *Ficus religiosa* L. (Moraceae)

Common name - Pimpal

Large deciduous tree with stem, numerous roots which used with stem, leaves 4 - 8 inches, tailed at tip and heart shaped base.

Bark is used for asthma[8].

4. *Tylophora dalzellii* Hook.f (Apocynaceae)

Perennial climber, with round slender twining stem, it excudes milky juice when bruised, leaves oppositely arranged, ovate - oblong, pinkish flowers

Leaves and stem are used for asthma[8].

5. *Heliotropium indicum* L. (Boraginaceae)

Common name - Bhurundi

Herb, slightly woody at base, with a long taproot, stem erect, unbranched or branches few, 30-80 cm tall; leaves alternate or sometimes nearly opposite, distinctly stalked, Flowers are born in a long tapering cluster at branch-ends.

Decoction of whole plant is employed in Bronchitis, asthma[6].

6. *Terminalia bellerica* (Gaertn.) Roxb. (Combretaceae)

Common name - Behada

Tall handsome tree, 15-20 tall, leaves alternately arranged, elliptic, obovate, leathery, dotted, entire, flowers arise in spikes in leaf axils, greenish yellow flowers.

Fruits are used for asthma[11].

7. *Acacia catechu* (L.f.) Willd (Fabaceae)

Common name - Khair

Small tree, growing 3-15metre high, stem dark brown, with rough bark, fern like leaves, flowers are white or pale yellow, 3 mm long bunched tightly together to form cylindrical flowers spike.

Stem & gum are used for bronchial asthma[12].

8. *Solanum incanum* L. (Solanaceae)

Common name - Dorli

Herb or soft wooded shrub, high up to 1.8 metre, spines on stem, stalk, sepals and leaves contain velvet hairs, flowers bell 2 deep blue, or purple, leaves with alternate and wavy margin.

All parts are used for asthma[12].

9. *Alpinia galanga* (L.) Willd (Zingiberaceae)

Common name - Kulnignin

It grows about 5 feet, leaves are long, rather narrow blades and the flowers of curious formation, growing in a simple terminal spike, total survival with deep red-veining, externally there are reddish brown.

Rhizome is used for asthma[14].

10. *Zingiber nissanum* (J. Graham) Ramamoorthy (Zingiberaceae)

Common name - Ran-ale

Annual or perennial herbs, leafy stem 40-70cm high, leaves elliptic-oblong, acute at base, spikes 25 cm long, flowers solitary in each bract.

Rhizome & leaves are used for asthma[14].

11. *Zingiber zerumbet* (L.) Roscoe ex.sm. (Zingiberaceae)

Common name - Ran-ale

Perennial herb, characterized by pine cone like heads, of bracts from which white flowers emerge, on maturity the heads turn bright red and exude wonderfully thick liquid with an equally wonderful fragrance.

Rhizome is used for asthma[14].

12. *Zingiber officinale* Roscoe (Zingiberaceae)

Common name - Ale

Herbaceous, perennial with upright , stem and narrow medium green leaves are arranged in two ranks on each stem, height is about 4 feet, inflorescence grows on separate stem from the leaf stem, and forms a dense spike up to 3 inch tall.

Rhizome is used for respiratory disorders[14].

13. *Calotropis procera* (Aiton) Dryand (Apocynaceae)

Common name - Rui

It is spreading Shrub or small tree, oozing copious milky sap when cut or broken, leaves are opposite, broadly elliptic but varying between ovate & obovate, flowers are waxy white.

Roots are used for bronchitis and asthma[15][10][9].

14. *Glycyrriza glabra* L. (Fabaceae)

Common name - Jeshthamadh

Plant is a perennial herb, growing up to 1 m in tall, with pinnate leaves about 7-15 cm long, The flowers are 0.8-1.2 cm long, purple to pale whitish blue, produced in a loose inflorescence.

Roots useful in asthma[6].

15. *Datura metel* L. (Solanaceae)

Common name - Dhotra

Herbs or shrubs, glabrous or minutely pubescent, Leaves large, entire, flowers large purple or white, calix long & tubular, Corolla long tubular or infundibuliform.

Smoked leaves & seeds are used in asthma and respiratory disorders[15][10][9].

16. *Justicia adhatoda* L. (Acanthaceae)

Common name - Adulsa

small evergreen, sub-herbaceous, which grows commonly in open plains, leaves are 10-16 inch in length, minutely hairy and broadly lanceolate.

Whole plant is used for asthma[10][9].

17. *Emilia sonchifolia* L.Dc.ex.Dc (Asteraceae)

Common name - Sadamandee

Annual herb, height up to 60cm tall, species is recognised by the sow-thistle like leaves, lower leaves are deeply and irregularly toothed, kidney shaped, ovate, upper leaves are smaller alternately arranged usually entire, inflorescence is an involucre flower[10].

18. *Calotropis gigantea* (L.) Dryand (Apocynaceae)

Common name - Rui

Large shrub, sometimes small tree, flowers either white or lavender in colour, the plant has oval, light green leaves, and milky stem, flower consists of five pointed petals and a small elegant crown rising from the centre.

Flower is used for asthma. Also dried flower powder thoroughly mixed with honey used for bronchial asthma[7][9].

19. *Butea monosperma* (Lam.) Taub (Fabaceae)

Common name - Palas

Medium sized tree, 20-40 feet high, trunk is usually crooked and twisted, leaves are pinnate with an 8-16cm petiole and three leaflets, petals red, flowers consist of five petals comprising one standard, 2 smaller wings and curved, beak shaped keel.

Stembark decoction is taken for asthma[7].

20. *Gloriosa superba* L. (Colchicaceae)

Common name - Agnishikha

Most unusual and splendid flower, in bud the pale green petals face downward, stamens are extremely prominent, twining vine, leaves bright green and Lance shaped, live tip elongates into splendor tendril that coils around nearby supports to get a grip.

Leaf paste applied on the forehead and neck for curing asthma of children[7].

21. *Acacia nilotica* subsp. *Indica* (Benth.) Brenan (Fabaceae)

Common name - Babool

Medium to large tree, the branches have a tendency to droop downwards if the crown is roundish, the leaves are twice compound, i.e. they consist of 5-11 feather-like pairs of pinnae; each pinna is further divided into 7-25 pairs of small, Flowers are bright yellow.

Gum is useful in cough, asthma with warm water[6].

22. *Ailanthus excelsa* Roxb. (Simaroubaceae)

Common name - Marukh

Indian Tree of Heaven is a large deciduous tree, 18-25 m tall; Leaves alternate, pinnately compound, large, 30-60 cm or more in length; leaflets 8-14 or more pairs, long stalked, Flower clusters droop at leaf bases, shorter than leaves, much branched.

Bark used for treating asthma and Bronchitis[6].

23. *Cynodon dactylon* (L.) Pers. (Poaceae)

Common name - Haryali

Blades are a grey-green colour and are short. The erect stems can grow 1-30 cm, rarely to 3 ft, tall. The stems are slightly flattened, often tinged purple in color. The seed heads are produced in a cluster of 3-7 spikes (rarely two) together at the top of the stem, each spike 3-6 cm long

Half a glass juice of whole plant with two spoon honey is given orally during early morning in Asthma[6].

24. *Datura innoxia* Miller (Solanaceae)

Common name - Dhotra

Perennial or annual shrubby plant that typically reaches a height of 2-5 ft. Its stems and leaves are covered with short and soft grayish hairs, giving the whole plant a grayish appearance. The flowers are white, trumpet-shaped, 12-19 cm long, They first grow upright, and later incline downward.

Leaf is useful in asthma[6].

25. *Eucalyptus globulus* Labill. (Myrtaceae)

Common name - Nilgiri

Tree that typically grows to a height of 45 m but may sometimes only be a stunted shrub, The bark is usually smooth, white to cream-coloured , leaves are arranged alternately, the same glossy to dark green on both sides, lance-shaped or curved.

Leaves yield an essential Oil useful in chronic cough, asthma, bronchitis[6].

26. *Piper longum* L. (Piperaceae)

Common name - Pimpli

Climber, It is a slender, aromatic, climber with perennial woody roots, creeping and jointed stems, and fleshy fruits embedded in the spikes. Leaves are numerous, 6.3 to 9.0 cm, broadly ovate or oblong-oval, dark green and shining above, pale and dull beneath.

Useful in asthma & bronchitis[6].

27. *Sida rhombifolia* L. (Malvaceae)

Common name - Sadedda

Annual with yellow flowers and very small spines at the base of each leaf and branch, Leaves are widest at or above the middle and taper toward the leaf bases (rhombic) The upper ½ of the leaves have toothed or serrated margins while the remainder of the leaves are untoothed.

Whole Roots, leaves and seeds are very good drug for asthma[6].

28. *Solanum Virginianum* L. (Solanaceae)

Common name - Kateringani

It is herb which is erect or creeping, sometimes woody at base, 50-70 cm tall, needlelike, broad-based prickles 0.5-2 cm × 0.5-1.5 mm. Leaves are unequal paired; Inflorescences elongate racemes 4-7 cm.

Fruit juice is very good medicine for asthma[6].

29. *Swertia chirayita* (Roxb.) Karst. (Gentianaceae)

Common name - Chirayita

Erect herb about 2-3 ft long stem, The stems are orange brown or purplish in colour. Leaves are opposite- arranged in mutually perpendicular pairs, broadly ovate or lanceshaped, 3.5-10 x 1.5-4 cm, hairless, blunt or heart-shaped at base.

Plant is used for bronchitis, asthma[6].

30. *Tamarindus indica* L. (Fabaceae)

Common name - Chinch

Large tree with a short massive trunk, ferny pinnate leaves, The tree can get 90 ft tall but is usually less than 50 ft. It has a short, stocky trunk, drooping branches and a domed umbrella shaped crown about as wide as the tree's height.

Bark is used for asthma[6].

31. *Trianthema Portulacastrum* L. (Aizoaceae)

Common name - Pandhari-ghentuli

Stems are prostrate or rising, somewhat succulent, up to 50 cm long or more, smooth or sparsely velvety. Leaves are flat, elliptic to obovate or spade-shaped, 1-2 cm long, 0.4-2 cm wide, margins entire, tip blunt, base rounded to wedge-shaped.

Juice of the whole plant used to treat asthma[6].

32. *Tylophora indica* (Burm. f.) Merr. (Apocynaceae)

Common name - Antamul

Small, slender, much branched, velvety, twining or climbing herb with yellowish sap, Leaves, 6-11 cm long, 3.8-6 cm wide, are ovate-oblong to elliptic-oblong, with a narrow tip, heart-shaped at base, thick, velvety beneath when young, smooth above. Flowers are greenish- yellow or greenish-purple, with oblong pointy petals.

Leaves and roots given in low doses in early morning in cases of whooping cough, asthma, Bronchitis, cough[6].

33. *Drimia indica* (Roxb.) Jessop (Asparagaceae)

Common name - Rankanda

Perennial herb with bulbs spherical 5-10 cm in diameter. Leaves appear after flowers, linear-lanceshaped, sword-shaped, flowering stem up to 60 cm. Flowers are pale brown, very distant in laxly flowered 15-31 cm long racemes.

Bulb is used for asthma[6].

34. *Vitex negundo* L. (Lamiaceae)

Common name - Nirgundi

Shrub and a tree with a single woody stem . It can grow up to five meters tall. Chaste tree's distinctive feature are the pointed leaves with 3-5 leaflets. Small, lilac or violet flowers. Flowers are the smallest of the commonly grown *Vitex* species.

Leaves useful in cough, Bronchitis, asthma[6].

35. *Withania somnifera* (L.) Dunal (Solanaceae)

Common name – Ashwagandha

Perennial herb that reaches about 6 feet in nature. It is perennial herb growing 35-75 cm tall. Leaves are dull green, elliptic, usually up to 10-12 cm long. The flowers are small, green and bell-shaped.

Roots are used for asthma[6].

RESULTS AND DISCUSSION

The present work describes the ethnomedicinal plants for curing respiratory diseases such as Asthma, bronchitis etc. There are various, genera are used by various tribal communities for respiratory diseases in area around Western ghats region of

Maharashtra. The most plants found from following families Fabaceae (6), Solanaceae (6), Apocynaceae (4) & Zingiberaceae(4). It was observed that most of the preparations include single plant species and in rare case two or more species. Such type of studies may provide new materials to the workers in the field of pharmacology and phytochemistry.

CONCLUSION

One valuable gift to human is provided by the nature is medicinal plants in the locality. India has long history of medicinal plants utilization in tradition & tribal communities. There were total 35 plants of 19 families were documented to cure respiratory diseases. The 4 species such as *Justicia adhatoda*, *Calotropis gigantea*, *Calotropis procera*, *Datura metel* were most commonly used for treatment of respiratory diseases in different tribal communities. In this review, we focused on collection of data of most frequently used medicinal plants by tribal communities for treatment of respiratory diseases. Therefore the current study will further help in conservation of traditional ethnomedicinal knowledge as well as development of native villagers.



Figure 3 :- a) *Calotropis gigantea* (L.) Dryand b) *Datura metel* L. c) *Gloriosa superba* L.

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