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Wild aromatic plant resources and their traditional uses in Eastern Ghats, Southern Peninsular India

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ABSTRACT

A survey on wild aromatic plant resources was undertaken and identified 170 aromatic species that used by the tribal people and local inhabitants in Eastern Ghats, southern peninsular India. Of which its belongs to Lamiaceae, Verbenaceae, Rutaceae, Zingiberaceae and Apiaceae i.e. each family contain more than 10 species. Among those majority of species (68) are herbs. Aromatic shrubs, trees, climbers and creepers are also there but in decreasing order. Among all the plant parts, leaves in majority of plants have aromatic nature. The native tribal communities depend on these plants for their therapeutic applications since a long period for curing various ailments. Plants with their botanical names, local names families, habit, and plant part used, locality and their traditional uses are tabulated.

Key words: Aromatic plants, medicinal uses, Eastern Ghats, tribal People

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INTRODUCTION

During the past few decades there has been an increasing interest in the study of essential oils and their prominent role in diverse applications for human benefits. Apart from the hitherto known applications of essential oils the role of essential oils has increased many folds (1). More and more areas are opening up for utilizing the essential oils which will benefit the industry. Essential oils in therapeutics are becoming popular in Japan and European countries. Aromatherapy involves the use of essential oils and aromatics derived from plants to cure diseases (2). Some of the essential oils are reported to be in many ways better than antibiotics due to their safety and wide spectrum of activity. Synergistic activity of essential oils needs further probe. Application of essential oils in agriculture as antifeedants, repellents, botanical insecticides (3), natural herbicides and growth boosters are still open to fascinating realms of research (I4).

These essential oils are odorous volatile substances which synthesize in specialized structures called ducts or glands which may occur in one or more plant parts, namely, root, wood, bark, stem, leaves, flower and fruit (5). The characteristic aroma is due to a variety of complex chemical compounds (6). The term essential oil is concomitant to fragrance or perfumes because these fragrances are oily in nature and they represent the essence or the active constituents of the plants. They are called volatile or ethereal oils as they evaporate when exposed to air at ordinary temperatures.

Essential oils are highly concentrated, low volume, high value products (7). The world of essential oils has since then come out from the narrow field of definition to a wide variety of applications in flavours, disinfectants, oral hygiene, pharmaceuticals and in almost all spheres of human activity (8). In the world wide flavours and fragrance market, essential oils constitute about 17 percent. Estimation of world production of essential oils varies from 40,000 to 60,000 tonnes per annum. Out of 1500 species of aromatic plants which serve as a source of raw materials for the perfume industries, information on the chemistry and properties of essential oils of only known about 500 species in some detail at present.

Of these, about 50 species find use as commercial source of essential oils and aroma chemicals, though the number of those having regular and large scale utilization hardly exceeds two dozen. The present paper is being described about the aromatic plants and their traditional role in health and wealth of tribes in entire Eastern Ghats region in India on after the extensive field survey.

The Eastern Ghats are located between 11° 31' and 22° N latitude and 76° 50' and 86° 30 E' longitudes in a North-East to South-West strike. The Ghats cover an area of about 75,000 Sq. Km with an average width of 200 Km in the North and 100 Km in the South. They are extended over a length of 1750 Km between the rivers Mahanadi and Vaigainal along East Coast. The Eastern Ghats run in a west wards direction meeting the Western Ghats in the Nilgiris of Tamilnadu.

Eastern Ghats are not a continuous range of mountains like that of Western Ghats but an assemblage of a series of much broken hills because the great rivers Mahanadi, Godavari, Krishna, Kauvery and Gundlakamma cut across them. Eastern Ghats are spread over four States of India, namely Orissa, Andhra Pradesh, Telangana and Tamil Nadu. Eastern Ghats can be broadly divided into (1) Northern-Eastern Ghats and (2) The Southern Eastern Ghats. The Northern portion of the Eastern Ghats of Orissa passes through the districts of Phulbhani, Kalahandi, Ganjam, Gajapathi, Koraput, Rayagad, Sambalpur and Dhenkanal. In Andhra Pradesh, Northern Eastern Ghats pass through the districts of Srikakulam, Vijayanagaram, Visakhapatnam, East Godavari, West Godavari and Khammam.

The hilly area from the river Krishna to near about Chennai, covering the Andhra Pradesh districts of Krishna (Kondapalli range), Kurnool. Mahaboob nagar, Prakasam (Nallamala ranges), Kadapa (Yerramala, Plakonda ranges), Nellore (Veligonda range), represent the Middle Eastern Ghats. The low hilly area runs in a West South-West direction meeting the high mountains ranges of the Western Ghats in the Nillagiri belt, covering the Tamilnadu district of North Arcot (Javadi hills), South Arcot (Gingee hills), Salem (hills of Shevaroy, Kalrayan), Namakkal (Kollimalai, Bodamalai, Nainamalai, Chitramalai), Dharmapuri (Melagiri hills), Tiruchirapalli (Pachamalai hills) represent the Southern – Eastern Ghats. The average elevation of the Eastern Ghats is about 750 meters, though a few individual peaks rise to heights of 1672 meters.

The region falls under tropical monsoon climate receiving rain fall from both the southwest (sharing about 85 per cent of the total) and the northeast monsoon. The range of the rainfall is from 1200 to 1600 mm in the northern parts and 600 to 1000 mm in the central and southern parts, indicating sub-humid and semi-arid climates respectively. The eastern portions, especially the coastal plains are characterized by heavy rains with cyclonic storms. The mean temperature in January ranges between 20 - 25 ^{o}C and shoots up to 41 ^{o}C during hot months and goes down to 2 ^{o}C during winter.

Forest vegetation in Eastern Ghats is classified under four types as below, Scrub Jungles 0 - to 400 m (foot hills), deciduous forest 300 to 900 m (slopes), and Evergreen forest 800 to 1300 m (Plateau), shoals 1200 to 1600 m. The vegetation of Eastern Ghats is remarkable for the concentration of character species like *Pterocarpus santalinus, Shorea robusta, Shorea tumbuggaia, Syzygium alternifolium, Santalum album, Terminalia pallida* etc. in certain well defined areas and for the presence of complex associations of tropical, sub-tropical and temperate species and of evergreens at the elevation of about 1100 m above mean sea level (9). As a whole, the vegetation is typically deciduous type and scrub jungle in most places.

The northern part of Eastern Ghats covering Mahendragiri hills of Ganjam, Koraput range and Madgole hills of Visakhapatnam with characteristic ‘Sal’ forests extending up to Pudhari, Rayagada Division is of moist deciduous type, interspersed with some patches of evergreen forest types of Shoals on the slopes. The predominance of Sal (*Shorea robusta*) in the northern section, particularly in Mahendragiri is owing to the relatively higher rainfall. The hills of Ganjam-Koraput range have many narrow endemic species like *Uvaria eucincta* and *Maytenus bailadillana*.

In this region wild rice, wild pigeon-pea and wild banana are very significant genetic resources whose habitats deserve protection.

The southern dry deciduous zone lying between Seshachalam hills and Madura hills, spread across Andhra, Tamil Nadu region is represented by the dry type of Sal (*Shorea tumbuggaia*) indicating ecological adaptation of the genotype. The Nallamalai-Cuddapah range is floristically rich with a marked change seen in its dry type of vegetation. *Boswellia ovalifoliolata*, *Shorea tumbuggaia* are endemic to Southern Eastern Ghats extending their distribution from Tirumala hills to Javadi hills of Noth Arcot district.

MATERIALS AND METHODS

Field investigations were conducted throughout the Eastern Ghats passing through the three states of peninsular India starting from 2013 to 2014. A total of 575 local people and tribes (key informants) that had lived over nearly 40 years in the study area were interviewed using a set of standard questionnaires (10) designed to achieve the research objectives. Data was collected using the participatory rural appraisal (PRA) method, because the informants also become investigators themselves and involved in interweaves, information meetings, open and group discussions and other observations (11). The data which is obtained from informants was organized and correlated with already existing data. This data has been provided information regarding the diverse methods used for the collection and use of wild aromatic plants including their local names and plant parts used.

Collection of wild aromatic plants was done by further confirmation of their aromatic nature by rubbing and brushing (12). The plant specimens were collected during either their flowering or fruiting seasons and they were organized using the normal specimen manufacturing method. The voucher specimens were deposited for preservation in the herbarium (13), Department of Botany, Montessori Mahila Kalasala. The plant species were identified scientifically with the help of recent and local floras and monographs.

RESULTS AND DISCUSSION

Collection of wild plants and their exploration is a common activity of the native tribes and village people. In the present of Eastern Ghats we documented a total of 170 wild aromatic plants belonging to 103 genera and spreading over 26 families. Survey and documentation of aromatic plants in other parts of India like Western Ghats were previously reported by other botanists (14). The collected information on the species have been tabulated alphabetically with botanical name of the plant, family, habit, vernacular names, plant parts used and locality (Table –1). Of the various plant parts which are having aromatic nature leaves of 76 plants species followed by root/rhizomes/tubers of 41 plant species, whole plant of 33 plant species, bark of 20 species, fruits of 18 plant species, flowers of 14 plant species, stem in 10 plants, seeds of 5 plants, Arial plants alone in 3 species, soft wood of 2 plants, oil extracted from 2 plants and gums of 2 plants, bulbs of one plant and culms of one plant show aromatic properties (Table - 2).

Among all the collected aromatic plant species majority of them belongs to the family Lamiaceae, 35 species, Verbenaceae 20 species, Rutaceae 18 species, followed by Zingiberaceae, Apiaceae, Myrtaceae. Families like Apocynaceae, Chenopodiaceae, Cyperaceae, Euphorbiaceae, Findersiaceae, Linaceae, Meliaceae, Passifloraceae and Santalaceae, are represented with single species (Table - 3). Within the documented data 68 herbs, 42 shrubs, 33 species were medium to large sized trees, 9 were small trees, 1 was thorny tree, 42 were shrubs, 5 were large climbers, 9 were climbers / climbing shrubs, 3 were creepers and 68 are herbs (Table - 4).

These aromatic plants play a significant role in human welfare. Mainly Aromatic plants are used prominently in perfume and herbal drug industries. Apart from the primary use in perfume and flavor industries the aromatic plants are also used by various tribes in Eastern Ghats for curing many of their ailments. In traditional system of medicine the plant parts can be used in curing various ailments and they can be used either in the form of powder, paste, water extract, decoction or in the form of oils. The information regarding the medicinal properties in curing various diseases collected from the tribes of Eastern Ghats are given in Table – 1. The Ethnomedicinal importance of wild aromatic plants collected from the Velliangiri hills of the Southern Western Ghats of Tamil Nadu was previously reported by Samydurai et al. (15). The data provided here is based on the filtration of literature as well as first class field information collected from the tribes.

These aromatic plants can use for humans in various applications. Some of the aromatic plants like *Pterocarpus santalinus* L.f., *Santalum album* L. and *Curcuma* species used as natural dye yielding plants. Natural dyes obtained from the plants are used in handlooms and in natural drawings and painting. Natural health drinks prepared from the species like *Hemidesmus indicus* (L.) R. Br. and *Decalepis hamiltonii* Wight & Arn., give cooling effect to the body in summer and the active principle isolated from these plants are now using as a flavour compound in soft drink preperations and as an additives' in ice creams and in other foods. The essential oils obtained from the grasses like species of *Cymbopogon* have an industrial application. They are used in beverages, as fragrance and in personal care products (cosmetics). These grasses can also be used as a fodder for live stock. The species of *Jasminium* have flowers with pleasant sweet smell which have potential ornamental importance in countries like India.

Table - 1 Plant parts used for aromatic / essential oils extrication

S. No	Plant Parts	No.
1	Leaves	76
2	Root /Rhizomes/Tubers	41
3	Whole plant parts	33
4	Bark	20
5	Fruits	18
6	Flowers	14
7	Steam	10
8	seeds	5
9	Aerial parts	3
10	wood	2
11	Gum	2
12	oil	2
13	Bulbs	1
14	Culms	1

Table - 2 Diversity of aromatic plants in Eastern Ghats so far (not completed)

So. No	Family	No of genera	No. of species
1	Lamiaceae	17	35
2	Verbenaceae	10	20
3	Rutaceae	11	18
4	Zingiberaceae	7	13
5	Apiaceae	9	10
6	Myrtaceae	6	9
7	Oleaceae	1	9
8	Lauraceae	7	8
9	Piperaceae	2	8
10	Vitaceae	4	8
11	Asclepiadaceae	4	4
12	Burseraceae	3	4
13	Liliaceae	4	4
14	Poaceae	2	4
15	Asteraceae	3	3
16	Geraniaceae	2	2
17	Rubiaceae	2	2
18	Apocynaceae	1	1
19	Chenopodiaceae	1	1
20	Cyperaceae	1	1
21	Euphorbiaceae	1	1
22	Flindersiaceae	1	1
23	Linaceae	1	1
24	Meliaceae	1	1
25	Passifloraceae	1	1
26	Santalaceae	1	1
Total	26	103	170

Some species like *Citrus* and *Aegle marmelos* (L.) Corr yield oils and along with this characteristic these plants produce fruits of commercial value. Oils obtained from the plants like *Eucalyptus* have great economic value from the past few centuries and they are used in preparation of various products and can also be directly used in body massage. The oils obtained from the species like *Mentha*, *Thymus* and *Ocimum* are used in pharmaceutical preparations and in several cosmetic manufacturing industries like soap, shampoo, paste and in perfume industries.

Species like *Cuminum, Curcuma, Foeniculum, Piper, Zingiber* are used as spices in house hold purpose and they have great economic importance. Seeds of *Anisomeles indica* are roasted and make into paste which is used as side dish. Nuts obtained from the fruits of aromatic plants like *Terminalia* and *Anacardium occidentale* have high nutritional value and are used as nutritive supplements and in preparation of various food products.

Regular usage of plants like *Aegle marmelos* (L.) Corr, *Aloe vera* L., *Boswellia ovalifoliolata* Bal. & Henry, *Boswellia serrata* Triana & Plach., *Centella asiatica* (L.) Urban, *Cinnamomum camphora* (L.) J.S.Presl., *Coriandrum sativum* L., *Curcuma aromaticum* Sal., *Cymbopogon citratus* Stapf., *Decalepis hamiltonii* Wight & Arn., *Eucalyptus globulus* Labill., *Eucalyptus tereticornis* Smith, *Foeniculum vulgare* Mill, *Hemidesmus indicus* (L.) R. Br., *Limonia acidissima* L., *Murraya koenigii* (L.) Spr., *Ocimum sanctum* L., *Pimpinella tirupatiensis* Bal. & Sub., *Piper betle* L., *Piper longum* L., *Piper nigrum* L.,Pterocarpus santalinus L.f, *Rauwolfia serpentina* Benth., *Santalum album* L., *Syzygium cumini* (L.) Skeels, *Thymus vulgaris* L., *Vitex negundo* L. etc are well reported in earlier literature and were recorded from the tribes for curing various ailments, as pesticides, preservatives as oils and for giving aroma or flavour to foods in the form of powder, paste, decotion, as oils etc.

Table – 4 Life forms of aromatic plants in Eastern Ghats

S. No	Plant habits	No. of species
1	Herbs	68
2	Shrubs	42
3	Trees	33
4	Small trees	9
5	Climbers / Climbing shrubs	9
6	Large climbers	5
7	Creeper / trailing herbs	3
8	Thorny tree	1

CONCLUSION

Results of the present study indicate the aromatic flora that distributed in entire Eastern Ghats of India and pivotal role of these aromatic plants in day to day life of functioning of ethnic tribal communities that found in Eastern Ghats of Peninsular India. The valuable traditional Knowledge and bioresources need to be conserved. There is an urgent need to document the Knowledge of tribes on aromatic plants or otherwise it will be lost forever. Methods to be developed to start sustainable cultivation and modern harvesting programs to collect these plants.

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