INTRODUCTION

Ethnobotany deals with the study of relationships between humans and indigenous plants. Plants are an important source in the preparation of herbal drugs and play a significant role in the survival of tribal and indigenous peoples throughout the world. According to the World Health Organization (WHO), it is estimated that more than 80% of the world population relies on traditional medicines, mostly plant drugs, for their healthcare needs (Kala et al., 2006). In developed countries, 25% of herbal medicines are used to treat chronic as well as infectious diseases. The indigenous people in rural areas have a vast knowledge of how to use plants for the treatment of various diseases. In India, about 1.5 million indigenous people use plant drugs as a traditional medicine for preventive and curative purposes. The tribes and indigenous peoples in India use more than 6,000 of 15,000 herbal plant species as herbal medicine (Dhamija et al., 2011).

The tribal and indigenous peoples have a strong faith in herbal native traditional medicine to cure diseases. Generally, every tribal group has a wide range of ethno-medicinal knowledge for the identification of medicinal plants and also has a unique and different technique for using these herbs for the treatment of various diseases. In India, some tribal groups have started to use allopathic medicine along with ethnomedicine. But still, there is a lack of documentation of indigenous knowledge of herbal medicine. So awareness should be created among the tribal and indigenous people to explore their ethnomedicinal knowledge for the treatment of diseases. The current study aimed to document indigenous knowledge on medicinal plant species used by local Malayali Tribes in the Jawadhu Hills, Thiruvannamalai district, Tamil Nadu, India.
Data Collection

An extensive field survey was carried out to get information on the medicinal plants from the Malayali tribes in the study area. In order to document the existing information on the medicinal plants from tribal practitioners, several field trips were carried out from August, 2016 to July, 2017 in the Jawadhu Hills. During the study, the ethnomedicinal information was collected from middle-aged and older tribal practitioners in their local language, Tamil, through direct interviews, questionnaires and discussions.

The information on the local name of the plant, parts of the plant used, method of preparation and mode of administration (i.e., paste, powder, juice and decoction) of all collected ethnomedicinal plants was recorded during the survey period. The collected ethnomedicinal plants were identified by using The Flora of the Presidency of Madras (Gamble, 1935) and The Flora of Tamil Nadu Carnatic (Matthew, 1983). Further, the identification was confirmed by referring to authentic specimens deposited at the Botanical Survey of India, Southern Circle, Coimbatore.

RESULTS AND DISCUSSION

The present study revealed that a total of 63 plant species belonging to 32 families were distributed into 55 genera, which were commonly used by the local Malayali Tribes for the treatment of various diseases. The most commonly represented families were Acanthaceae (8 species), followed by Euphorbiaceae (5 species), Amaranthaceae and Asclepiadaceae (4 species each), and the remaining 28 families were represented by less than 4 species in the study forest, Jawadhu Hills. The most represented genera are Cassia (3), Achyranthes, Barleria, Euphorbia, Phyllanthus, and Sida (2) in the studied plants (Table 1).

Tribes are using these plants to cure diseases like headaches, earaches, sore throats, fevers, viral fevers, asthma, cough, cold, blockage of nose, wounds, snake bites, insect bites, scorpion stings, antidotes, piles, gonorrhea, stomach aches, stomach disorders, psoriasis, skin diseases, ringworm, gastric ulcer, kidney stone, urinary infection, antiseptic, gallstones, arthritis, diabetes, wheezing, ulcers, joint pains, inflammation, rheumatism, infection fingers, traumatic, folkloric, hair growth, diabetes, leucoderma, jaundice, leprosy, anti-fertility, bronchitis, tooth diseases, antidepressant, dyspepsia, and eye inflammation. The different parts of plants were used to prepare medicines in the form of paste, powder, juice, decoction, and oil. Further, it was observed that some of the plants were used in more than one form of mode of preparation (Table 1).

Among the different parts of the plant used, leaves (43.41%) were most frequently used in the preparation of medicine followed by whole plant (21.20%), root (11.10%), leaf and root (8.8%), fruit (3.3%), flower, inflorescence, seed, tuber, rhizome, leaf and flower, leaf and seed, root and flower, leaf and seed, root and flower, root and flower, leaf, root, fruit and seed with 2.2% (Figure 2). Xavier et al. (2014) reported that leaves are mostly recommended for the preparation of ethnomedicine. The most frequently used method of preparation was paste (27.26%), followed by powder (17.17%), decoction, juice (11.11% each category), paste and juice (8.8%), paste and powder (6.6%), decoction and juice,
Table 1: Ethnomedicinal plants, local name, mode of administration and uses in Malayali Tribes of Jawathu hills, Tamilnadu.

| S.No. | Species                  | Family                  | Local Name       | Parts used | Medicinal uses                                                                 | Mode of administration |
|-------|--------------------------|-------------------------|------------------|------------|--------------------------------------------------------------------------------|----------------------------|
| 1     | Acalypha indica L.       | Euphorbiaceae           | Kuppaimeni       | Leaf       | Headache, wound Insect bites.                                                    | Paste, juice             |
| 2     | Achyranthes aspera Linn. | Amaranthaceae           | Nayurivi         | Whole plant| Asthma, antidote Piles                                                           | Paste                    |
| 3     | Achyranthes bidentata Blume | Amaranthaceae       | Sennaiyururi     | Root       | Psoriasis                                                                      | Paste                    |
| 4     | Aerva lanata (L.) Juss.ex.Shut. | Amaranthaceae      | Sirupeelai       | Leaf       | Psoriasis                                                                      | Paste                    |
| 5     | Ageratum conyzoides Linn. | Asteraceae             | Appakkoti        | Whole plant| Psoriasis                                                                      | Paste                    |
| 6     | Alternanthera pungens Kunth. | Amaranthaceae       | Oottaramul       | Leaf       | Psoriasis                                                                      | Decoction                |
| 7     | Alysipcarus monilifer (L.) DC | Fabaceae              | Kasukoti         | Whole plant| Psoriasis                                                                      | Paste                    |
| 8     | Ammannia baccifera L.    | Lythraceae             | Kall-uruvii      | Leaf       | Psoriasis                                                                      | Paste                    |
| 9     | Andrographis paniculata (Burn.F) Wall.ex.Nees. | Lamiaceae       | Nilavembu        | Leaf       | Psoriasis                                                                      | Paste                    |
| 10    | Anisochilus carnosus (L.f.) wall | Lamiaceae      | Karpura-valli    | Root       | Psoriasis                                                                      | Paste                    |
| 11    | Asparagus racemosus Willd.(L.) | Asparagusaceae   | Thaneervitaan    | Root       | Psoriasis                                                                      | Paste                    |
| 12    | Bidens pilosa Linn.      | Asteraceae             | Nattai-churi     | Root       | Psoriasis                                                                      | Juice                    |
| 13    | Biophytum sensitivum     | Oxalidaceae            | Tintanali        | Root       | Psoriasis                                                                      | Juice                    |
| 14    | Boerhavia diffusa L.     | Nyctaginaceae          | Mookkaratti      | Root       | Psoriasis                                                                      | Juice                    |
| 15    | Borreia hispida (L.) K. Schum. | Rubiaceae              | Kizhangu         | Root       | Psoriasis                                                                      | Juice                    |
| 16    | Cardiospermum halicacabum L. | Sapindaceae       | Rose mullippoondu| Leaf      | Psoriasis                                                                      | Juice                    |
| 17    | Cassia occidentalis L.   | Caesalpinaceae         | Narattanakarai   | Leaf       | Psoriasis                                                                      | Juice                    |
| 18    | Cassia tora L.           | Caesalpinaceae         | Malayavarai      | Leaf       | Psoriasis                                                                      | Juice                    |
| 19    | Cassia hirsuta L.        | Caesalpinaceae         | Malayavarai      | Leaf       | Psoriasis                                                                      | Juice                    |
| 20    | Cissus quadrangularis L. | Vitaceae               | Pirantai         | Whole plant| Psoriasis                                                                      | Juice                    |
| 21    | Coccinia indica Wight & Arn. | Cucurbitaceae    | Kobai            | Leaf       | Psoriasis                                                                      | Juice                    |
| 22    | Cocculus hirsutus Linn.  | Menspermaceae          | Kattu-k-koti     | Leaf       | Psoriasis                                                                      | Juice                    |
| 23    | Commelina benghalensis L. | Commelinaeae           | Kanavazhai       | Leaf       | Psoriasis                                                                      | Juice                    |
| 24    | Croton verrucosa Linn.   | Euphorbiaceae          | Kilukilippai     | Whole plant| Psoriasis                                                                      | Juice                    |
| 25    | Cyamotis arachnoidea Clarke | Commelinaeae       | Nirupalli        | Root       | Psoriasis                                                                      | Juice                    |
| 26    | Cymbopogon citratus (DC) Stapf. | Poaceae             | Vasanapullu      | Root       | Psoriasis                                                                      | Juice                    |
| 27    | Daemia extensa (Jacq.) R. Br. Ex Schult. | Asclepiadaceae | Veliparuthi     | Root       | Psoriasis                                                                      | Juice                    |
| 28    | Euphorbia heterophylla Linn. | Euphorbiaceae       | Paal perukki     | Leaf       | Psoriasis                                                                      | Paste                    |
| 29    | Euphorbia hirta Linn.    | Euphorbiaceae          | Ammam Paccharisi | Leaf       | Psoriasis                                                                      | Paste                    |
| 30    | Evolulus alsinoide L.    | Convolvulaceae         | Vishnukranthi    | Whole plant| Psoriasis                                                                      | Paste                    |
| 31    | Gloriosa superba L.      | Liliaceae              | Kannuveli        | Root       | Psoriasis                                                                      | Juice                    |
| 32    | Gymnema sylvestre (Retz.) R. Br.ex. schult. | Asclepiadaceae | Sirukuvinjan     | Leaf       | Psoriasis                                                                      | Juice                    |
| 33    | Hemidesmus indicus (L.) R. Br. In Aiton | Asclepiadaceae | Nannari         | Root       | Psoriasis                                                                      | Juice                    |
| 34    | Impatiens balsamina L    | Balsaminaceae          | Kaci-t-tumpai    | Flower     | Psoriasis                                                                      | Juice                    |
| 35    | Ionidium sulcifrons L.    | Violaeeae              | Orilaiathamarai  | Root       | Psoriasis                                                                      | Juice                    |
| 36    | Ipomoea staphylina Roem. & Schult. | Convolvulaceae | Onaankodi       | Root       | Psoriasis                                                                      | Juice                    |
| 37    | Justicia tranquvariens L.f. | Acanthaceae       | sivanervembu     | Leaf       | Psoriasis                                                                      | Juice                    |

(Contd...)
| S.No. | Species | Family | Local Name | Parts used | Medicinal uses | Mode of administration |
|-------|---------|--------|------------|------------|-----------------|------------------------|
| 41    | Leptadenia reticulata (Retz.) | Asclepiadaceae | Palaikkodi | Leaf | Leprosy, tonic and stimulant | Leaf extract |
| 42    | Leucas aspera (Wild). Link, Enum. | Lamiaceae | Thumbai | Leaf, flower | Snakebite, Scorpion bite, blockage of nose, head ache. | Juice |
| 43    | Mimosa pudica L. | Mimosaceae | Thotta Surungi | Root | Anti fertility, wounds | Paste, decoction |
| 44    | Mollugo pentaphylla L. | Molluginaceae | Seeragappoondu | Leaf | Cooling purpose, urinary troubles | Juice |
| 45    | Oldenlandia umbellata L. | Rubiaceae | Saayavaer | Leaf, root | Asthma, bronchitis, anemia | Paste |
| 46    | Oxalis corniculata Linn | Oxalidaceae | Puliyarai | Leaf | Astringent, antiseptic and anemia | Paste |
| 47    | Passiflora foetida L. | Passifloraceae | Mosukkattan | Leaf | Cough | Paste, powder |
| 48    | Pavonia zeylanica (L.) Cav. | Malvaceae | Mammatti | Whole plant | Skin problems, ringworm, rheumatism | Powder |
| 49    | Peristrophe bicalyculata (Retz) Nees | Acanthaceae | Chebira | Whole plant | Bone fracture, sprains, wounds | Powder, juice |
| 50    | Persicaria chinensis (Linn) H.Gross | Polygonaceae | Erumainakkuchedi | Root | Diarrhoea | Powder |
| 51    | Phyllanthus vulgaris G.Forst | Euphorbiaceae | Patar nelli | Whole plant | Bleeding | Powder |
| 52    | Phyllanthus maderasptensis L. | Plantaginaceae | Nila-nelli | Fruit | Teeth diseases | Powder |
| 53    | Plantago erosu Wall. | Plantaginaceae | Ishappukol vitai | Leaf | Antiseptic, gastric troubles | Powder |
| 54    | Polygonum glabrum Willd. | Polygonaceae | Sivappu | Whole plant | Antimicrobial, antidepressant drugs | Juice |
| 55    | Ruellia prostrata Poir. | Acanthaceae | Kumbakodai | Whole plant | Diabetes | Juice |
| 56    | Sida acuta Burm F.FI. | Malvaceae | Vattatirippi | Leaf | Wound | Paste |
| 57    | Sida cordifolia L. | Malvaceae | Arivalmanipunudu | Root | Refrigerant | Paste |
| 58    | Smilax aspera Linn. | Smilacaceae | Kizzhanna | Whole plant | Intestinal diseases | Powder |
| 59    | Stachytarpheta indica L. | Verbenaceae | Seemai nayuruv | Whole plant | Fever | Powder |
| 60    | Strobilanthes foliosa T. Anderson | Acanthaceae | Neela Kurinchi | Leaf | Antiseptic | Paste |
| 61    | Tephrosia purpurea (L.) Pers. | Fabaceae | Kattukolini | Root, flower | Dyspepsia, eye inflammation | Decoction, juice |
| 62    | Toddalia asiatica (L.) Cav. | Rutaceae | Kattumilaku | Fruit | Fever, wound, cough | Powder |
| 63    | Xanthium strumarium L. | Asteraceae | Marul-umattai | Leaf | Infection fingers | Paste |

In the present investigation, more than one plant was used for the treatment of the same disease. For example, Alysinepus monilifer, Andrographis paniculata, Barleria buxifolia, Barleria prionitis, Cocculus hirsutus, Crotalaria verrucosa, Daemia extensa, Evolvulus alsinoides, Stachytarpheta indica, Toddalia asiatica (fever), Alysinepus monilifer, Anisochilus carnosus, Cassia hirsuta, Cassia tora, Cassia tora, Cocculus hirsutus, Justicia extensa, Cardioplectus hirsutus, Daemia extensa, Cardiospermum halicacabum, Cardiospermum hirsutum, Cassia tora, Cassia hirsuta, Cassia hirsuta, Justicia extensa, Pavonia zeylanica (Skin disease), Acalypha indica, Biophytum sensitivum, Cissus quadrangularis, Sida acuta, Toddalia asiatica (wound), Cardiospermum hirsutum, Cassia occidentalis, Daemia extensa, Passiflora foetida, Toddalia asiatica (cough). Likewise single plant is used for more than one disease, for example Leucas aspera (snakebite, Scorpion bite, blockage of nose and head ache), Cassia occidentalis (rheumatism, digestive, diabetes, wheezing, cough and cold), Cardiospermum hirsutum (Cough, piles, arthritis and joint pains), Alysinepus monilifer (stomach ache, fever and skin diseases), Barleria buxifolia (viral fever, urinary and stomach disorders), Oxalis corniculata (Astringent, antiseptic and anemia), Pavonia zeylanica (Skin problems, ringworm and rheumatism), Toddalia asiatica (fever, wound and cough), Cocculus hirsutus (Fever, skin diseases and stomach disorders), Commelina bengalensis (sore throat, burns, pain and inflammation), Cissus quadrangularis (bone fracture and wound digestive) Acalypha indica (headache and wound), Achyranthes bidentata (asthma and antiasthmatic) and Gloriosa...
**CONCLUSION**

The present investigation was aimed to record the ethnomedicinal knowledge of plants used for the treatment of various diseases by the Malayali tribes of Jawadhu hills. Medicinal plants still play a major role in the primary health care of the tribes. The Malayali tribes of the Jawadhu hills have been using several medicinal plants for therapeutic purposes. The tribes depend on these plants for the treatment of various diseases such as headaches, fevers, asthma, coughs, colds, wounds, snake bites, piles, stomach disorders, skin diseases, gastric ulcers, kidney stones, urinary infections, diabetes, jaundice, inflammation etc. Furthermore, it is also observed that some medicinal plants in that area are destroyed. So there is a need to create awareness among tribes for documentation, sustainable utilization and conservation of such medicinal plants.

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**Figure 3: Percentage of mode of preparation**

- Decoction, paste, power, juice: 27.26%
- Decoction, paste, power: 11.17%
- Decoction, paste: 11.11%
- Decoction, paste, juice: 5.55%
- Decoction, juice: 5.55%
- Juice: 5.55%
- Leaf extract: 4.06%
- Paste, juice: 2.22%
- Paste, decoction: 2.22%
- Paste, juice: 2.22%
- Paste, powder: 2.22%
- Powder, juice: 2.22%
- Powder, paste: 2.22%
- Powder, juice: 2.22%