

Ethnobotanical and Taxonomic Studies of Some Medicinal Plants Nearby Achankovil Forest, Kerala

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KEYWORDS: Kollam, Malapandaram, Tribes, ethnobotany, taxonomy

ABSTRACT

The desire for the wisdom of traditional healing systems has led to a revivification of interest in herbal medicines across the world. The infiltration of modern systems of medicine coincident with globalization leads to shrinkage of indigenous treatment systems which are a barrier to drug development. Thus, an attempt was done to document the indigenous informations in Malapandaram tribal group residing nearby Achankovil forests, Kollam district. A total of nine plants comprising eight families were documented in the present study which are commonly used by the Malapandaram tribe-the indigenous people in the area. A taxonomic study was also conducted for the selected plants. The present study gathered crucial informations about traditional knowhow and exemplifies the need to document, research and development of new drugs to combat emerging diseases.

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INTRODUCTION

Ethnobotany is the systematic study of the inter-relationship between people and plants. Lion part of the world's population in developing countries still rely plants for their primary healthcare systems to treat various ailments (Albuquerque et al., 2012). The research attributes of ethnomedicine are staggering, as it is a complex multi-disciplinary system in healing for people for millennia (Abbasi et al., 2010). The last few decades have witnessed an explosion in finding healing powers from plants. The emergence of drug resistance pathogens and toxic side effects of currently using medicines paves the way for developing new treatment testimonials from plant sources. The treatment system followed by the indigenous people is considered as the cornerstone of drug development programmes.

Plants have served as the basis of traditional medicine system for thousands of years in countries such as China and India (Gurib-Fakim, 2006). These plant based systems continue to play an essential role in health care medicines. The development of clinically effective anticancer agents such as taxol (from *Taxus brevifolia*) and the discovery of potential anti AIDS agent such as michellamine B (an alkaloid from woody vine, *Ancistrocladus* species) and calanolide A (from *Calophyllum teysmanii*) demonstrate the value of plants as source of potential new drugs and highlight the importance of conserving these valuable resources (Gurib-Fakim, 2006). There is also a renewal of interest in the natural plant products as these are biologically more compatible with the system and have little toxicological concerns. As per World Health Organization (WHO), nearly 80% of the world inhabitants, especially living in the rural areas of developing countries, rely mainly on traditional medicines for their primary health care (WHO, 2003). There are several areas world over where a vast knowledge on the use of plants against different illnesses exists. In fact, medicinal plants and their traditional uses have been an integral part of social, cultural, religious aspect of ancient civilization (Folke, 2004). Plants have been the basis of traditional medicinal systems including Ayurvedic, Unani and Chinese. Unfortunately, due to scarcity of written documents, relative low income and lack of interest of younger generations, the traditional knowledge on

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especially living in the rural areas of developing countries, rely mainly on traditional medicines for their primary health care (WHO, 2003). There are several areas world over where a vast knowledge on the use of plants against different illnesses exists. In fact, medicinal plants and their traditional uses have been an integral part of social, cultural, religious aspect of ancient civilization (Folke, 2004). Plants have been the basis of traditional medicinal systems including Ayurvedic, Unani and Chinese. Unfortunately, due to scarcity of written documents, relative low income and lack of interest of younger generations, the traditional knowledge on medicinal plants is highly threatened and fast eroding (Huntingto Historically all medicinal preparations were derived from plants, whether in the simple form of plant parts or in the more complex form of crude extracts, mixtures, etc. The primary benefits of using plant-derived medicines are that they are relatively safer than synthetic alternatives, offering profound therapeutic benefits and more affordable treatment (Iwu et al., 1999). About 200 years ago our pharmacopoeia was dominated by herbal medicines (Ernst, 2005) and almost 25% of the drugs prescribed worldwide were come from plants. Of the 252 drugs considered as basic and essential by the WHO, 11% are exclusively of plant origin and a significant number are synthetic drugs obtained from natural precursors (Rates, 2001). During the last few decades there has been an increasing interest in the study of medicinal plants and their traditional use in different parts of India. In the recent years number of reports on the use of plants in traditional healing by either tribal people or indigenous communities of India is increasing (Savithramma et al., 2007; Pattanaik et al., 2008; Kosalge and Fursule, 2009; Namsa et al., 2009; Upadhyay et al., 2010). Kerala, the epitome of biodiversity is well known for its traditional systems of medicine. The indigenous people in Kerala are famous for their autochthonous treatment modalities with plant-based formulations. However, there exists a lacuna of knowledge in the documentation of ethnobotanical knowledge in Kerala.

Achankovil is a 128 km long west flowing river in Kerala, India. It flows through the districts of Kollam, Pathanamthitta and Alappuzha. The river drains vast tract of fertile plains of Upper Kuttanad in the Alappuzha and Pathanamthitta districts. It also sustains numerous urban settlements along its course such as Konni, Pathanamthitta, Pandalam and Mavelikkara. The forest area, which is the catchment area for this river is also referred to as Achenkovil Reserve Forest. It forms part of Agasthyamala Biosphere Reserve. A small village situated in its upper riparian area of the river is called as Achenkovil village. The Achenkovil village is an important pilgrimage center which is associated with the legend of Sabarimala and it is also one of the important interstate border point between Kollam district and Tenkasi district.

There are about 35 ethnic communities scattered in Kerala mostly along western ghat forests. Among them Malapandaram form about 5% of the total population. The major livelihood of these tribes is nomadic gathering. Hunting in the forests provides the basis of their economy, which is supplemented by trading forests products with the farmer villagers in the plains. They display their lack of aggressiveness by separating and fleeing from conflicts. Malapandaram women gather vegetables foods, water and firewood and do the cooking, while men are engaged in hunting and harvesting of honey products. The simplicity of their gathering and hunting economy fosters individual self-sufficiency and economic independence. Marriage for them is an extremely loose monogamous convention. They live together in small bands consisting of 1-6 families. Meat, tobacco and honey gathered from collective expeditions are shared generally but otherwise people eat or trade what they gather. It is very urgent as ethnobotanical knowledge is restricted to the elder people and the younger generation was totally unaware. The present study is an attempt in this line to document the existing bits of traditional knowledge among the tribal people in Pandalam area nearby Achankovil river. Therefore, the **aim and Objectives** of the present study are:

- To conduct an ethnobotanical study of plants used by Malapandaram tribe.
- To conduct a taxonomic study of the ethnobotanically important plants used by the Malapandaram tribe.

MATERIALS AND METHODS

The indigenous people of the study area are Malapandaram the oldest group of the branch of ethnic group in South India. The Malai Pandaram or otherwise termed as Hill Pandaram is a scheduled tribe. They are settled along the Pampa river, Achan Kovil river, Pathanapuram and Sasthamkotta in Kollam District. Most of the them have a general knowledge of medicinal plants that are used for first aid remedies, to treat cough, cold, fever, headache, poisonous bites and some other simple ailments. The study area investigated was nearby Achankovil forest, kollam district. to get information from tribal practitioners. One informant was identified to get the ethnomedicinal information. A field datasheet has been prepared to record the plant details with ethnomedicinal information.

The ethnobotanical information on plants was collected during the period of January- March 2024. The information was gathered from Ms. Vasantha, a 45 years old lady of the Malapandaram tribal community residing in Achankovil tribal colony. The information collected includes local name of the medicinal plant, type, diseases treated, parts used. Identity and morphological characterization of the collected plant species were done with the volumes of The Flora of Presidency of Madras (Gamble, 1935).

RESULTS AND DISCUSSION

1. *Thespesia populnea*

Family: Malvaceae

Common name: Portia tree, Indian tulip tree

Habit: Tree

Root: Taproot system

Stem: Bark greyish. Twigs densely covered with brown to silvery scales, glabrescent

Leaves: Leaves alternate, simple, petiolate, stipule lanceolate to subulate, apex acuminate, base generally cordate, main veins yellow

Inflorescence: Inflorescence a large solitary axillary flower; pedicel erect or ascending, sometimes articulate with 2 scale like bracts near the base.;

Flower: Cup-shaped yellow flowers

Calyx: Calyx campanulate, subtruncate, densely adpressed hirsute within, scaly, glabrescent outside

Corolla: Corolla broadly campanulate, pale yellow with dark purple centre; petals 5, obliquely obovate

Androecium: The androecium is composed of long staminal tube with numerous stamens, each stamen has long ascending filament and terminated with a reniform anther.

Gynoecium: The gynoecium has a five-carpelled syncarpous cup-shaped fleshy ovary and each carpel has two ovules arranged on an axile placentation, The ovary has a long slender style terminated with five broader elongated stigmas which are fused and longitudinally grooved, the ovary is green while the style and stigmas are yellow.

Fruit: Apple-shaped fruit, a globose capsule

Seed: Seeds 4 per cell, obovoid, slightly angular, covered by closely matted silky hairs.

Economic importance: Its bark is used to treat mouth infections among infants, and its wood is used to make canoes, house parts, and artwork. it is used to make the *thavil*, a Carnatic musical instrument of South India. The wood and the yellow gum from the fruit and flowers yield a dye, and the bark produces tannin (Ara and Naqshi, 1992).

2. *Wrightia tinctoria*

Family: Apocynaceae

Common name: Pala indigo plant

Habit: Medium-size deciduous tree

Root: Taproot

Stem: The bark is smooth, somewhat corky and pale grey.

Leaves: Leaves large, simple, opposite, decussate and glabrous (sometimes puberulous beneath). Young leaves are bluish with reddish nerves.

Inflorescence: Lax dichasial cymes

Flower: Flowers white, fragrant, lower bisexual, white, scented, in terminal cymes appearing along with new leaves, bracts 2 and minute

Calyx: Calyx lobes 5, with membranous margin, ovate, obtuse, ciliate, glandular inside.

Corolla: Salver shaped, lobes 5, oblong, obtuse, throat with 1-2 series of erect, fimbriate corona scales.

Androecium: Stamens 5, inserted on the mouth of the tube, anthers sagitate, spurred at base, conniving and adhering to the stigma, disc absent.

Gynoecium: Carpels 2, free, many ovuled, style filiform, stigma ovoid, usually with a toothed basal ring.

Fruit: Green follicular mericarps, pendulous pairs and coherent only at the tip.

Seed: Seed linear, pointed at the ends, light yellowish-grey, crowned with a tuft of white silky hairs.

Economic importance: The leaves, flowers, fruits and roots are a source of indigo-yielding glucoside which produces a blue dye or indigolike dye. Timber is used for making furniture. The leaves are used to relieve toothache when chewed with salt (Cano & Volpato, 2004).

3. *Bacopa monnieri*

Family: Scrophulariaceae

Common name: Brahmi

Habit: Creeping herb

Root: Fibrous root system

Stem: Cylindrical, glabrous with prominent nodes and numerous branches.

Leaves: Succulent, oblong, oblanceolate and opposite

Inflorescence: Racemose inflorescence

Flower: The flowers are small, actinomorphic and white, with four to five petals.

Calyx: Calyx-lobes 5, unequal, ovate and others slightly smaller

Corolla: Corolla bluish-white, broadly campanulate, faintly 2-lipped, lobes 5, subequal.

Androecium: Stamens 4, didynamous

Gynoecium: Ovary oblong-globose, style slightly deflexed. Capsule ovoid or oblong, enclosed in calyx.

Fruit: Fruits are small capsule

Seed: Oblong, reticulate.

Economic importance: Leaves and tender shoots are eaten cooked as vegetable, bitter in taste. Also considered as tonic for brain, believed to increase memory power if taken with milk. It also promotes liver health and encourages normal blood pressure. It also acts as an anti-oxidant. It has also been used in traditional ayurvedic treatment for epilepsy and asthma (DeWalt, 1994). It is also used for treatment of ulcers, tumors, ascetics, enlarged spleen, inflammations, leprosy and anemia etc.

4. *Curculigo orchiodes*

Family: Amaryllidaceae

Common name: Golden eye-grass

Habit: Rhizomatic herb

Root: Tuberous rootstock

Stem: Short stem with sheathing leaf

Leaves: Simple, lanceolate, plicate, base sheathing, pilose, subsessile.

Inflorescence: Umbel like raceme

Flower: Solitary, yellow in colour, epigynous, bright yellow, bisexual or unisexual, with a lanceolate and membranous bract.

Perianth: Perianth is gamotepallus with six equal lobes, outer lobes are hairy on the back, while the inner ones are sparsely hairy along nerves.

Androecium: Stamens 6, filaments erect

Gynoecium: Ovary 3-celled, ovules many, villous, tricarpellary, syncarpous and trilocular.

Fruit: An oblong capsule,

Seed: Subglobose

Economic importance: Rhizome is used in traditional medicines. hepatoprotective, anti-oxidant, anticancer, and antidiabetic activities. Rhizomes of the plant are used as tonic, demulcent, and diuretic (Folke, 2004)

5. *Centella asiatica*

Family: Apiaceae

Common name: Gotu Kola, Indian Pennywort

Habit: Mostly annual, perennial herbs, aromatic

Root: They grow as a herbaceous rhizome to 50 cm in height

Stem: Stem is thin, cylindrical, fluted, stoloniferous with long internodes

Leaves: Alternate, simple or usually much dissected, often exstipulate

Inflorescence: Simple or compound umbel

Flower: Bisexual, actinomorphic, epigynous with a disc

Calyx: Sepals 5, united, toothed

Corolla: Petals 5, free, often unequal, valvate or imbricate

Androecium: Stamens 5, free, anthers versatile

Gynoecium: Carpels 3, syncarpous, Ovary inferior, style 2

Fruit: Cremocarp, dehiscent into two dry segments (mericarps)

Seed: 15 seeds per ramet which are brownish in colour and slightly kidney-shaped.

Economic importance: In Burmese cuisine, raw pennywort is used as the main constituent in a salad mixed with onions, crushed peanuts, bean powder and seasoned with lime juice and fish sauce. Centella is used as a leafy green in Sri Lankan cuisine, being the predominantly locally available leafy green, where it is called *gotu kola*. The centella fruit-bearing structures are discarded from the *gotu kola mulluma* due to their intense bitter taste (Ernst, 2005). A variation of porridge known as *kola kenda* is also made with *gotu kola* in Sri Lanka. *Gotu kola kenda* is made with well-boiled red rice with some extra liquid, coconut milk first extract, and *gotu kola* purée. The porridge is accompanied

with jaggery for sweetness. Centella leaves are also used in modern sweet "pennywort" drinks and herbal (Giday et al., 2005). In addition, the leaves are served stir-fried whole in coconut oil, or cooked in coconut milk with garlic or *dhal*.

6. *Emilia sonchifolia*

Family: Asteraceae

Common name: Liliac tassel flower

Stem: The stem is cylindrical, hollow, glabrous to glabrescent with few scattered multicellular hairs.

Leaf: The leaves are alternate, simple. Leaves from the base with obovate to spatulate lamina extensively attenuated in pseudo-petiole, coarsely and irregularly serrated margin. Leaves of the stem are sessile. The lamina is oval to triangular, auriculate and with corded base more or less clasping, 8 to 16 cm long and 2 to 8 cm wide. The margin is deeply dissected into acute lobes which are finely serrated, wedged apex. The upper surface is covered with scattered long multicellular hairs, the underside is glabrous.

Inflorescence: The inflorescence consists of flowers grouped in few to quite numerous capitulum, arranged in terminal, compound, loose cymes. The capitulum is narrow, cylindrical, slightly enlarged at the base, 10 to 14 mm long and 4 to 6 mm wide and does not spread. Only one involucre with 5 to 8 linear bracts.

Flower: The flowers are all tubular, pink, purple pink to purple, barely exceeding the involucre of the bracts. Flowers, borne in heads which are arranged in open panicles. Each head surrounded by bracts 8-11 mm long.

Calyx: consists of 40-50 barbed hairs. Each hair about 10 mm long.

Corolla: tubular, 10-13 mm long, corolla lobes 1-1.2 mm long. Anthers 0.8-1 mm long. Stamens fused to form a tube around the style.

Gynoecium: Ovary 1-1.2 mm long, clothed in ca. erect hairs. Style unbranched, stigmas 2 in number.

Fruit: The fruit is an achene with 5 longitudinal ribs, fusiform, short hairs, 2.3 to 3.3 mm long, reddish brown in color, surmounted by a pappus finely scabrous with soft bristles, white in color, 5 to 7.5 mm long. Fruit Individual fruits about 3 mm long, surface longitudinally 5-ribbed, each rib clothed with bristles, brown or straw-coloured. Pappus white, about 7-8 mm long.

Economic importance: It is one among the "Ten Sacred Flowers of Kerala State in India, collectively known as Dasapushpam. In Vietnam, it has been used in traditional medicine for the treatment of fever, sore throat, diarrhea, eczema and as an antidote for snake bites. The leaves and young shoots can be used, raw or cooked (Pant et al., 2009). The leaves are harvested before the plant flowers. The young leaves are used as food in Java and Puerto Rico, however, in India and China, it is used medicinally.

7. *Asparagus racemosum*

Family: Liliaceae

Common name: Shatavari

Habit: Climber

Stem: Modified into Cladode

Leaves: Reduced to scales, leaves alternate

Inflorescence: Racemose type

Flowers: bracteate, bisexual, actinomorphic, trimerous, hypogynous

Perianth: 6 segments (Tepals) arranged in two whorls of three each

Androecium: 6 stamens arranged in two whorls of three each, opposite to perianth. Anthers dithecous, basifixed and introrse

Gynoecium: syncarpous, superior and trilocular, axile placentation, style simple and stigma trilobed.

Fruit: Loculicidal capsule. Seeds endospermic, fleshy or hard

Economic importance: It is useful as an antioxidant, an aphrodisiac and for the health of the uterus; efficacy as an antidepressant, an analgesic, galactagogue, and an antidiarrheal, protection of the brain and liver and efficacy against

ulcers, movements in the digestive system, as well as in fighting intestinal distress. It has efficacy in lowering blood cholesterol and protecting heart health anticancer, anti-inflammatory, anti-anxiety, anti-convulsive, anti-amnesic, anticonvulsant and anti-tussive properties (Gurib-Fakim, 2006). Antiparasitic, anti-secretory and nephroprotective effects benign prostatic hypertrophy treatment, antiepileptic properties; efficacy against diabetes, molluscan activity, high blood pressure, clotting and enzyme deficiency, as well as anaemia and thrombocytopenia, antistress, adaptable revitalizer for women, multiple antiviral, phagocytic and other functions.

8. *Hemidesmus indicus*

Family: Apocynaceae

Common name: Indian Sarsaparilla

Habit: Twining shrub with milky latex

Stem: Branches numerous from the base, slender, terete, striate, glabrous and thickened at nodes.

Leaves: Opposite decussate, shortly petiolate, variable in shape from ovate to lanceolate, narrow leaves acute while broad obtuse at apex, lamina simple, dark green often midvein distinctly white.

Inflorescence: Cymes axillary, subsessile.

Flowers: Complete, pedicle short, and clothed with numerous ovate acute imbricating bracts.

Calyx: 1-2 mm long, lobes 5, ovate, ciliolate along the margins.

Corolla: Yellow, c. 8 mm across, 3-4 mm long, rotate, lobes 5, fleshy, triangular corona of 5 scales.

Androecium: stamens equal to the number of petals, epitalous, anthers in corolla tube

Gynoecium: two carpels, syncarpous, superior, unilocular ovary, placentation parietal, bilobed stigma and anatropous ovules

Fruits: Fruits are paired, cylindrical, pointed and slender. Follicles.

Seed: Many, long, ovate-oblong, flat, black, crowned with silvery white coma.

Root: Woody and aromatic.

Economic importance: The root of *Hemidesmus* plant is demulcent, alternative, astrigent, diaphoretic, tonic, antipyretic and blood purifier. It is used in leprosy, skin diseases, fever, asthma, bronchitis, syphilis, pruritus and other urinary diseases, chronic rheumatism and leucorrhoea (Pant et al, 2009).

9. *Cymbopogon citratus*

Family: Poaceae

Common name: Lemon grass

Habit: tall perennial herb

Stem: herbaceous and erect. Nodes and internodes distinct.

Leaves: Leaf blades linear, glaucous- green, glabrous, smooth or more or less rough upwards and along the margins, midrib somewhat stout below, whitish on the upper side, lateral nerves 4-6 on each side. Ligules very short, scarious, rounded or truncate.

Inflorescence: Spatheate panicle. Spikelet consists of two opposite rows of bracts one above the other. The two lowest bracts are sterile glumes followed by lemma. A membranous structure palea is present in between the glumes and axis.

Flowers: small, bisexual, zygomorphic and hypogynous. Perianth consists of lodicules.

Androecium: three stamens, filaments delicate, basifixed anthers, ditheous, introrse.

Gynoecium: monocarpellary, superior ovary, unilocular with single ovule. Placentation basal, styles usually two with plumose stigma.

Economic importance: The leaves and the oil are used to make medicine. Lemon grass is used for treating digestive tract spasms, stomachache, high blood pressure, convulsions, pain, vomiting, cough, achy joints (rheumatism), fever, cold & exhaustion. it is also used to kill germs and as a mild astringent (Facciola, 1990).

Ethnobotanical information collected from the tribal community

Sl. No.	Botanical name	Family	Part used	Ethnomedicinal uses
1.	<i>Hemidesmus indicus</i>	Apocynaceae	Roots	Ulcer, kidney stones
2.	<i>Wrightia tinctoria</i>	Apocynaceae	leaves	Hair greying, dandruff
3.	<i>Centella asiatica</i>	Apiaceae	Whole plant	Hair growth
4.	<i>Thespesia populnea</i>	Malvaceae	Bark	Body injury, itching
5.	<i>Curculigo orchoides</i>	Amaryllidaceae	Leaves/whole plant	Blood increase in body
6.	<i>Asparagus racemosum</i>	Liliceae	Roots	Urinary infection
7.	<i>Cymbopogon citratus</i>	Poaceae	Leaves	Body pain
8.	<i>Bacopa monnieri</i>	Scrophulariaceae	Whole plant	Improving memory power, hair growth
9.	<i>Emilia sonchifolia</i>	Asteracea	Leaves	Insect bites, cuts and wounds

CONCLUSION

The study concludes that the Malapandaram tribes utilize many species as medicines for curing different ailments. These medicinal plants are the source of common primary health care practices by them. Efforts are, therefore, required to conserve and protect this traditional knowledge of these tribes including the ethical, cultural and religious aspects in addition to the conservation of these medicinal plant species. These also shows the depth of indigenous knowledge and practice on medicinal plants to treat ailments. This indigenous knowledge of medicinal plants is owned by older age people.

It can also be concluded as herbs constitute the main source of traditional remedies and leaves were found to be the most frequently used plant parts followed by roots for preparation of human and livestock remedies. The wide use of some medicinal plants, their various parts, and use of fresh plant materials leads to be the potential threats for the loss of medicinal plants in the study area. Medicinal plants mainly threatened by anthropogenic factors such as firewood collection, overgrazing, charcoal production, changing wild vegetation to farm land, and overpopulation have all been recognized as contributing factors to the loss of plant taxa. The oral-based knowledge transfer, refusal of young next generation to gain the indigenous knowledge, the influence of modern education, and lack of awareness were the major threats to vacant indigenous knowledge.

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