Indian Society for Spices

Documentation of spices and condiments as medicines by Reang community of Tripura

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Abstract

A total of 36 species of spices and condiments belonging to 30 genera and 19 families were reported to be used for medicinal purposes by the Reang community. Leaves were the most commonly used part followed by whole plant, rhizomes, fruits, young shoots, barks, flowers and stems. Zingiberaceae was the most dominant family followed by Apiaceae, Fabaceae and Araceae. There were 24 herbs, 7 trees, 5 shrubs, and 1 climber species. The Informant Consensus Factor was maximum (0.75) for medicinal uses of spices for treating gastric problems and ulcer and minimum (0) for liver disease. The highest fidelity levels were observed in *Curcuma longa* L. (100%) to treat wounds and gynecological problems and lowest in *Amaranthus spinosus* L. (28%) for snake bite. The present study reveals that Reang community uses the plants not only as spices and condiments but also as herbal medicines for treatment of various ailments.

Introduction

Spices have a wide variety of biofunctions and it has additive or synergistic actions against a variety of ailments (Sachan *et al.*, 2018). According to traditional Chinese medicine theory, most of the pungent and warm spices have properties that can kill germs, bacteria and viruses and can improve bowel movement activities (Wu *et al.*, 2012). Medicinal herbs contain natural chemicals that are favourable to human health (Thomas *et al.*, 1997). Aromatic plants are essential to daily life since they are the main source of naturally occurring organic compounds that are used in food goods, medicine, spices and flavour (Singh & Sundriyal, 2002). Spices are used in folk medicine because of their

beneficial effect on human health. Herbs and spices are organic source of vitamins and minerals. Due to the therapeutic value of spices, they are often used in Indian ayurvedic medicines to treat different minor ailments. Examples for this include use of clove for alleviating toothache, cinnamon for reducing blood glucose level, fenugreek for lowering cholesterol, lemongrass for cough and nasal congestion, turmeric for wound healing, ginger for motion sickness and nausea *etc.* (Padakkati & Meti 2020). Sanjay, (2021) studied the therapeutic value of 16 different spices such as *Curcuma longa, Zingiber officinale, Cuminum cyminum, Piper nigrum, Ferula narhex, Coriandrum sativum, Mentha pipereta, Elettaria cardamomum, Sygyzium aromaticum, etc.* to treat different diseases.

As part of Indo-Burma global biodiversity hotspots, Northeastern India is rich in both flora and fauna. Tripura is one of the states of Northeast India. It lies between $22^0\,56'$N to $24^0\,32'$N and $90^0\,09'$E to $92^0\,20'$E and covers an area of 10,49,169 sq.km. It shares a border with Bangladesh on three sides *i.e.*, north, south, west and Assam to the north east and Mizoram to the east (Majumdar & Datta 2009). Tripura is the home to 19 ethnic communities such as Tripuri, Reang, Kalai, Jamatia, Noatia, Hrangkhawl, Uchai, *etc*.

Reang is the second largest community in Tripura. Reang has the total population 165,103 and literacy rate is 39.8% (Census of India, 2001). The people of Reang community are found scattered all over the state but mostly reside in two districts i.e. - Dhalai and Gomati. Linguistically, Reangs belong to Tibeto-Burmese origin. They are also considered as subtribes of kukis. Reangs are

divided into 2 clan- Meska and Molsoi. Reangs are mostly Hindu but they have faith in different deities like Buraha, Bonirao, Songrama, Jampira, Lampra *etc.* (Acharya, 1999). Like most of the Tripuri they practice *jhum* cultivation and are mostly dependent on forest resources. The Reang people consume an appropriate balanced diet and are generally non-vegetarians. Most of them depend on the wild edible plants collected from forest, wild habitats and also grow some of them in the kitchen gardens for daily consumption (Singh & Shrivastava 2017). The spices used on a daily basis such as mwso (chillies), risum (garlic), piyaz (onion), swtwi (turmeric), haching (ginger) and muiching (*Zanthoxylum*), *etc.* have been used for healing different ailments such as cough, cold, skin problems, fever *etc.* Some of the spices are used in traditional medicine. Indigenous people are incredibly knowledgeable about their environment and rely on forest resource for food, housing, customs and health care (De *et al.,* 2010).

As Tripura comes under Indo-Burma global biodiversity hotspot, there is a richness in floral diversity and urgency to scientifically record the important plant species used as spices and also as medicine to utilize them for therapeutic purpose and also to reduce the pressure on wild species. So far, studies were conducted on uses of spices for medicinal purpose by Manipuri community of Tripura (Guha *et al*., 2018). But no studies were reported on spices and condiments used as medicine by Reang community of Tripura. The present study was taken up with the objective of documentation of spices and condiments as medicine by Reang community.
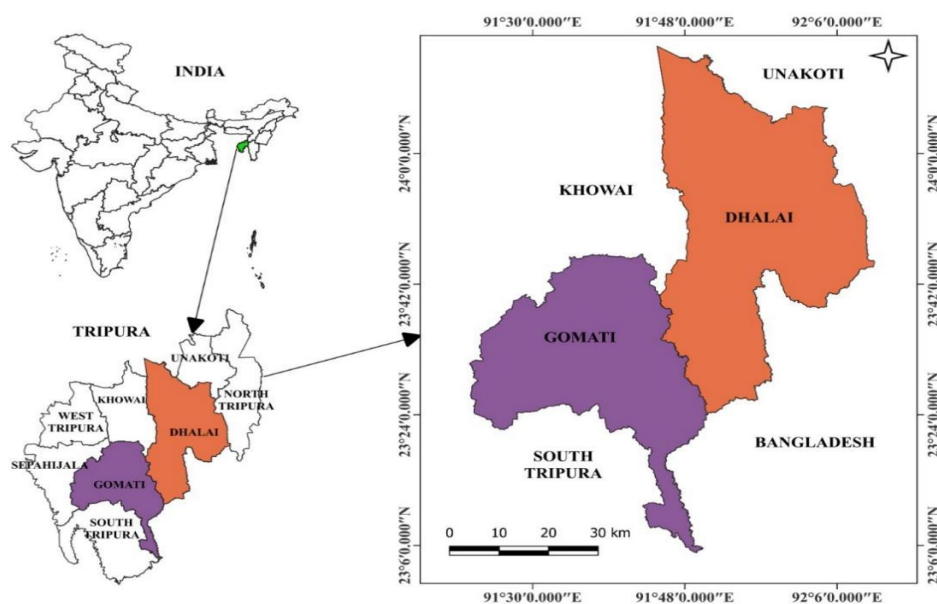
Fig. 1. Map of study area

Materials and methods

Study area

A field survey was conducted in villages of Dhalai and Gomati districts of Tripura from May 2021 to July 2023. 10 random villages from each district were selected for the study. Dhalai district covers an area of 2400 km² with latitude of 23.89119° N and longitude of 91.79353°E whereas Gomati district covers an area of 1,522.8 km² with latitude of 23.72619° N and longitude of 91.69975°E. Dhalai is mainly between Atharamura and Sakhan range. More than 70% is covered with hills, and forests. Gomati is clearly defined by lush green valleys. Data were collected from 60 informants by questionnaire method and personal interviews. Among the informants 45 were men and 15 were women. Most of the informants were village headmen, medicine men, herbalist and old men and women of the community. For collection of data standard ethnobotanical questionnaire was

prepared (Jain & Mugdhal, 1999). The survey was done in all seasons to gather the information of the plants. The informants were asked to show the plants in their natural habitat. The specimens were mostly collected from home gardens and nearby forest areas in accordance with the information provided by the informants. Identification of these plants was made with the help of taxonomic literature and herbarium specimens. Collection of plant specimens and preparation of herbarium were made as per the standard method (Jain & Rao, 1976). The vernacular name (local name), scientific name, family, parts used and methods of utilization *etc.* were recorded. The voucher specimens were deposited in the Department of Forestry, NERIST, Nirjuli, Arunachal Pradesh.

The data obtained was analysed through informant consensus factor to determine the homogeneity of the informant's knowledge and fidelity level to authenticate the

uniqueness of a species to treat a particular ailment.

Informant Consensus Factor (ICF)

ICF was measured to study the total usage of plant species according to cultural applicability. ICF value can be calculated by the formula ICF = (Nur-Nt)/(Nur-1) (Trotter & Logan, 1986).

Where, Nur refers to the number of use reports for a particular use category and Nt refers to the number of taxa used for a particular use category by all informants. ICF values are low (near 0) if plants are chosen randomly or if there is no exchange of information about their use among informants, and approach one when there is well defined information exchanged between informants (Gazzaneo *et al.*, 2005)

Fidelity Level (FL)

The fidelity level (FL) is the percentage of informants claiming the use of certain plant species for the same major purpose or ailment to treat (Alexaides, 1996).

It is calculated as FL (%) = (Np/N)×100,

where Np refers to the number of informants that claimed a use of plant species to treat a particular disease and N refers to the number of informants that used the plants as a medicine to treat any given disease (Friedman *et al.*, 1986).

Results and discussion

The present study reported the rich therapeutic usage of spice and condiments by the Reang community of the state. A total of 36 spices and condiment species having therapeutic properties were recorded to be used by the community. These species are spread over 19 families under 30 genera. The list of all the species including the botanical name, local names, family, habit, part(s) used, and their medicinal use are given in Table 1. Among the various families, Zingiberaceae has the highest number of spices with 5 species followed by Apiaceae and Fabaceae with 3 species each (Fig. 2). Similarly, the therapeutic significance of family Zingberaceae has also been recorded as family with the highest number of therapeutic spice species (Singh & Sundriyal, 2002; Gudade *et al.*, 2015; Salam & Jamir, 2016; Ayodele *et al.*, 2016; Sanjay, 2021). Among the various habit forms, herbs are the dominant with 24 species followed by trees (7 spp.), shrubs (5 spp.) and climber (1 sp.) (Fig. 3). The findings of the present study where herbs being the dominant habit of spices and condiment species concur with the findings of many researchers (Singh & Sundriyal, 2002; Salam & Jamir, 2016; Ayodele *et al.*, 2016; Bharali *et al.* 2017; Guha *et al.*, 2018). Likewise, the study on the drug formulation revealed that different plant parts were being used by the different healers. The different plant part used are grouped into eight categories such as flowers, fruits, leaves, rhizomes, young shoots, barks, *etc.* Leaves are found to be the most commonly used parts (11 spp.); followed by rhizomes, fruits and whole plants (9 spp. each) and young shoots and bark (3 spp. each) (Fig. 4). Similar results are also reported by many authors (Singh & Sundriyal, 2002; Salam & Jamir, 2016, Ayodele *et al.*, 2016; Guha *et al.,* 2018).

Altogether the species were being used to treat 14 different categories of ailments ranging from common cold, cough, flu and fever, high blood pressure, indigestion, tonic, wound healing, skin diseases, joint pain, gastric and ulcer, bleeding piles, Urinary tract infection (UTI), snake bite, diarrhoea, kidney stone, diabetes, headache to gynecological problems. The different health ailments treated by the healers using the traditional knowledge system are recorded and analysed. Among the major ailment categories gastric and ulcer is the dominant one with 46 use reports followed by flu and fever with 31 use reports each. Around 12 species are used to treat gastric and ulcer followed by flu and fever (10 spp), circulatory system disorder.

The highest degree of consensus (ICF value=0.75, 0.7, 0.69 and 0.68) were obtained for the gastric and ulcer, flu and fever, respiratory disorder and circulatory system disorder (Table 2). The category of plants used for liver disease and animal bite/insect bite has the lowest degree of consensus (ICF=0, 0.2). Some of the plants are used in more than one category. All of the recorded species (except *Solanum robustum*) were found to be used for treating multiple ailments. *Curcuma longa* and *Trachyspermum roxburghianum* are used for treating maximum number of ailments such as kidney stones, skin problems, UTI, tonic, joint pain, cold and fever, followed by *Ocimum americanum* (cold and cough, fever, asthma, gastric and ulcer, indigestion, tonic) and *Sygyzium aromaticum* and *Solanum robustum*. Each plant is used to treat more than one ailment. For example- *Curcuma longa* L. was used for wound healing, gynecological problems and skin problems, *etc.* The results showed that the FL (%) ranges from 28 to 100. High fidelity per cent was obtained for those species, where almost all the uses refer to same purpose while the low (below 50%) fidelity was usually obtained for plants that are used for several purposes. The highest fidelity level (100%) was found in *Curcuma longa* for wound healing and gynecological problems and second highest (87%) in *Trachyspermum roxburghianum* for cold and fever (Table 3). Plants with low FLs are not necessarily unimportant, but low values indicates that traditional knowledge about them is at risk of not being passed on and that it may be slowly disappearing (Chaudhary *et al.*, 2006).

Table 1. List of spices and condiment used as medicine by Reang community

Sl. no.	Scientific name	Local name	Family	Habit	Parts used	Medicinal uses
1.	*Amaranthus spinosus* L.	Dalok bwso	Amaranthaceae	Herb	Whole plant except roots	Diarrhoea and fever, snake bite and also drink as tonic
2.	*Amorphophallus bulbifer* (Roxb.) Blume	Batima	Araceae	Herb	Young shoots and rhizome	Constipation, abdominal pain, bleeding piles
3.	*Allium sativum* L.	Risom	Amarylidaceae	Herb	Bulbs	Joint ache, fever and flu and wound healing

4.	*Allium cepa* L.	Piyaz	Amarylidaceae	Herb	Leaves and bulbs	Cold, runny nose, infection of ear and gastric.
5.	*Alpinia nigra* (Gaertn.) B.L. Burtt	Thorai	Zingiberaceae	Herb	Stem and rhizome	Skin infections, Gastric and ulcer, indigestion and abdominal pain.
6.	*Blumea lanceolaria* (Roxb.)	Muihan	Asteraceae	Herb	Leaves	Wound healing, gastric and ulcer, fever, snake bite, *etc.*
7.	*Canavalia gladiata* (Jacq.) DC.	Baikang	Fabaceae	Climber	Pods	Stomach ache, cough and sinus.
8.	*Citrus limon* (L.) Osbeck	Kawji	Rutaceae	Shrub	Fruits and leaves	Cold and cough, Kidney stones, fever and high blood pressure.
9.	*Citrus macroptera* Montr.	Sadkora	Rutaceae	Shrub	Fruits	Kidney stones, indigestion, gastric and ulcer.
10.	*Capsicum frutescens* L.	Mwso Bilati	Solanaceae	Herb	Fruits	Indigestion, cold and fever (malaria).
11.	*Centella asiatica* (L.) Urb.	Samsota	Apiaceae	Herb	Whole plant	Gastric and ulcer, wound healing, tonic, high blood pressure.
12.	*Coriandrum sativum* L.	Dhania	Apiaceae	Herb	Whole plant	Indigestion, tonic and flu
13.	*Curcuma longa* L.	Swtwi	Zingiberaceae	Herb	Rhizome	Wound healing, blood purifier, gynaecological problems and skin problems, *etc.*
14.	*Curcuma aromatica* L.	Lairo	Zingiberaceae	Herb	Leaves Rhizome	Wound healing, tumor, joint pain, gastric and ulcer.
15.	*Colocasia esculenta* L.	Muito	Araceae	Herb	Rhizome	Joint ache, skin infections.
16.	*Cinamommum tamala* T. nees & Eberm.	Tejpata	Lauraceae	Tree	Leaves	Gastric and ulcer, lowers blood sugar levels.
17.	*Cymbopogon citratus* (D.C)	Suimander	Poaceae	Herb	Leaves	Cold and fever, tonic.
18.	*Dendrocalamus hamiltonii* Nees & Arn. ex Munro	Wathwi	Poaceae	Herb	Young shoots (New culm)	Indigestion, cold and fever
19.	*Eryngium foetidum* L.	Bakhor	Apiaceae	Herb	Whole plant	Flu and fever, stomach ache, diabetes
20.	*Enhydra fluctuans* Lour.	Elengcha	Asteraceae	Aquatic herb	Whole plant	High blood pressure, diabetes, gastric and ulcer

| 21.	*Lasia spinosa* (L.) Thwaites	Pachwl kwlwi	Araceae	Herb	Young shoots and rhizome	Joint pain, cough, stomach pain and snake bite.
22.	*Mangifera indica* L.	Thaichwk	Anacardiaceae	Tree	Bark and fruits	Gum and tooth pain, hemorrhoids and piles
23.	*Musa paradisiaca* L.	Thailik, Laiphang	Musaceae	Herb	Flowers	Ulcer, kidney stones, diabetes and gynecological problems
24.	*Monocharia vaginalis* C. Presl	Chichri	Pontederiaceae	Aquatic	Whole plant except roots	Gastric and ulcer and high blood pressure, tonic
25.	*Moringa oleifera* L.	Sejna	Moringaceae	Tree	Leaves and bark	Malarial fever, infections, wounds, joint pain and indigestion
26.	*Neptunia prostrata* (Lam). Baill	Thorai ha	Fabaceae	Aquatic	Whole plant	Stomach problems, UTI, gastric and ulcer
27.	*Oroxylum indicum* (L.) Kurz	Baifang	Bignoniaceae	Tree	Pods	Wound healing, Joint pain and typhoid fever, gastric and ulcer
28.	*Ocimum americanum* L.	Banta	Lamiaceae	Herb	Whole plant	Cold fever and cough, fever, asthma, gastric and ulcer, indigestion, tonic
29.	*Premna esculenta* Roxb.	Orai lai	Lamiaceae	Shrub	Leaves	High blood pressure, wounds and inflammation, joint pain
30.	*Solanum anguivi* L.	Kham kha	Solanaceae	Shrub	Fruits	Diabetes, ulcer and high blood pressure
31.	*Solanum robustum* H.L. Wendl.	Khamka borok	Solanaceae	Shrub	Fruits	High blood pressure, diabetes
32.	*Syzygium aromaticum* L.	Lwng	Myrtaceae	Tree	Flower buds	Toothache, indigestion
33.	*Tamarindus indica* L.	Thentwrwi	Fabaceae	Tree	Fruits, Leaves	Indigestion, flu and fever, high blood pressure, constipation, kidney stones
34.	*Trachyspermum roxburghianum* (DC.) H. Wolff	Khundropui	Apiaceae	Herb	Whole plant	Kidney stones, skin problems, UTI, tonic, cold and fever, joint pain, cramps
35.	*Zanthoxylum rhetsa* DC	Muiching	Rutaceae	Tree	Leaves, Bark	Toothache and stomach ache, joint pain, snake bite
36.	*Zingiber officianale* Roscoe	Haching	Zingiberaceae	Herb	Rhizomes, leaves	Cold and cough, joint pain, typhoid fever gynecological problems, insect bite
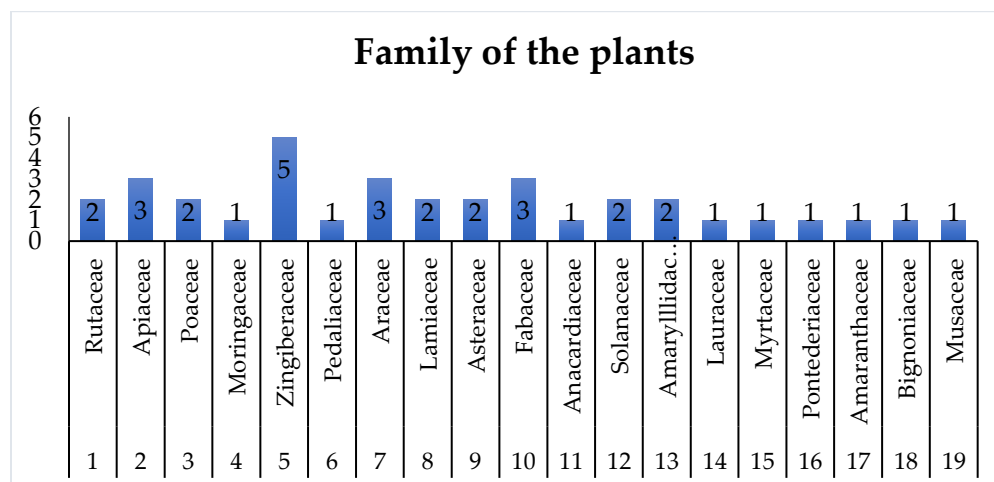
Fig. 2. Number of species per family used as medicines
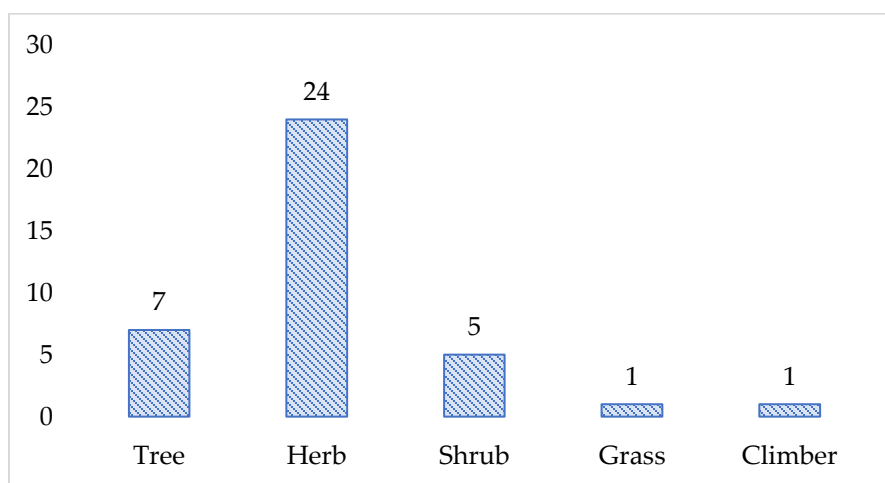

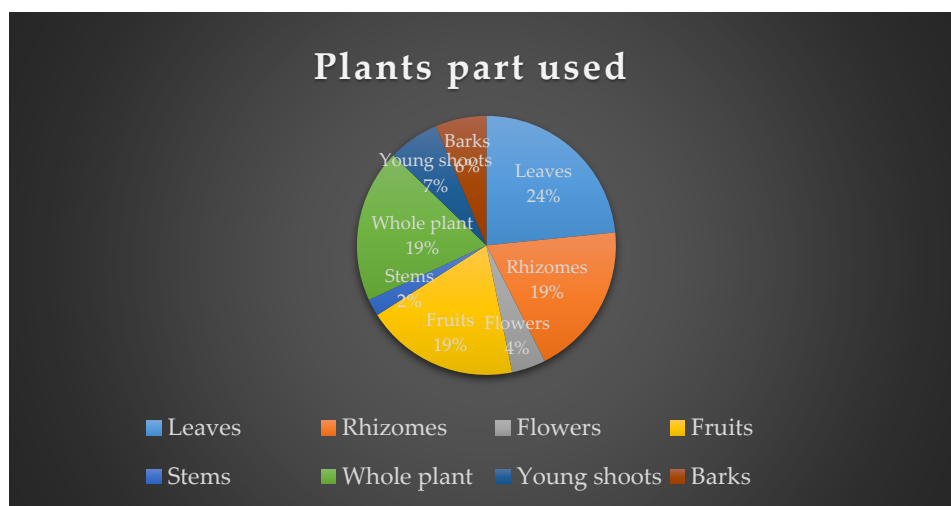**Fig. 3.** Habit of the plants used as medicines by Reang community

Fig. 4. Parts of spices and condiments plants as medicine

Plate -1

Some of the species of spices and condiments used by Reang community (1) *Trachyspermum roxburghianum* (DC.) H. Wolff (2) *Amorphophallus bulbifer* (Roxb.) Blume (3) *Canavalia gladiata* (Jacq.) DC. (4) *Citrus limon* (L.) Osbeck (5) *Curcuma aromatica* L. (6) *Ocimum Americanum* L. (7) *Lasia spinosa* L. (Thwaites) (8) *Blumea lanceolaria* (Roxb.) (9) *Zingiber officinale* Roscoe

Table 2. Categories of ailments and Informant Consensus Factor (ICF) value

Sl. no.	Category	Ailments/diseases	Name of the taxa	No. of taxa	No. of Informants	ICF
1.	Gastric and ulcer	Abdominal pain, diarrhoea, stomach ache, Indigestion	*Amaranthus spinosus, Amorphophallus bulbifer, Allium cepa, Alpinia nigra, Blumea lanceolaria, Canavalia gladiata, Citrus macroptera, Centella asiatica, Curcuma aromatica, Cinnamomum tamala, Eryngium foetidum, Neptunia prostrata*	12	46	0.75
2.	Flu and fever	Malarial fever, cold fever, typhoid fever	*Zingiber officinale, Capsicum frustescens, Coriandrum sativum, Cymbopogon citratus, Eryngium foetidum, Moringa oleifera, Oroxylum indicum, Ocimum americanum, Tamarindus indica, Trachyspermum roxburghianum*	10	31	0.7
3.	Respiratory disorder	Cough, sinus, asthma, cold, runny nose	*Ocimum americanum, Zingiber officinale, Citrus limon, Canavalia gladiata, Allium cepa*	5	14	0.69
4.	Circulatory system disorder	High blood pressure, tonic, blood purifier, chest pain	*Centella asiatica, Citrus limon, Cymbopogon citratus, Coriandrum sativum, Curcuma longa, Monocharia vaginalis, Premna esculenta, Solanum anguivi, Solanum robustum, Tamarindus indica*	10	30	0.68
5.	Skin disease	Skin allergies or rashes, skin inflammations, burnt, irritation, eczema	*Alpinia nigra, Curcuma longa. Trachyspermum roxburghianum, Zanthoxylum rhetsa, Lasia spinosa, Centella asiatica, Coriandrum sativum, Eryngium foetidum, Colocasia esculenta*	9	21	0.60
6.	Internal organ disease	Internal bleeding, bleeding piles, hemorrhoids	*Amorphophallus bulbifer, Musa paradisaca, Oroxylum indicum, Trachyspermum roxburghianum, Mangifera indica, Moringa oleifera*	6	12	0.54
7.	Liver disease	Jaundice, Urinary tract infection	*Trachyspermum roxburghianum, Neptunia prostrata, Eryngium foetidum, Ocimum americanum, Cymbopogon citratus*	5	5	0.00
8.	Urinary problems	Kidney stones, Frequent urination	*Citrus limon, Citrus macroptera, Capsicum frustescens, Eryngium foetidum, Trachyspermum roxburghianum, Musa paradisiaca, Ocimum americanum. Tamarindus indica,*	8	20	0.63
9.	Animal bite and insect bite	Snake bite, insect bite	*Zingiber offficinale, Zanthoxyllum rhetsa, Lasia spinosa, Blumea lanceolaria, Amaranthus spinosus*	5	6	0.2
10.	Musculoskeletal disorder	Joint pain, swelling, muscle ache, joint fracture, swelling of joint	*Zanthoxylum rhetsa, Lasia spinosa, Colocasia esculenta, Curcuma aromatica, Moringa oleifera, Premna esculenta, Zingiber officinale*	7	10	0.33

11.	Nervous disorder	Paralysis, numbness, stiffness of muscle	*Colocasia esculenta, Blumea lanceolaria, Lasia spinosa, Moringa oleifera, Oroxyllum indicum, Trachyspermum roxburghianum, Zanthoxylum rhetsa*	7	14	0.53
12.	Endocrine disorder	Diabetes, tumour	*Solanum anguivi, Solanum robustum, Centella asiatica, Enhydra fluctuans, Cinnamomum tamala, Curcuma longa, Curcuma aromatica, Zingiber officinale*	8	12	0.36
13.	Analgesic/ Pain	Headache, toothache, body ache	*Amorphophallus bulbifer, Allium sativum, Allium cepa, Ctrus limon, Zanthoxylum rhetsa, Sygyzium aromaticum*	6	10	0.44
14.	Gynecological problems	Menstrual cramps, anemia, irregular periods,	*Curcuma longa, Musa paradisica, Trachyspermum roxburghianum, Monocharia vaginalis, Zingiber officinale, Curcuma aromatica, Allium sativum, Alpinia nigra*	9	25	0.66

Table 3. Fidelity level of the 10 most cited medicinal plants

Sl. No.	Species name	Medicinal use	N	Np	FL(%)	Rank
1.	*Curcuma longa* L.	Wound healing and gynecological problems	9	9	100	1
2.	*Trachyspermum roxburghianum* (DC.) H.Wolff	Cold and fever	8	7	87	2
3.	*Zingiber officianale* Roscoe	Cough and Indigestion	5	4	80	3
4.	*Ocimum americanum* L.	Gastric and ulcer	5	3	60	4
5.	*Centella asiatica* (L.) Urb.	High blood pressure	7	4	57	5
6.	*Alpinia nigra* (Gaertn.) B.L.Burtt	Abdominal pain, skin infections	6	3	50	6
7.	*Premna esculenta* Roxb.	Diabetes	5	2	40	7
8.	*Moringa oleifera* L.	Malarial fever	8	3	37	8
9.	*Musa paradisica* L.	Anemia	6	2	30	9
10.	*Amaranthus spinosus* L.	Snake bite	7	2	28	10

Conclusion

The present study revealed 36 plants belonging to 30 genera and 19 families, used primarily as spices and condiments, were also utilized for medicine purpose to treat 14 different ailments by Reang community. Generally, the people had strong belief in traditional medicine and mostly dependent on traditional medicine due to unavailability of modern health care facilities. Preservation of the traditional knowledge is very important since the passing of knowledge from elder to younger generation were fading slowly due to increased dependence on modern medicines. The traditional knowledge of these community needs to be preserved and utilized for formulation of new therapeutic drugs with lesser side effects after confirming their therapeutic efficacies. Moreover, there is an urgent need to develop strategies for conservation and commercial plantation of these valuable species as it

could become a source of income generation for Reang community of Tripura.

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