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Ethnobotanical Study Among Tribal Communities of Kalimpong, West Bengal

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ABSTRACT

Traditional health-care practices of the tribal population of 10 villages of the Kalimpong, West Bengal, were surveyed and documented. The results from the present study were based on interviews with local physicians of indigenous system of medicine, old aged people (>60 y), and traditional herbal healers. A total of 71 plants belonging to 40 families and 63 genera were documented, of which 40.84% of plant species were herbs followed by trees (32.39%), shrubs (12.68%), grass (7.04%), fern and climber (2.82% each), and creepers (1.41%). Leaves of 24 species were used for treatment of different ailments followed by whole plant (17 species), root/rhizomes and fruit (15 species each), bark (14 species), seed/seed pericarp (4 species), seed oil (4 species), twig (3 species), and other parts by one species each. The highest number of plants was used for treating skin-related problems (14 species) followed by diabetes (12 species), fever and stomachache (10 species), diarrhea, dysentery and ulcer (9 species each), gastric problems (8 species) cold and cough and rheumatism (7 species each). Other diseases were treated by using six or fewer number of species. Out of 71 species, 46 were reported to have more than one therapeutic use in the community.

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KEYWORDS

Medicinal and aromatic plants; Conservation; Ethnobotany; Tribal communities, Himalaya

Introduction

According to the World Health Organization (WHO), almost 25% of the prescribed human medicines are plant-derived and ~80% of world population still depend on herbal medicines for their primary healthcare.^[1] The recent past has witnessed a tremendous increase in the use of plant-based herbal medicines not only in rural areas but also by urban people in both developed and developing countries.^[1] The reasons behind the high demand for herbal

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medicines include high economic cost and side effects of allopathic medicines^[1] as well as the lack of modern health facilities.^[2]

India has been home to herbal medicines since ancient times. Of the 17,000 higher plant species, ~7500 species are of medicinal values and ~2 million traditional healers, also known as “Vaidyas” use these bioresources for treating various diseases. The Indian Himalayan region (IHR) is a storehouse of these bioresources^[3] and has played an important role in the evolution of Ayurveda, providing the restricted habitats for many medicinal plant species.^[4] In India, various communities use over 50% of the plant species of any ecosystem in ethnomedicine and in general >7500 species are utilized in primary health care by various tribes.^[5] Tribal communities are usually forest dwellers acquiring vast knowledge on the use of various forest and forest products over the centuries.^[3] India possesses a total of 427 tribal communities, of which >130 live in North East India and about 40 inhabited in West Bengal.^[5] According to 2011 census, the tribal population in the West Bengal was 5.29 million, accounting for about 5.8% of the total population of the state.

Kalimpong, a district in West Bengal, came into existence in 2017 after separation from Darjeeling as the 21st district of the state. Tribal or ethnic groups in Kalimpong include Lepcha, Bhutia, Limboo, and Tamang along with non-tribal Nepali populations. Traditionally, agriculture, horticulture, and animal husbandry are major livelihood occupations of these people. These ethnic people have great intimacy with nature and thus, are well acquainted with wild resources, especially wild eatables.^[3] They usually hold tremendous amount of traditional knowledge collectively known as traditional ethnobotanical knowledge (TEK) on the use of plant species and can identify them^[6,7] as in other parts of the country.^[8]

Moreover, these tribal people live in far-flung remote villages, where modern medical facilities are lacking. These limitations make them capable of maintaining their own medical health system based on traditional ethnobotanical knowledge.^[7] Mostly all senior members use local herbs for treating minor ailments of their family, but *Maondaok*, the medicine man, is the expert who prepares and prescribes local herbal medicines, commonly called *Jaributi*, for the community to treat some moderate to severe diseases.^[7] They also maintain their indigenous medical system by keeping it hidden from unauthorized persons as they believe that the efficacy of the medicinal plants will be jinxed if this knowledge is shared with outsiders.^[5]

Studies have been conducted on the ethnomedicinal properties of plants in West Bengal.^[6,7,9] The present study, was an in-depth survey-based study to document ethnobotanical uses of different plant species by tribal communities in their traditional health-care system in Kalimpong, West Bengal.

Study Area

The present study was carried out at the Kalimpong district, situated in the northern part of West Bengal (Fig. 1), the eastern part of the Indian Himalayan Range with an area of 1056 km², and located at 27° 01'19.85" N latitude and 88°33'57.91" E longitude at an average elevation of 1250 m above sea level.

Ten adjoining villages in the eastern part of the district, namely, Bhalukhop, Bong, Comesi, Pudung, Suntalay, Sindibong, Mangwa, Birik, Lish, and Lulagon were surveyed (Table 1). Being sub-tropical, Kalimpong receives an average rainfall of 250–300 cm of which about 80% falls from June to August.^[5] Summers and winters are mild with 25.5°C as the highest temperature in August, while the lowest temperature is around 8°C during January. The average family size is about 4.7 among the inhabitants occupying the study area.

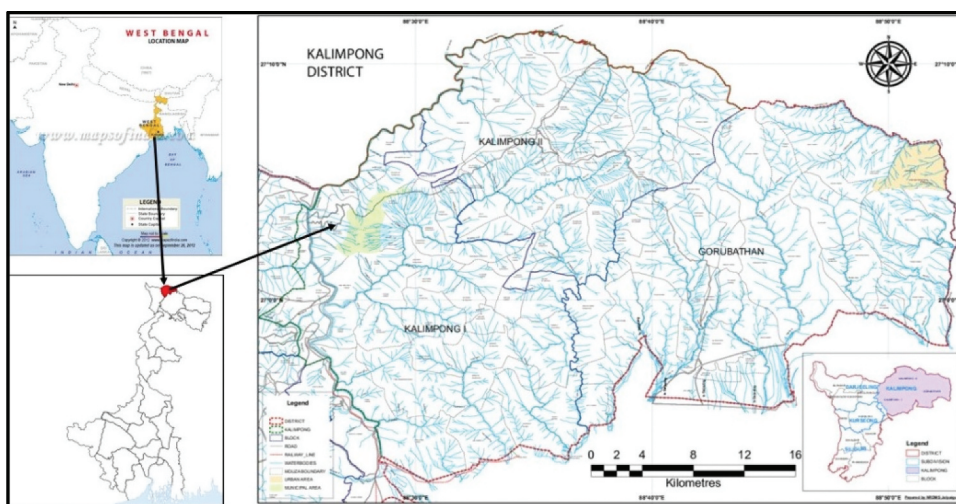


Figure 1. Map of the study area in Kalimpong, West Bengal.

Table 1. Demographic distribution of the villages surveyed in Kalimpong, West Bengal.

S. no.	Name of the villages	Families	Total population	Male	Female
1	Pudung Khasmahal	532	2382	1185	1197
2	Comesi	84	377	182	195
3	Bhalukhop khasmahal	1162	5254	2660	2594
4	Sindibong Khasmahal	983	4606	2276	2330
5	Lish	87	360	173	187
6	Bong khasmahal	818	4220	2096	2124
7	Suntalay khasmahal	42	209	117	92
8	Lulagon khasmahal	182	979	497	482
9	Birik	24	93	48	45
10	Mangwa	161	711	376	335
	Average family size		4.7		

Source: <http://www.census2011.co.in>.

Ethnobotanical Data Collection

The study was conducted from February 2017 to January 2019. Prior consent and permission to interview the villagers was obtained from village administration and from each participant verbally. Along with the questionnaire surveys, open-ended interviews were used to collect information about the use of medicinal plants and their products in traditional medicine. Keeping in mind that the age of a person affected traditional knowledge,^[10] only participants over 35y of age were considered as potential respondents. Among the participants, more than 80% were male, while only those females were treated as respondents who were interviewed independently as some females did not respond without their male companions. Sixty percent of the respondents were in the age group 66-85y, 27% represented the age group 51-65y followed by 13% at 35-50y age group. Two basic approaches were adopted to obtain information: first the respondents were interviewed by asking questions about the prevalent human diseases, their diagnostic knowledge of treating the diseases, and plants, their parts, and products used in the treatment. They were also asked about different purposes of plants, including medicinal, cultural, rituals, and sacredness; the second approach was inventory-based which involved previously prepared list of plants being encountered in the region and subsequently asking the informants for their names and uses. As stated by them, their traditional ethnomedicinal acquaintance was mainly attained through parental heritage and experience of using the plants to heal themselves or their families. During the survey, plant specimens collected and identification details provided by the respondents were compared and cross-checked with available published literature.

Results

A total number of 71 ethnomedicinal species belonging to 63 genera and 40 families used by ethnic communities dwelling in the adjoining villages in Kalimpong were documented. Of these species, herbs dominated the list with 29 species accounting 40.84% of total, while with 23 species trees represented 32.39% of total collected species. The remaining 26.77% was occupied by other life forms (Fig. 2). Likewise, 24 plant species had their leaves being used for treating different ailments followed by whole plant (17 species), root/rhizomes and fruits (15 species), bark (14 species), seed/seed pericarp (4 species), seed oil (4 species), twig (3 species), and latex, petiole, gum, rind, sap, and flower by one species each (Fig. 3). The highest number of plants was reported to be used for the treatment of skin-related problems (14 species) followed by diabetes (12 species), fever and stomach ache (10 species), diarrhea, dysentery and ulcer (9 species each), gastric problems (8 species), and

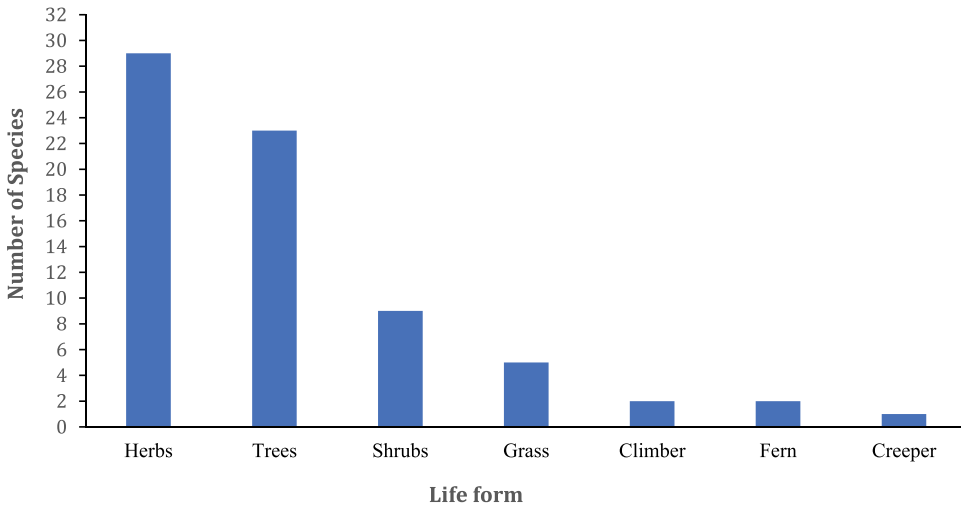


Figure 2. Forms of medicinal plant species used in Kalimpong, West Bengal.

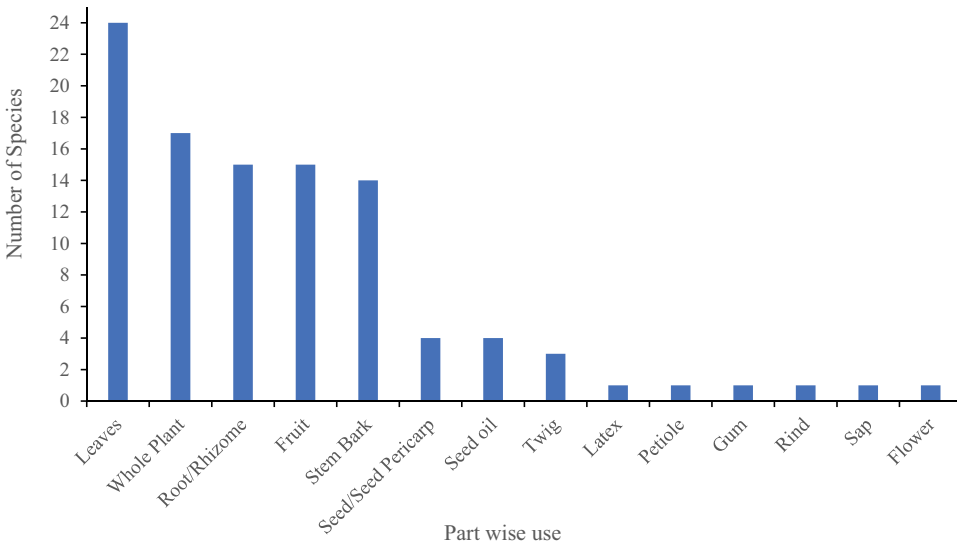


Figure 3. Plant parts used for treating different ailments in Kalimpong, West Bengal.

cold and cough, indigestion, and rheumatism (7 species each) (Fig. 4). Other diseases were treated by using six or fewer number of species. Out of the 71 plant species, 46 were documented to have more than one therapeutic use in the traditional health-care system of the community. Compositae and Rutaceae were the largest families with the highest number of species with four each being used by the community (Table 2).

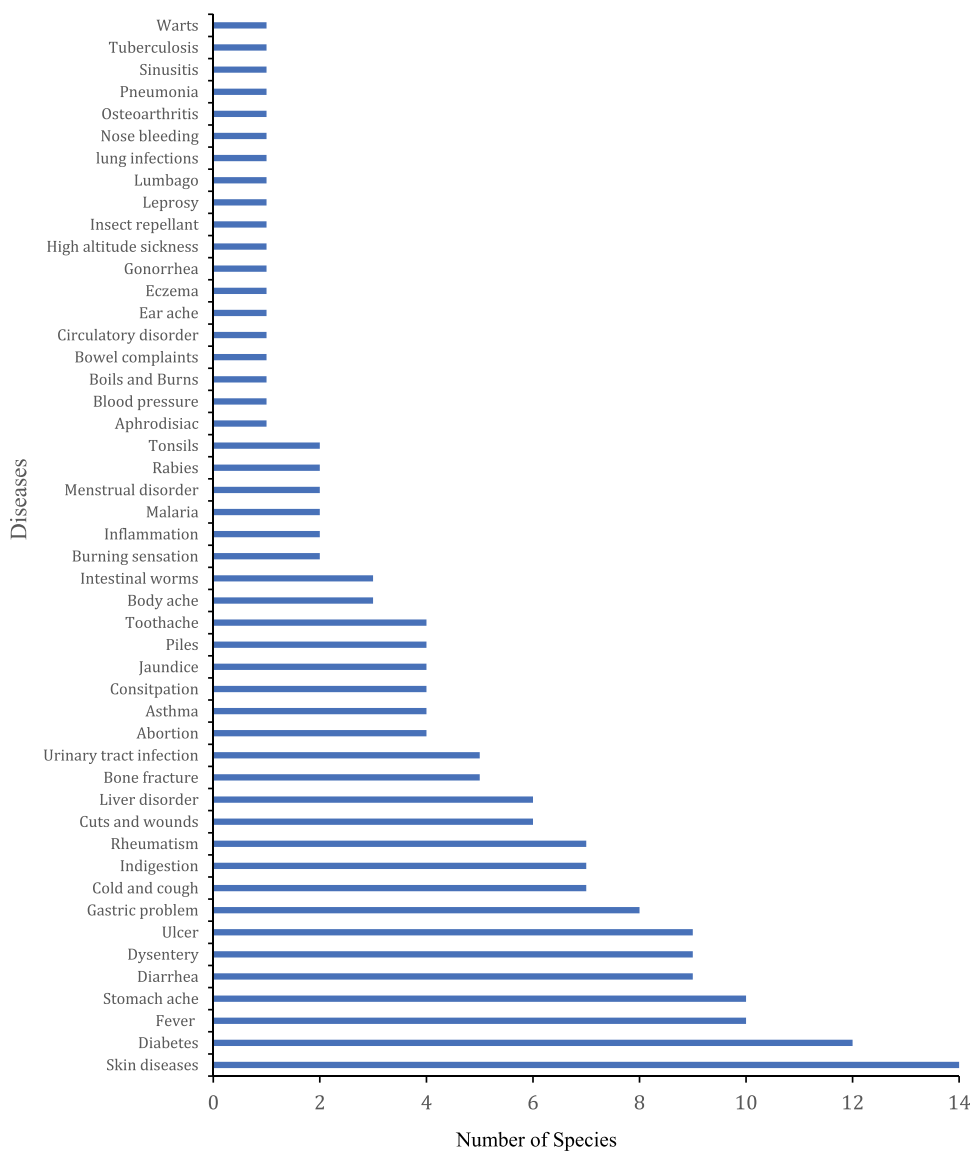


Figure 4. Number of plant species identified for various pharmacological actions in Kalimpong, West Bengal.

Discussion

The information documented in the present study was consistent with the other general information reported previously in relation to traditional systems of medicines such as Ayurveda and Siddha.^[9–18,28] Plants are bestowed with different biological and pharmacological properties due to the presence of secondary metabolites including alkaloids, tannins, xanthones, saponins, glycosides, phenols, and terpenoids. Some species *viz.* *Swertia chirayita*, *Bergenia ciliata* are endangered due to biotic and abiotic pressures. In the study area, the traditional

Table 2. Medicinal plants and the mode of usage by traditional people of Kalimpong.

Botanical name; Family	Habit*	Altitude (m asl)	Local name	Mode of usage
<i>Achyranthes aspera</i> ; Amaranthaceae	H	1000–1800	Apamarga	Plant juice with salt is massaged in skin diseases for 3–4 weeks. ^[11]
<i>Acorus calamus</i> ; Acoraceae	H	600–2800	Flag bojho	Decoction of the rhizome boiled with salt given orally in gastric problem and stomachache ^[12] and massage with salt is useful in osteoarthritis; rhizome paste is applied at forehead to get relieve from fever and on infected part to cure skin diseases ^[13] ; small piece of dried rhizome is chewed to cure distressing cough ^[13] ; grinded rhizome paste applied externally on skin diseases and bowel complaints ^[7]
<i>Adiantum caudatum</i> ; Pteridaceae	F	500–1600	Uniu	The decoction of leaves and root are given to patient orally in diabetes and cold and cough and to get relieve from fever. ^[14]
<i>Adiantum incisum</i> ; Pteridaceae	F	700–2500	Uniu	Decoction of leaves and roots given orally in cold and cough, diabetes, jaundice, and diarrhea ^[15]
<i>Ageratum conyzoides</i> ; Compositae	H	1000–1800	Ilamay jhar	Paste of leaves and young twigs applied on cuts and wounds ^[6] ; fresh leaf extraction with honey is given till the cure of the dysentery. ^[16]
<i>Allium hookeri</i> ; Amaryllidaceae	H	2600–4500	Dungdug	Cooked as vegetable and consumed as digestive tonic and is useful in circulatory system ^[3]
<i>Allium sativum</i> ; Amaryllidaceae	H	2000–4000	Lasun	Chewing raw leaves brings down the blood pressure ^[17] ; leaf juice given in gastric problem and indigestion and in high-altitude sickness; juice is applied externally in infected part of skin in skin diseases ^[7] ; juice is poured in ear to relieve ear pain. ^[7]
<i>Amaranthus caudatus</i> ; Amaranthaceae	H	1866–3050	Latte saag	Decoction of leaves is taken orally in stomach ache. ^[18]
<i>Amaranthus spinosus</i> ; Amaranthaceae	H	200–1500	Lunde saag	Leaf extract applied on peptic ulcer. ^[18]
<i>Amomum subulatum</i> ; Zingiberaceae	H	700–1800	Bada Elaichi	Fruits used in indigestion and in stomach ache. ^[19]
<i>Artemisia vulgaris</i> ; Compositae	H	2300–3000	Tittay patte	Crushed leaf juice inserted in the nose during nose bleeding ^[17] ; tender leaves chewed to cure mouth ulcer ^[17] ; leaves are crushed and consumed in menstrual disorder ^[13] ; leaves crushed and rubbed on infected areas of skin ^[7] ; decoction of young shoot taken to increase appetite and promote digestion ^[7] ; fumigation of leaves for repelling insects. ^[7]
<i>Artocarpus lakoocha</i> ; Moraceae	T	150–1200	Badar	Latex applied externally on bone fracture. ^[17]
<i>Azadirachta indica</i> ; Meliaceae	T	100–1500	Nimpatta	Fresh/dried leaves chewed to control diabetes. ^[17]
<i>Bauhinia purpurea</i> ; Leguminosae	T	250–1500	Koitalo	Chewing dried bark cure fever and diarrhea. ^[17]

(Continued)



Table 2. (Continued).

Botanical name; Family	Habit*	Altitude (m asl)	Local name	Mode of usage
<i>Berberis aristata</i> ; Berberidaceae	S	1800–3000	Sano Chutro, Sutangkung, Skyerba	The root paste is applied on wounds caused due to rabies ^[20] ; 5–10 ml of the extract of the root is taken orally for 2 weeks is useful in diabetes. ^[7]
<i>Bergenia ciliata</i> ; Saxifragaceae	H	1500–3050	Pakhanbed	The decoction of root and leaf taken orally to get relieve from fever and cold and cough. ^[21]
<i>Betula cylindrostachya</i> ; Betulaceae	T	3000–4200	Saur	The stem bark is chewed in tooth ache and gum problems. ^[18]
<i>Bidens pilosa</i> ; Compositae	H	150–2400	Kuro	Decoction of leaves taken orally in rheumatism and the paste applied to get relieve in toothache and eye diseases ^[17,22]
<i>Bombax ceiba</i> ; Malvaceae	T	550–1100	Simal	Root and stem bark paste is applied on infected parts of the skin ^[11] ; the paste of petioles of leaf with honey and black pepper seed divided into three equal parts and each part is taken with the glass of cold water at a regular interval of 8 hours to cure diarrhea ^[16] ; gum extracts given in dysentery and young root in gonorrhea ^[7] ; mixture of seed Powder (30 g) with <i>Hing</i> (10 g) is given to induce abortion. ^[16]
<i>Brassica juncea</i> ; Brassicaceae	H	500–1300	Sarsiun	The decoction of whole plant is taken orally to cure dysentery; the massage of the seed oil is considered good in body ache. ^[11]
<i>Brassica nigra</i> ; Brassicaceae	H	501–2000	Tori	Paste of whole plant is applied externally to relieve from rheumatism. ^[12]
<i>Buddleja asiatica</i> ; Scrophulariaceae	S	400–2000	Bhimsempati	The leaf paste is applied externally in infection parts of the skin. ^[22]
<i>Carica papaya</i> ; Caricaceae	T	100–600	Mewa	The juice of fruit is considered useful in liver diseases and jaundice and taken ripe or unripe fruits as raw or in juice form is considered good during indigestion. ^[22]
<i>Centella asiatica</i> ; Apiaceae	H	200–2700	Ghortapre	The whole plants are chewed raw in liver disorder, lung infection, and tonsils ^[7,20]
<i>Cinnamomum tamala</i> ; Lauraceae	T	1200–2100	Sinkauli, Napsor, Mensing	The decoction of leave and bark is taken orally to cure diarrhea ^[23] ; decoction of stem bark taken three times daily for 3–4 weeks is considered useful in diabetes. ^[7]
<i>Citrus aurantifolia</i> ; Rutaceae	T	100–450	Kagati	Fruits paste applied externally on infection portion of the skin during skin diseases. ^[11]
<i>Citrus limonia</i> ; <i>Citrus medica</i> ; Rutaceae	T	500–1600 200–1800	Jyambir Bimiro	Fruits paste applied externally on infection portion in skin diseases. ^[11] Decoction of bark is taken orally in malarial fever ^[18] ; dried rind powder taken orally in indigestion and dysentery. ^[7]
<i>Curcuma caesia</i> ; Zingiberaceae	H	1500–3000	Hardi	Rhizome powder paste along with lime is applied on bone fractures ^[11] ; fresh rhizome with sugar molasses is given to empty stomach to cure jaundice ^[16] ; chewed fresh or dried rhizome orally against stomach troubles and to get relieve from flatulence ^[7]
<i>Cuscuta reflexa</i> ; Convolvulaceae	Cl	600–2700	Akashbeli	Decoction of plants is given orally is considered abortifacient ^[20,22] ; boiled fresh plant extract with extract of <i>Polygonum hydropiper</i> seeds and salt together and given to women for 3 days to facilitate abortion ^[16]

(Continued)

Table 2. (Continued).

Botanical name; Family	Habit*	Altitude (m asl)	Local name	Mode of usage
<i>Cymbopogon flexuosus</i> ; Poaceae	G	300–1500	Kagati jhar	Half teaspoon full of plant juice is given orally in fever and headache ^[24]
<i>Cynodon dactylon</i> ; Poaceae	G	840–2600	Dubo	Juice is prepared from the freshly collected roots and taken orally in piles and urinary tract infection ^[20] ; plant grinded, mixed with water and consumed orally to cure liver cirrhosis ^[13] ; fresh roots taken orally in piles; juice of aerial parts applied over cuts and wounds ^[7]
<i>Datura metel</i> ; Solanaceae	S	400–1200	Dhaturo	Paste of immature seeds is applied on wounds caused due to rabies ^[22] ; 3–5 pinches of dried seed powder is given orally in stomachache ^[16] ; leaf paste applied in rheumatic swelling, lumbago and inflammation; the smoke of the plant is given against asthmatic problems ^[7]
<i>Dendrocnide sinuate</i> ; Urticaceae	S	1200–2700	Sisnu	Leaves roasted and put into the body wounds ^[25]
<i>Drymaria cordata</i> ; Caryophyllaceae	H	300–1050	Abizal	Plant juice is given orally 3–4 times a day for 10 days in fever, throat pain and against asthmatic problem ^[26] ; the plant is eaten cooked during fever ^[19] ; plant juice is given orally twice a day for 2 weeks in sinusitis and pneumonia ^[27]
<i>Erythrina stricta</i> ; Leguminosae	T	200–1500	Faledo	The decoction of coat of inner bark of stem is taken orally for stomach ulcer ^[18]
<i>Eupatorium adenophora</i> ; Compositae	S	200–1000	Kala jhar, Banmara	Plant paste is applied externally on cuts and wounds till the affected part heals ^[23]
<i>Euphorbia hirta</i> ; Euphorbiaceae	H	300–1100	Dudhe	Sap is used to cure cuts and wounds and leaf juice is given orally in diarrhea ^[13] ; root paste mixed with honey given to cure dysentery. ^[16] Young leaves and shoots given orally in case of dysentery; root paste applied externally twice daily for 3 weeks on warts and cuts ^[2]
<i>Fagopyrum esculentum</i> ; Polygonaceae	H	270–1400	Fapar	The decoction of the leaves is taken orally in stomachache in tonsils ^[20]
<i>Ficus religiosa</i> ; Moraceae	T	300–500	Pipal	Water extract of plant is given during burning of cuts wounds ^[5]
<i>Girardinia diversifolia</i> ; Urticaceae	H	1200–3000	Bhangray sisnu	Root paste is applied on bone fracture ^[27] ; root decoction (25–50 ml) taken two times daily for 4–8 weeks in diabetes ^[9]
<i>Gynocardia odorata</i> ; Archariaceae	T	1200–2400	Gantay, Tukkung	Message of seed oil is applied on leprosy, eczema and chronic rheumatism ^[7] ; the fruits are crushed and the seeds are extracted and used for skin diseases ^[28] ; fruit juice (10–15 ml) taken one time daily for 2 weeks in diabetes ^[9]
<i>Hippochaete debilis</i> ; Equisetaceae	H	2600–3500	Kurkure jhar	Plant paste is applied externally on the affected area in skin diseases ^[11]
<i>Juglans regia</i> ; Juglandaceae	T	1800–2500	Okhar	Bark and leaf used in rheumatism ^[11,20] ; fruits nut are either consumed fresh or dried are aphrodisiac ^[16] ; bark decoction given orally to get relieve from intestinal worms ^[7]
<i>Litsea cubeba</i> ; Lauraceae	T	500–1600	Siltimmur	Fruits are chewed to treat stomach disorder ^[18] ; one raw fruit chewed twice a day for 4–6 weeks in diabetes ^[9]

(Continued)



Table 2. (Continued).

Botanical name; Family	Habit*	Altitude (m asl)	Local name	Mode of usage
<i>Lycopersicum esculentum</i> ; Solanaceae	H	1800–3050	Rambra	Raw fruit is taken during indigestion; paste of raw fruit is applied on gums during bleeding ^[5]
<i>Machilus glaucescens</i> ; Lauraceae	T	500–650	Kaulo	Bark paste applied in treatment of bone fracture ^[29]
<i>Melia azadirachta</i> ; Meliaceae	T	500–1100	Bakaina	Leaf juice is taken orally 2–3 times daily to get relieve from intestinal worms ^[30]
<i>Mimosa pudica</i> ; Leguminosae	C	150–1200	Buhari jhar	Root powder is applied twice a week in a month during toothache ^[27] ; paste of aerial part of the plant applied on piles ^[7]
<i>Momordica charantia</i> ; Cucurbitaceae	Cl	480–4100	Karela	Stem bark and fresh leaves are crushed and 2–3 tea spoonful of extract is taken orally for diabetes ^[31] ; fruit extract (25 ml) taken two times daily for 12–14 weeks to cure diabetes; leaves juice rubbed on Soles during burning sensation; fruits taken in gastritis and for better digestion ^[7] The leaf chewed in dental problem ^[32]
<i>Nicotiana tobacum</i> ; Solanaceae	H	700–1300	Khainee	Decoction of young leaves and shoot taken orally in cold and cough ^[11,20] ; fresh leaf decoction is given at early morning in empty stomach to get relieve form constipation ^[16]
<i>Ocimum tenuiflorum</i> ; Lamiaceae	H	1000–4000	Tulsi	Foliage eaten raw in gastritis, indigestion and liver disorder and is also useful in menstrual disorder ^[5,22]
<i>Oxalis corniculata</i> ; Oxalidaceae	H	250–2450	Chariamilo	Fruit is eaten raw to treat cough, diarrhea and dysentery ^[11] ; bark juice is given orally in constipation and body ache ^[13] ; extract of whole plant is given at early morning in empty stomach in liver inflammation ^[33] ; fruit juice is given in urinary troubles ^[7]
<i>Phyllanthus emblica</i> ; Phyllanthaceae	T	400–1500	Rukh amala	The juice of the fruit, boiled to reduce the amount to half, is used to treat coughs and cold ^[34] The roots are chewed during gastric problem, ulcer ^[33] ; stem bark decoction is useful in dysentery; fresh root about 9 cm long is taken to induce abortion ^[16]
<i>Piper nigrum</i> ; Piperaceae	Cl	200–2200	Chabo	Paste of young twigs and aerial parts applied externally to relieve in skin diseases ^[11]
<i>Plumbago zeylanica</i> ; Plumbaginaceae	H	610–850	Sito – chitu	
<i>Polygonum molle</i> ; Polygonaceae	H	1200– 4000	Thotne	
<i>Polygonum runcinatum</i> ; Polygonaceae	H	2000–2600	Ratnaulo	Whole plant paste is applied in rheumatism and juice or extract is given in jaundice ^[18]
<i>Premna barbata</i> ; Lamiaceae	S	800–1800	Gineri	Decoction of leaf is given in arthritic pain and Urinary tract infection ^[35]
<i>Prinsepia utilis</i> ; Rosaceae	T	2000–3000	Bhekali	Massage of the seed oil is useful in rheumatism ^[36]
<i>Prunus cerasoides</i> ; Rosaceae	T	1200–2400	Pajyun	Paste made of bark applied over fractured bone ^[5,7]
<i>Ricinus communis</i> ; Euphorbiaceae	S	200–3000	Dalda	Boil leaves are useful in ulcers; crushed leaves given orally in urinary infections. ^[11] Seed oil is taken for 2–3 days in constipation and 7–10 days for removal of intestinal worms ^[16]

(Continued)

Table 2. (Continued).

Botanical name; Family	Habit*	Altitude (m asl)	Local name	Mode of usage
<i>Rosa alba</i> ; Rosaceae	S	1300–2500	Gulab	Decoction of rose flower is given in stomachache and dysentery ^[37]
<i>Sapindus mukorossi</i> ; Sapindaceae	T	2000–4000	Rittha	Seed pericarp is used as a disinfectant ^[6,20]
<i>Stephania glabra</i> ; Menispermaceae	Cl	1500–2000	Tamarkay	One tea spoon of decoction of root is consumed empty stomach ^[26] , tubers chewed against gastritis and diabetes ^[7]
<i>Swertia chirayita</i> ; Gentianaceae	H	1200–1500	Chireto, Rungkyon, Tagota	The decoction of leaves is taken orally in bodyache ^[21] ; infusion of the whole plant (50–60 ml) taken one time daily in empty stomach for 2 weeks in diabetes ^[9] ; infusion of whole plants is given twice a daily for 3 days during viral and malarial fever ^[6] ; decoction of whole plants is given as liver tonic ^[7]
<i>Terminalia alata</i> ; Combretaceae	T	500–1300	Herra	Fruit boiled with milk given for 10–15 days in diarrhea, ulcer ^[38] , fruit chewed for 2–3 days in indigestion and bronchitis ^[38]
<i>Terminalia bellirica</i> ; Combretaceae	T	2000–3000	Berra	The decoction of fruit is given to patient orally in gastric problem, piles, ulcer and stomachache ^[21] , fresh or dried fruit chewed in constipation; sore throat, fever and bronchitis ^[7]
<i>Tinospora cordifolia</i> ; Menispermaceae	Cl	100–1500	Gurjo	Fruit boiled in milk and drunk for 10–15 days is useful in burning sensation and urinary tract infection; juice of stem given twice a day to control diabetes and as an immunity booster ^[23] , fresh root extract is given in stomachache ^[16] , Stem boiled in milk and drunk for 10–15 days in tuberculosis ^[27]
<i>Trigonella foenum-graecum</i> ; Leguminosae	H	3600–4500	Methi	Powdered seed can be applied to treat boils, ulcers and burns ^[39]
<i>Zanthoxylum armatum</i> ; Rutaceae	S	2400–3600	Boke timbur	Fruits are eaten in the morning for 4–6 days in indigestion ^[27] ; fruits and bark used as tonic in diarrhea and fever ^[7] ; oil extraction of dry fruits is massaged on the body in rheumatism; finger massaged of the fruit oil on the gums and tooth during toothache ^[7]

*H-Herb, F-Fern, T-Tree; C-Creeper; G-Grass; S-Shrub; Cl-Climber.

practices of using medicinal plants for health-care needs is gradually declining because of ignorance, urbanization, and unavailability of desired raw materials due to the proximity of forest area. Most of the traditional knowledge is owned by the old age people (>60 y) and traditional healers. Folk traditions are gradually declining in the Himalaya regions and only a few are coming forward to adopt these practices as an occupation.^[12,19] Importance of traditional indigenous knowledge is gradually declining in most parts of the country and world.^[28] Therefore, to understand the regional human ecology and preserve biodiversity of the region, inventory, and documentation of TEK is useful for designing appropriate framework and strategies for developing appropriate policy interventions. The finding of this study will help in the conservation of medicinal plant-based traditional systems of medicine of tribal population of Kalimpong and may be used for exploring the possibility of developing novel plant-based drugs with antidiabetic, hepatoprotective, antirheumatic, and antiulcer properties.

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