



Ethnobotanical Study of Traditionally Used Medicinal Plants in Malayali Ethnic People of Pachamalai Hills, Tamil Nadu, India

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ABSTRACT

Medicinal plants are treating and preventing various diseases. There is urgency in recording such data. The aim of the present study is to identify plants collected for medicinal purposes by the ethnic people of Pachamalai hills of Tamil Nadu, India and to document prepare and use the traditional names of these plants. The ethno medicinal information's were collected through interviews among ethnic people. A total of 27 species of plants distributed in 27 genera belonging to 18 families were identified as commonly used ethno medicinal plants by ethnic people in Pachamalai hills for the treatment of various ailments based on the disease affected body systems treated. Leaves are the most frequently used plant parts and most of the medicines are prepared in the form of paste, administered orally, topically and brush. The most important In this study, documenting the medicinal plants and associated indigenous knowledge can be used for conservation and sustainable use of medicinal plants in the area and for validation of these plant preparations for medicinal treatment of human beings. The study has various socioeconomic dimensions associated with the local communities.

1. Introduction

According to World Health Organization (WHO) up to 80% of the populations in some developing countries use traditional medicine [1]. Traditional herbal medicine is still an important component of healthcare in India. India is the second largest country in the world with over one billion with diverse socio-cultural backgrounds. It accounts for 16% of the world's population and holds 21% of the world's global burden of diseases. The impact of traditional systems of medicine in the public healthcare system of India is substantially high and medicine is intimately interwoven with religiosity and ethnicity [2]. During the last two decades, some notable progress has been made in the field of medicinal plants and their traditional use in different parts of India [3]. Indigenous use of medicinal plants all over the world precedes the origin of modern medicine in healthcare system [4]. The flowering plants used for medicinal purpose worldwide are estimated to be about 50,000 out of total 422,000 flowering plant species [5, 6]. World Health Organization (WHO) estimated that prescribed drug (25%), consider drug (11%) and precursor compound produced as a result of various synthetic drugs are of plant origin [7]. Treatment of diseases with medicinal plants is more beneficial than synthetic and modern medicines as, ease of use, treatment efficacy, affordable cost and minimal side effects. Life styles of people are poor and economically they depend on cattle grazing, agriculture and use of natural resources. The current study was aimed to explore and document the indigenous knowledge of plants and to evaluate the importance of medicinal plants used in local healthcare system. This study was also aimed to educate the traditional healers about conservation status of medicinal plants. Pachamalai hills possess a rich biological and cultural diversity which translates into a wealth of traditional knowledge and practices including the use of floristic resources for medicinal purposes by various ethnic groups. Indeed, traditional medicine is omnipresent in the Malayali community where by Pachamalai hills people still use traditional medicine for the treatment and/or management of various ailments. Nonetheless, with globalization and access to conventional medicines, particularly the younger Malayalis have no knowledge about the traditional medicines because it is concealed by the traditional practitioners.

2. Experimental Methods

2.1 Pachamalai Hills Geographical Location

The Pachamalai hills are located (11°18'14.1" N, 78°39'15.2" E) in northeast of Tamil Nadu, India with an area of 14,122 square kilometers and elevation of above sea level. Pachamalai hills located between the Tiruchirappalli and Salem district of Tamil Nadu, India.

2.2 Climate of the Area

The Pachamalai hills have a semi-arid climate with dry and cold winter and hot and dry summer. A semi-arid climate prevails with a maximum temperature ranging between 23 °C to 31 °C and a minimum temperature ranging 12 °C to 18 °C. These hills receive maximum rainfall during the months of September, October and November through the Northwest monsoon. The hills receive rainfall in the months of June and August through Southwest monsoon.

2.3 Data Collection

The study area was investigated to get information from local people having practical knowledge of medicinal plants. Selection of informant is depended upon the distribution of local people having sound knowledge about medicinal plants. They were requested to collect specimens of the plants they know and to show the plant species on site. The wealth of medicinal plant knowledge among the people of these hills is based on hundreds of years of beliefs and observations. This knowledge has been transmitted orally from generation to generation.

2.4 Preservation and Identification of Plant

Standard method was followed with record to collection of plant materials, drying, mounting, preparation and preservation of plant specimens [8]. Voucher specimens of medicinal plants in triplicate were collected, prepared and identified. Plants with their correct nomenclature were arranged alphabetically by family name, vernacular name, ethno medicinal uses and route of administration and dosage. The identification and nomenclature of the listed plants were based on the Flora of Presidency of Madras [9] and the Flora of Tamil Nadu Carnatic [10]. They were later verified at Botanical Survey of India, Southern Circle, Coimbatore, India.

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3. Results and Discussion

3.1 Habit of Medicinal Plants

In the current survey, 68% of the reported species are herbs followed by shrub (18%), climber (9%) and tree (5%) (Fig. 1). The common use of herbaceous medicinal plants was also reported in other parts of the world [11] and attributed to their wide range of bioactive ingredients [12]. Traditional healers used herbs is most commonly used as medicine due to easy availability in nature [13, 14].

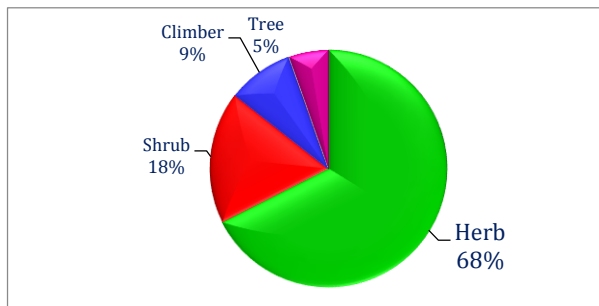


Fig. 1 Percentage of medicinal plant habit

3.2 Different Plant Families Recorded

The plant used for medicinal purposes in Pachamalai hills is presented in with Table 1 relevant information. The present ethnobotanical investigation 27 species are recorded on 18 families were found in the research area. The most represented family was Fabaceae, has the high number of species (4 species) followed by Amaranthaceae, Apocynaceae, Asteraceae, Lamiaceae and Malvaceae with each two species, other families with one species each (Fig. 2). The high proposal of medicinal species Euphorbiaceae families has already reported [15]. Euphorbiaceae also known to have the highest number species, more than any other plant family in the world [16].

Table 1 Medicinal plant used in Pachamalai hills ethnic people

S. No.	Botanical Name, family and traditional name	Life form	Parts used	Traditional uses	Mode of Preparation	Other ingredients	Route of administration, dosage and duration of treatment
1	<i>Abutilon indicum</i> (L.) Sweet. Malvaceae Nayuruv	Herb	Leaves	Tuberculosis	Paste	Water	Oral: Pinching 4-5 leaves are grinding and taken orally in early morning only
2	<i>Acalypha indica</i> L. Euphorbiaceae Kuppaimeni	Herb	Leaves	Itching Scabies	Paste Paste	Water	Topical: Enough amount of leaves are grinding and applied affected before bathing
3	<i>Achyranthes aspera</i> L. Amaranthaceae Nayurivi	Herb	Seed Root	Body strength Tooth ache	Raw Raw	Water -	Oral: 20-30 seeds are taken twice a day. Brush: 10cm length of root is brushing in mouth when the time of tooth ache
4	<i>Aerva lanata</i> (L.) Juss. ex Schult. Amaranthaceae Sirukanpeelai	Herb	Flower Leaves	Kidney stone	Decoction	Water	Oral: Pinching flower is dried under shadow condition powder mixed with hot water twice a day. Topical: 6-7 leaves pinched grinding paste and applied affected wound area.
5	<i>Aloe vera</i> L. Liliaceae Sotrukatalalai	Herb	Gel	To kill intestinal warms Burns	Raw Raw	Water -	Oral: The leaves of <i>Aloe vera</i> gel taken as water daily early morning 3-4 days. Topical: Leaves gel applied burning wound twice a day 15 days.
6	<i>Anacardium occidentale</i> L. Anacardiaceae Mundhiri	Tree	Seed guard Cotyledons	Sperm production	Raw	-	Oral: Seed of munthiri eating daily morning and night with milk 48 days
7	<i>Andrographis paniculata</i> (Burm. f.) Wall. Acanthaceae Nilavembu	Herb	Leaves	Diabetes Viral fever	Raw Decoction	- Hot water	Oral: 4-5 leaves taken as empty stomach daily Oral: Dried leaves powdered and mixed hot water drinking twice a day
8	<i>Aristolochia bracteolata</i> Lam. Aristolochiaceae Aaduthinnapaalai	Climber	Leaves	Fever Wound	Juice Paste	Water Turmeric	Oral: 2-3 leaves taken as juice 2 times a day. Topical: Both Leaves and turmeric grinding paste applied 3 times a day.

9	<i>Artocarpus heterophyllus</i> L. Moraceae Pala	Tree	Root Fruit	Asthma Sperm production	Juice Raw	Water -	Oral: The root of pala taken as juice twice a day 45 days. Oral: Fruit pericarp taken as 10 days.
10	<i>Calotropis gigantea</i> (L.) R. Br. Asclepiadaceae Erukku	Shrub	Leaves	Insect bite	Paste	Turmeric	Topical: 4-6 leaves grinding with turmeric powder and applying biting area.
11	<i>Catharanthus roseus</i> (L.) G. Don. Apocynaceae Nithiya kalyani	Herb	Whole plant	Diabetes	Powder	Water	Oral: Dried plant materials powdered and making paste taken as 1 time a day.
12	<i>Curcuma domestica</i> Valetton. Gingeraceae Manjal	Herb	Rhizome	Skin eruption Antiseptic	Paste Paste	Water Water	Topical: Dried rhizome is grinded paste and applied skin eruption. Topical: Dried rhizome is grinded paste and applied affected area.
13	<i>Ervatamia divaricata</i> L. Aboceae Nandhiyavattai	Herb	Flower	Skin diseases	Paste	-	Topical: Small amount of flower taken as grinded paste and applied affected area.
14	<i>Euphorbia hirta</i> L. Euphorbiaceae Ammanpacharasi	Herb	Leaves	Diabetes	Juice	Water	Oral: 30 gm of leaves making juice and drinking daily morning time.
15	<i>Lantana camara</i> L. Verbenaceae Unnichi	Shrub	Leaves	Malaria fever	Juice	Water	Oral: Small amount of leaves taken as making juice
16	<i>Leucas aspera</i> (Willd.) Link. Lamiaceae Thumbai	Herb	Leaves	Epilepsy Head ache	Juice Paste	Water -	Oral: 10-12 leaves taken as making juice and drinking daily. Topical: 50 gm of leaves grinded paste and applied forehead
17	<i>Manihot esculenta</i> . Crantz. Euphorbiaceae Maravalli	Herb	Rhizome	Body strength	Raw	-	Oral: 150 gm of fresh rhizome eating daily twice a day.
18	<i>Melothria maderaspatana</i> L. Cucurbitaceae Musumusukkai	Climber	Leaves er	Hair growth	Paste	Coco-nut oil	Topical: 100 gm of leaf grinded paste dried sunlight and added coconut oil applied hair daily
19	<i>Mimusops elengi</i> L. Sapotaceae Mahilam	Tree	Leaves Fruit	Dental problems Increase sperm counting Skin diseases	Decoction Raw	- -	Oral: Leaf extract is used mouth wash. Oral: 2-3 fruits taken as 45 days daily.
20	<i>Nerium oleander</i> L. Apocynaceae Arali	Shrub	Leaves	Skin diseases	Paste	Turmeric	Topical: 50 gm of leaves grinded paste and applied affected area.
21	<i>Phyllanthus emblica</i> L. Euphorbiaceae Nelli	Tree	Fruit Fruit Fruit	Diabetes Hair growth Body strength	Juice Oil Raw Juice	- Coco-nut oil - -	Oral: 20 ml of fruit juice taken as daily twice a day. Topical: 5-6 dried fruits tipped in 100 ml of oil and applied daily twice a day. Oral: 2-3 fruits taken as raw daily. Oral: 20 ml of fruit juice taken as daily twice a day.
22	<i>Psidium guajava</i> L. Myrtaceae Koyya	Tree	Leaves Fruit Fruit	To kill Intestinal warms Diabetes Body strength	Raw Raw Raw	Water - -	Oral: 2-3 leaves taken as raw in empty stomach at early morning. Oral: 100 gm fruits taken as daily. Oral: 2-3 fruits taken as daily.
23	<i>Sida acuta</i> Burn. Malvaceae Karunthotti	Herb	Leaves Latex	Head ache Wound	Paste Paste	- -	Topical: 2-3 leaves grinding paste and applied forehead Topical: Enough amount of latex is applied wounding surface area.
24	<i>Sphaeranthus indicus</i> L. Asteraceae Kottaikkarantai	Herb	Whole plant	Piles	Paste	-	Topical: 20 gm of leaf grinded paste taken once a day.
25	<i>Syzygium cumini</i> (L.) Skeels. Myrtaceae Naaval	Tree	Leaves	Diabetes	Juice	-	Oral: Leaf juice is taken as oral in empty stomach in morning time
26	<i>Tridax procumbens</i> L. Asteraceae Vettukkaayapoondu	Herb	Leaves Latex	Swellings Wounds	Paste Raw	- -	Topical: 20 gm of leaves grinding paste and applied swelling surface. Topical: Enough amount of latex is applied wounding surface area.
27	<i>Vitex negundo</i> L. Lamiaceae Notchi	Shrub	Root	Epilepsy	Powder	Water +sugar	Oral: 30 gm of root powder making decoction is taken as mixed with ingredients daily morning.

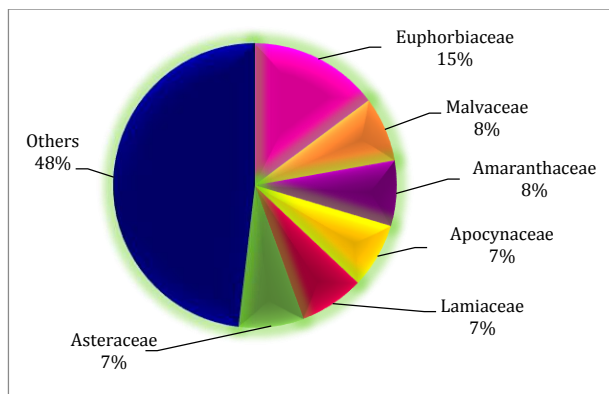


Fig. 2 Percentage of families

3.3 Plant Parts Used for Traditional Medicine

Plant parts used by the ethnic people of Pachamalai hills to treat various ailments were mainly leaves, fruits and root (Table 1). Aerial parts of plant and whole plants were also used in case of small herbaceous plants. The most frequently utilized medicinal plants parts were leaves (51%) used for the preparation of medicine solely, it was followed by fruit (20%), root (8%), stem (6%), flower, latex, rhizome, seed and whole plant (each 5%) and (gel 3%) (Fig. 3). All over the world tribal communities, utilized for the preparation of herbal medicine using leaves [15, 17–19]. The local people point of view leaves were used mostly that part is collected very easy to compare the underground parts flowers and fruits etc. [20] and in scientific point of view leaves are active in photosynthesis and production of metabolites [21].

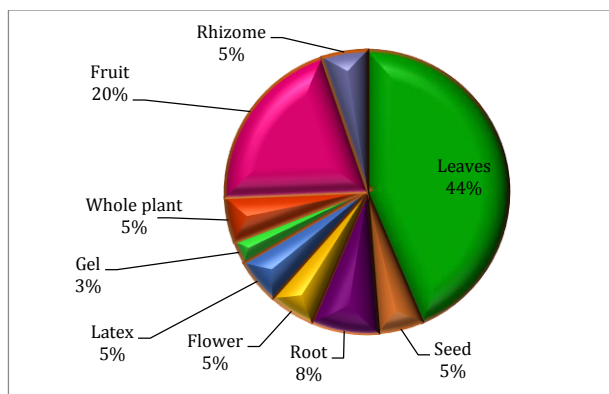


Fig. 3 Percentage of parts used

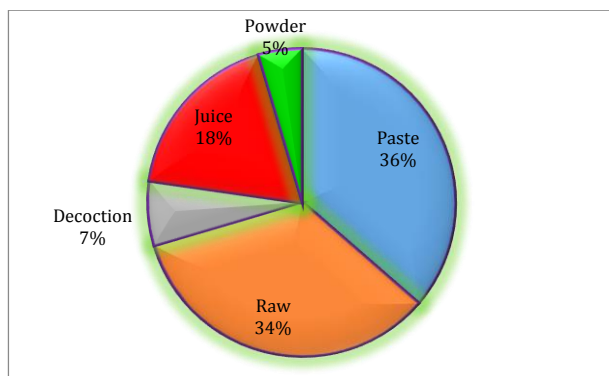


Fig. 4 Percentage of preparation and consumption

3.4 Mode of Preparations and Administrations in Indigenous Medicine

Considering the mode of preparation of herbal medicines, reports include paste, powder, decoction, juice, and raw. Among these majority of the plant remedies were prepared by paste (36%) followed by raw (34%), juice (18%), decoction (7%) and powder (5%) (Fig. 4). According to the informants, preparation of paste for the treatment of ailments is a common method of the tribal communities in global level [20, 22, 23]. The paste was prepared by grinding the fresh or dried plant parts with oil or water. In some cases, the processing involves drying of the plant material followed

by grinding into fine powder. The juice was taken as orally along with water or milk or honey, Raw (taken as raw plant parts orally), Decoction was obtained by boiling the plant parts in water until the volume of water reduce to required amount. Water is commonly used if a solvent is required for the preparation. Sometimes milk or honey is used as a matrix or added to increase a viscosity of the preparation [24]. Oral administration was the main mode (62%) of intake of medicine followed by topical administration (36%) and brush (3%) these modes of preparation and administration are the most used in traditional medicine (Fig. 5). Similar results were obtained in previous ethnobotanical surveys carried out in Cameroon and other part of the world [25–28].

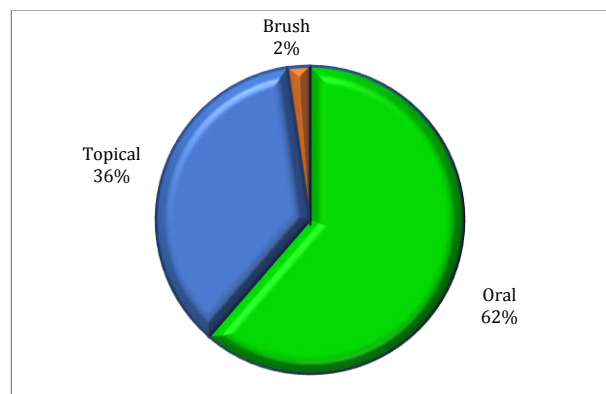


Fig. 5 Percentage of administration route

4. Conclusion

In the present study concluded that documented 27 plant species belongs to 18 families, Euphorbiaceae is mostly used families in the study area. The leaves are the favoured part of local users. Documentation of this knowledge is valuable for the communities and their future generations and for scientific consideration of wider uses of traditional knowledge in treating human beings. The low cost and no side effects of these traditional preparations with medicinal plants make them adaptable by the local community. The wealth of this traditional knowledge of medicinal plants points to a great potential for research and the discovery of new drugs to cure the diseases of human. So, further scientific assessment of these medicines for phytochemical, biological, preclinical and clinical studies is, however, greatly needed. The present research work indicates that research projects should be designed in priority on this area for the pharmacological evaluation and conservation of medicinal plants of this area.

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