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An Ethnobotanical Survey of the Medicinal Plants Used by the People of Sekkarakudi Village, Thoothukudi District, Tamil Nadu, India

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Abstract: Ethnobotanical research was carried out to learn more about the medicinal plants utilised by the residents of Sekkarakudi village in Thoothukudi district, Tamil Nadu, India. With the support of the local government, 27 knowledgeable female informants were selected for the study. The informants provided information on the plant parts used, local names, medicinal uses, and preparation methods (such as decoction, paste, powder, and juice), as well as details about their age, gender, education, and occupation. There have been reports of the use of 54 plant species from 29 families to treat a variety of illnesses. Of the 54 plant species, herbal forms (23 species) were found to be commonly employed, whereas leaves (25 species) were the most regularly used plant parts to create herbal medicines. *Zingiber officinale* (0.592) is the medicinal plant species with the highest usage values. This study demonstrated the continued reliance of the local population on medicinal herbs, which are essential to the primary healthcare system.

Keywords: Create herbal medicine, Ethnobotanical survey in Thoothukudi district, Medicinal herbs, Knowledgeable female informants.

INTRODUCTION

The term "medical plants" refers to a wide range of plant uses employed in allopathic and traditional medical systems worldwide to preserve health and treat particular illnesses. Numerous essential medications have been made possible by documenting traditional knowledge of native plant species (Cox, 2000: Gilani, 2005). Given that 20-25% of prescribed medications come from plants, even those who have only ever used allopathic therapy are probably at least somewhat dependent on medicinal plants (Rates, 2001). According to estimates from the World Health Organisation, 80% of people worldwide either exclusively or mostly receive their medical care through traditional means (Bannerman, 1982). More than 4.3 billion people are thought to be significantly dependent on medicinal plants (Boomibalagan *et al*., 2013).

Despite the availability of allopathic treatment in many areas of the region, it is estimated that 70–80% of the rural population in developing Asian countries receives their primary healthcare from traditional medicine (Sheng-Ji, 2001). Because most developing countries have limited access to modern health services, modern medicine is more expensive than indigenous herbal medicines, traditional medicine is widely accepted in society, and people believe that natural products are safe. These factors have all contributed to the increased use of traditional medicine (Tugume *et al*., 2016). Herbal treatments are essentially plant parts or raw plant extracts that include many ingredients that are often thought to function in concert with one another (Ekor, 2014).

The majority of the traditional knowledge that the locals have learned has been transmitted orally from one generation to the next. At the moment, this knowledge is progressively disappearing because the keepers pass away before transferring it to the next generation. In addition, one of the main dangers to traditional medicine has been the progressive loss of ethnobotanical knowledge brought on by a dearth of recording. The villagers' traditional knowledge is in danger of disappearing (Rani *et al*., 2018).

In addition to protecting indigenous knowledge, the identification of local plant names, scientific names,

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and traditional usage helps future studies on the safety and effectiveness of medicinal herbs in the treatment of various illnesses (Jain *et al*., 2022). Recently, some studies have been conducted on ethnobotanical and associated indigenous knowledge in some villages in Tamil Nadu, India (Rani *et al*., 2018; Girija *et al*., 2021; Priyadharshana *et al*., 2022). However, no research was done to include the traditional knowledge of the healers from Sekkarakudi village in Thoothukudi district, India, and the medicinal plants they use in the Tamil Nadu medical records. Therefore, the objective of the current study is to find out the medicinal plants that the local inhabitants of Sekkarakudi village, Thoothukudi district, Tamil Nadu, India, employ as a means of treating human ailments by traditional healers.

METHODOLOGY

Description of the study area

The objective of the current study was to record the traditional knowledge that the people in Sekkarakudi village, Thoothukudi district, Tamil Nadu, India, had about some medicinal plant species. The research region is located between 77.9530° E and 8.7976° N. The survey site is 13.328 km^2 in size and has an elevation range of 26 m above sea level. Sekkarakudi has a total population of 5,166, of whom 2,600 are male and 2,566 are female, according to the 2011 Census. In the village of Sekkarakudi, 67.52% of people are literate, with 79.46% of men and 55.42% of women. About 1,446 dwellings make up the hamlet of Sekkarakudi.

Data collection and identification of plant species

Throughout the study period from July to November 2023, frequent field surveys were conducted in this village. The data was collected through questionnaires, personal interviews, and discussions with locals who knew medicinal plants found in the area and used by their families and neighbours in Tamil. The questionnaire contained details of the plants, such as the parts used, medicinal uses, and mode of preparation for remedies. The ethnobotanical data were collected following the methodology suggested by Jain (1989).

With the assistance of local administrators, 27 knowledgeable people - all of whom are women - were chosen for the study. Every informant was a local, with families who had been residing in the study area for many generations. Interviews were conducted in informants' homes or the fields. Typically, plant samples were taken in the field based on the informants' directions. Using a plant atlas, informants were asked to identify species that were unavailable at the time of the interview. Each plant/part was assigned a field number, and information was gathered from the informants on plant parts used, local names, medicinal uses, mode of preparation (i.e., decoction, paste, powder and juice) and administration, as well as the age, gender, educational qualification, and occupation of the respondents. The data gathered were cross-verified by repeated queries with different local herbalists on different field trips. All the collected plant species were dried and prepared as herbarium specimens using standard methods as suggested by Jain and Rao (1976). The proportion of informants who reported independently against a particular disease category for each medicinal plant was assessed and noted in the field book.

From this village informant, plants/parts of plants were collected and identified using standard literature such as Floras of Madras Presidency (Gamble, 1956), Further Illustrations on the Flora of Tamil Nadu and Carnatic (Matthew, 1982; 1983; 1988), Flora of Tamil Nadu, India (Nair and Henry, 1983; Henry *et al*., 1987; 1989), as well as Legumes of India (Sanjappa, 1992). We checked the accuracy of scientific names on the IPNI database (http://www.ipni.org), The Plant List website (http://www.theplantlist.org/), Plants of the World Online site (http://www.plantsoftheworldonline.org/) as well as the GRIN Taxonomy website (http://www.ars-grin.gov/cgi-bin/npgs/html/queries.pl). The APG system IV is used for family names (APG, 2016). For future reference, the voucher specimens were deposited in the Herbarium of V.O. Chidambaram College, Thoothukudi, Tamil Nadu. The information gathered from the informants was scrutinised and synchronised into a final report.

Quantitative Analysis of Data

Use Value

The results obtained through the investigation were quantitatively analysed using one of the indices, use value. The use value of species (UV), demonstrates the relative importance of medicinal plants (Rossato *et al*., 1999). It is calculated by the formula:

$$UV=\sum Ui/N$$

Where, Ui is the number of users who reported the particular plant and N is the total number of informants interviewed for a given plant species.

RESULT AND DISCUSSION

Table 1 illustrates the distribution of informants from Sekkarakudi village based on specific socio-economic variables. All 27 informants were female. In terms of age, 3.703% (1) were aged 20-30 years, 18.518% (5) were aged 31-40 years, 22.222% (6) were aged 41-50 years, 29.629% (8) were aged 51-60 years, 14.814% (4) were aged 61-70 years, and 11.111% (3) were aged over 70 years. Concerning educational attainment, 66.666% (18) were uneducated, 7.407% (2) had completed SSLC, and 7.407% (2) had completed HSC. Regarding occupation, all informants were classified as coolies.

Table 1: Proportion of informants by socioeconomic variables

Factor	Categories	Number of informants	Percentage
Age	Less than 20	-	0
	20-30	1	3.703
	31-40	5	18.518
	41-50	6	22.222
	51-60	8	29.629
	61-70	4	14.814
	More than 70	3	11.111
Education	Illiterate	18	66.666
	Less than 6^{th}	3	11.111
	7^{th} to 9^{th}	2	7.407
	SSLC	2	7.407
	HSC	2	7.407
Occupation		All are Coli	

The ethnobotanical survey in Sekkarakudi village, Thoothukudi district, Tamil Nadu indicated that 54 taxa belonging to 29 families are utilised as a medicine to treat various diseases like piles, scabies, itching, headache, wounds, pain, gastric troubles, stomach upset, swellings, diabetes, cold, fever, burns, cough, flatulence, toothache, insect bites, constipation, jaundice, ear pain, and leg cramps. Table 2 lists the surveyed plants along with the plant family and species that belong to them, all cited in alphabetical order. Both scientific and local names are included, along with details on the parts utilised, the plant's habits, and its therapeutic applications. Similarly, Sivasankari *et al*., (2013) identified 52 species of medicinal plants from 36 families during an initial survey conducted in Uthapuram village, Madurai district, Tamil Nadu.

Table 2: Data on medicinal plants with their botanical names and uses

S. No	Botanical Name	Family	Local name	Useful Parts	Habit	Uses	Use Rate (out of 27)	Use Value
01.	*Abutilon indicum* (L.) Sweet	*Malvaceae*	Thuthi	Flowers	Shrub	Piles	1	0.037
02.	*Acalypha* indica L.	*Euphorbiaceae*	Kuppaimeni	Leaves	Herb	Scabies, Itching, One side headache	2	0.074
03	*Allium cepa* L.	*Amaryllidaceae*	Vengayam	Bulbs	Herb	Headache	1	0.037
04.	*Allium ascalonicum* L.	*Amaryllidaceae*	Chinnavengayam	Bulbs	Herb	Small wounds, Headache, Pain reliever	5	0.185
05.	*Allium sativum* L.	*Amaryllidaceae*	Poondu	Bulbs	Herb	Gastric troubles, Leg Swelling, Body fatigue, Stomach upset, Seer marunthu	6	0.222
06.	*Aloe vera* (L.) Burm.f.	*Xanthorrhoeaceae*	Katrazhai	Leaves	Herb	Swelling, Wounds	1	0.037
07.	*Areca catechu* L.	*Arecaceae*	Paaku	Fruit	Tree	Cold	1	0.037
08.	*Azadirachta indica* A. Juss.	*Meliaceae*	Vepamaram	Leaves	Tree	Cold, Headache, Diabetes, Pain	6	0.222
09.	*Borassus flabellifer* L.	*Arecaceae*	Panaimaram	Inflorescence	Tree	Body pain	1	0.037
10.	*Brassiaca nigra* (L.) W.D.J Koch	*Brassicaceae*	Kadugu	Seeds	Herb	Leg Pain, Cold, Leg Swelling	3	0.111

11.	*Calotropis gigantea* (L.) W. T.Aiton	*Apocynaceae*	Erukku	Latex, Leaves	Shrub	Thorn pricks, Leg wounds	2	0.074
12.	*Cardiospermum halicacabum* L.	*Sapindaceae*	Mudakatraan	Leaves	Climber	Gastric troubles	1	0.037
13.	*Carica papaya* L.	*Caricaceae*	Pappali	Leaves, Fruit	Tree	Fever, Skin diseases	1	0.037
14.	*Citrullus colocynthis* (L.) Schrader	*Cucurbitaceae*	Kumatti	Fruit	Climber	Pain reliever	1	0.037
15.	*Clitoria ternatea* L.	*Fabaceae*	Sangupushpam	Flowers	Climber	Diabetes	1	0.037
16.	*Cocos nucifera* L.	*Arecaceae*	Thennaimaram	Inflorescence	Tree	Burns, Cold	4	0.148
17.	*Plectranthus amboinicus* (Lour.) Spreng.	*Lamiaceae*	Omavalli	Leaves	Shrub	Cold	3	0.111
18.	*Coriandrum sativum* L.	*Apiaceae*	Kothamalli	Leaves	Herb	Dizzines due to pittam, Cold	3	0.111
19.	*Cuminum cyminum* L.	*Apiaceae*	Seeragam	Seeds	Herb	Stomach pain, Cold	2	0.074
20.	*Curcuma longa* L.	*Zingiberaceae*	Manjal	Rhizome	Herb	Cold, Headache, Small wounds, Seer marunthu	8	0.296
21.	*Cynodon dactylon* (L.) Pers.	*Poaceae*	Arugampul	Leaves	Herb	Cold, Cough	1	0.037
22.	*Eleusine coracana* (L.) Gaertn.	*Poaceae*	Ragi	Seeds	Herb	Leg swelling, Wounds	1	0.037
23.	*Ferula jaeschkeana* Vatke	*Apiaceae*	Perunkaayam	Resin	Herb	Gastric troubles, Flatulence, Body fatigue	3	0.111
24.	*Ficus carica* L.	*Moraceae*	Athi	Leaves	Shrub	Burns, Fire wounds	2	0.074
25.	*Hibiscus rosa-sinensis* L.	*Malvaceae*	Chembaruthi	Flower	Shrub	Hair growth	1	0.037
26.	*Jatropha curcas* L.	*Euphorbiaceae*	Aathalai	Leaves	Shrub	Cracked heels, Toothache	2	0.074
27.	*Lawsonia inermis* L.	*Lythraceae*	Mrudhani	Leaves	Shrub	Hair growth	1	0.037
28.	*Leucas aspera* (Willd.) Link	*Lamiaceae*	Thumbai	Leaves Flowers	Herb	Insect bites, Nose irritation	1	0.037
29.	*Mentha spicata* L.	*Lamiaceae*	Pudhina	Leaves	Herb	Gastric troubles, Cold	1	0.037
30.	*Momordica charantia charantia*	*Cucurbitaceae*	Pavakkai	Fruit	Climber	Diabetes	1	0.037
31.	*Morinda citrifolia* L.	*Rubiaceae*	Manjanathi	Leaves	Tree	Leg swelling, Wound healing, Body pain	3	0.111
32.	*Moringa oleifera* Lam.	*Moringaceae*	Murungai	Leaves	Tree	Balanced body, Headache	2	0.074
33.	*Murraya koenigii* (L.) Spreng.	*Rutaceae*	Karuveppilai	Leaves	Tree	Headache, Hair growth	2	0.074

34.	*Musa paradisiacal* L.	*Musaceae*	Vaazhai	Fruits	Herb	Constipation	1	0.037
35.	*Ocimum tenuiflorum* L.	*Lamiaceae*	Thulasi	Leaves	Herb	Balanced body, Headache, Cold, Cough	5	0.185
36.	*Ocimum basilicum* L.	*Lamiaceae*	Thiruneetrupachai	Leaves	Herb	Seer marunthu	1	0.037
37.	*Papaver somniferum* L.	*Papaveraceae*	Khassa-khassa	Seeds	Herb	Body pain	1	0.037
38.	*Phyllanthus emblica* L.	*Phyllanthaceae*	Nellikai	Fruit	Tree	Diabetes	1	0.037
39.	*Phyllanthus niruri* L.	*Phyllanthaceae*	Keezhanelli	Leaves	Herb	Jaundice	2	0.074
40.	*Piper betle* L.	*Piperaceae*	Vettrilai	Leaves	Creeper	Cold	1	0.037
41.	*Piper nigrum* L.	*Piperaceae*	Milagu	Fruit	Climber	Cold, Headache, Balanced body, Body fatigue, Cough, Stomach upset	12	0.444
42.	*Psidium gujava*	*Myrtaceae*	Koiya	Leaves	Tree	Diabetes	1	0.037
43.	*Punica granatum* L.	*Lythraceae*	Maadhulai	Seeds	Shrub	Diabetes	1	0.037
44.	*Ricinus communis* L.	*Euphorbiaceae*	Aamanakku	Seeds	Shrub	Stomach pain	1	0.037
45.	*Saccharum officinarum* L.	*Poaceae*	Karumbu	Stem	Shrub	Dizzines due to pittam	1	0.037
46.	*Senna auriculata* (L.) Roxb.	*Fabaceae*	Aavaram	Flowers	Shrub	Diabetes	1	0.037
47.	*Sesamum indicum* L.	*Pedaliaceae*	Ellu	Seeds	Herb	Ear pain	2	0.074
48.	*Solanum trilobatum* L.	*Solanaceae*	Thuthuvalai	Leaves	Shrub	Balanced body, Cold, Headache, Cough	4	0.148
49.	*Solanum virginianum* L.	*Solanaceae*	Kandankathiri	Leaves, Fruit	Herb	Leg cramps, Balanced body, Cold	5	0.185
50.	*Syzygiumcumini* (L.) Skeels	*Myrtaceae*	Naaval	Leaves, Fruit	Tree	Diabetes, Gastric Troubles	1	0.037
51.	*Syzygium aromaticum* (L.) Merr. & Perry	*Myrtaceae*	Krampu	Flower	Tree	Headache, Toothache	2	0.074
52.	*Trigonella foenum – graecum* L.	*Fabaceae*	Vendhayam	Seeds	Herb	Stomach ache, Diabetes	1	0.037
53.	*Vitis vinifera* L.	*Vitaceae*	Dhiratchai	Fruit	Climber	Dizzines due to pittam	1	0.037
54.	*Zingiber officinale* Roscoe	*Zingiberaceae*	Inji/Sukku	Rhizome	Herb	Diarrhea, Dizziness, Balanced body, Cold, Headache, Body fatigue, Stomach pain	16	0.592

Lamiaceae is the family with the most species (5) in the current study (Table 3). In Uthapuram village, Madurai district, Tamil Nadu, a survey conducted by Sivasankari *et al*., (2013) found that the Lamiaceae and Euphorbiaceae families have the highest number of plant species utilised for medicinal purposes. This study's findings are substantially consistent with that study. Due to their curative and preventative qualities, species of the

Lamiaceae family have had a long history of usage in food preservation, flavouring, and medicine (Carović-Stanko *et al*., 2016).

Table 3: Family-wise distribution of enumerated medicinal plants

S. No	Family	Number of genus	Number of species
01.	Amaryllidaceae	1	3
02.	Apiaceae	3	3
03.	Arecaceae	3	3
04.	Apocynaceae	1	1
05.	Brassicaceae	1	1
06.	Caricaceae	1	1
07.	Cucurbitaceae	2	2
08.	Euphorbiaceae	3	3
09.	Fabaceae	3	3
10.	Lamiaceae	4	5
11.	Lythraceae	2	2
12.	MalvaceaeJuss.	2	2
13.	Meliaceae	1	1
14.	Moraceae	1	1
15.	Moringaceae	1	1
16.	Musaceae	1	1
17.	Myrtaceae	2	3
18.	Papaveraceae	1	1
19.	Pedaliaceae	1	1
20.	Phyllanthaceae	1	2
21.	Piperaceae	1	2
22.	Poaceae	3	3
23.	Rubiaceae	1	1
24.	Rutaceae	1	1
25.	Sapindaceae	1	1
26.	Solanaceae	1	2
27.	Vitaceae	1	1
28.	Xanthorrhoeaceae	1	1
29.	Zingiberaceae	2	2

In the present study, among the 54 plant species, herbal forms (23 species) were found to be commonly used, followed by shrubs (12 species), trees (12 species), climbers (6 species), and creepers (1 species) (Figure 1). Similarly, Vignesh Kumar *et al*., (2024) observed that the traditional healers of the Vadakku Kalankarai village used 18 (48.65%) herbs, 10 (27.03%) trees, 7 (18.92%) shrubs, and 2 (5.40%) climbers.

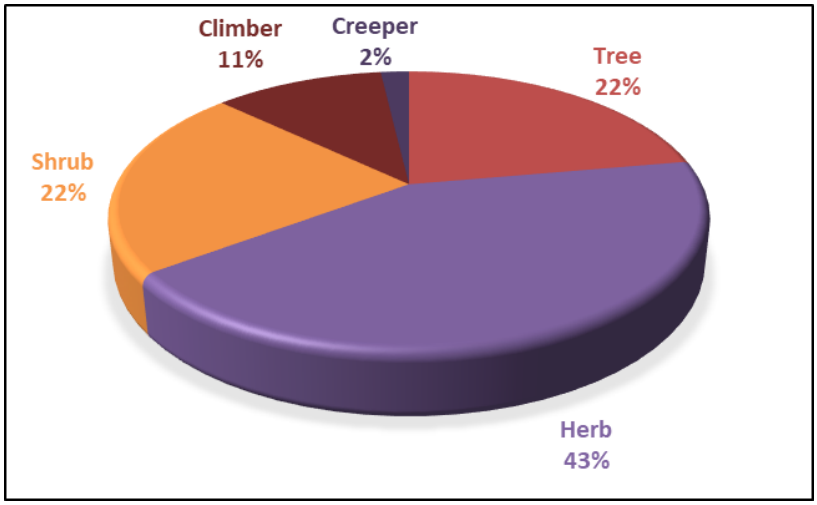

Figure 1: Habit of the medicinal plants used for herbal medicine preparation

The most commonly used plant parts for herbal medicine preparation were leaves (25 species), fruit (12 species), seeds (8 species), flowers (6 species), bulbs (3 species), rhizome (2 species), and stems, resins, and latex (1 species each) (Figure 2). In a previous study conducted by Rajalakshmi *et al*., (2019), it was found that leaves were the most commonly used part of medicinal plants, accounting for 66% of usage. These leaves were used either alone or in combination with other plant parts to prepare various medicines. The fruit was the second most commonly used part, accounting for 19% of usage, followed by bark (11%), root and seed (each 10%), rhizome (8%), flowers (6%), latex (3%), whole plant (2%), and stem bark (1%). Leaves are readily accessible and pose a lesser threat to the plant's survival compared to underground parts like tubers, roots, and rhizomes. Harvesting underground parts or the entire plant can have a significant ecological and survival impact on the species, as they play an active role in photosynthesis and metabolite production (Ghorbani, 2005). Leaves, remaining green and available for most months of the year, are commonly utilized in medicine preparation. When fresh leaves are not accessible, dried ones are also employed.

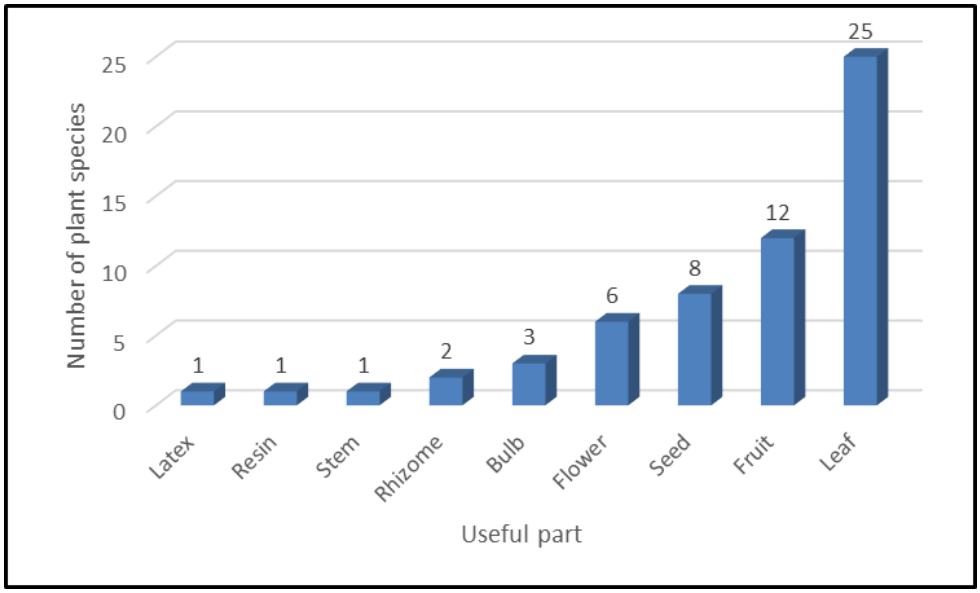

Figure 2: Plant part used for herbal medicine preparation

In the current study, plant remedies were prepared in various forms: paste (24 plants), decoction (20 plants), raw form (13 plants), oil (8 plants), juice (3 plants), powder, latex, and cooked (each one plant) (Figure 3). In an earlier study, Rajalakshmi *et al*., (2019) also reported that people in Thanjavur and its surrounding areas in Tamil Nadu, India, prepared medicinal plants in paste form to treat illnesses.

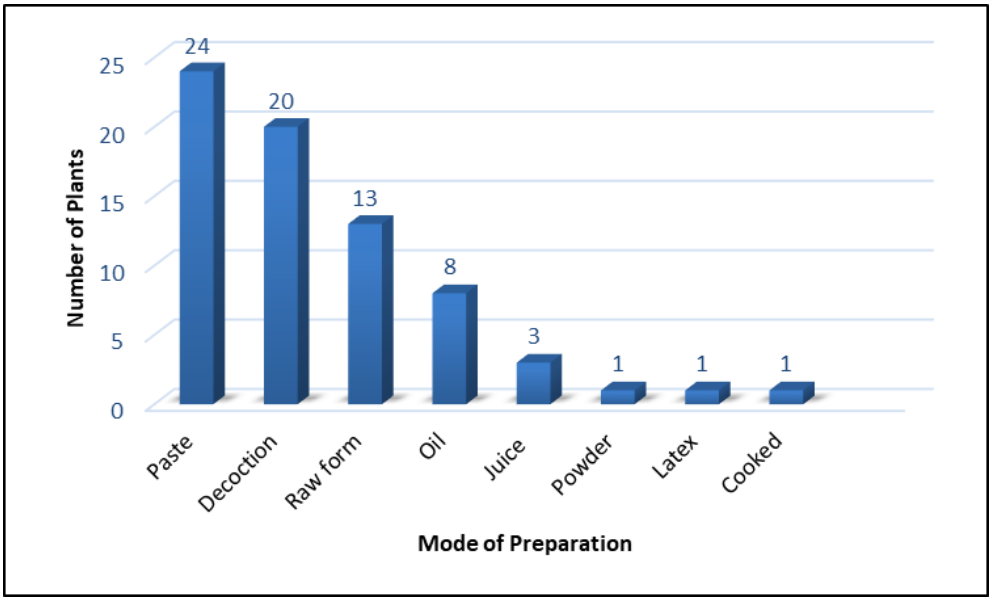

Figure 3: Mode of preparation

In this study, we calculated quantitative analyses such as use value from the ethnobotanical documentation. The medicinal plant species with the highest use values are *Zingiber officinale* (0.592), *Piper nigrum* (0.444), *Curcuma longa* (0.296), *Azadirachta indica* (0.222), and *Allium sativum* (0.222). These values indicate the widespread usage of medicinal plants in the research areas. An earlier study by Rajalakshmi *et al*., (2019) found that the highest use values were associated with *Solanum trilobatum* (0.95).

CONCLUSIONS

According to this study, the residents of Sekkarakudi village have excellent knowledge of medicinal plants and a vast floristic diversity that they use to treat a wide range of ailments. 27 female informants from the area reported encountering 54 therapeutic plants that belonged to 29 different families. The most significant plants used to treat different medical conditions were identified using a quantitative examination of the data utilising use value. Further pharmacological analysis was required for plants including *Zingiber officinale*, *Piper nigrum*, *Curcuma longa*, *Azadirachta indica*, and *Allium sativum* to manufacture novel medications. By disclosing the medical information, they both announced the dissemination of this knowledge and suggested that it be documented for the benefit of future generations.

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