Research Article

NEW ETHNOMEDICINAL INFORMATION FROM LEPCHA COMMUNITY OF DZONGU, SIKKIM

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ABSTRACT: The Lepcha community of Sikkim is primarily confined to the Dzongu area of the state. The people of this community are mostly dependent on the forest produces for their livelihood since the ancient times and used plant resources to cure daily ailments. In the present work, extensive field surveys conducted in different corners of Dzongu to document the ethnomedicinal plants and their uses from the traditional practitioners as well as the local people. As a result of which new information on the ethnomedicinal uses of 40 plant species have been recorded and these are presented here for future reference. The uses of plants have been validated statistically following Use Value (UV) and Fidelity Level (FL) methods.

Key words: Dzongu, Ethnomedicine, ITK, Lepcha, Sikkim, Medicinal plants.

INTRODUCTION

Traditional healing is the age-old practice of disease curing brought about by the specific knowledge, skills, incantation and beliefs of the indigenous people spread around the globe (Castetter 1944). This treatment method is passed from ancestors to progenies to improve health, satiate agony and attain wellbeing. In most of the pharmacopeia relevance has been given to the wild plants which are indiscriminately used for the treatment of various ailments. About 85% of the medicines used by the ethnic communities globally are either plants or plant derivatives (Farnsworth 1988). In India almost 80% of the people still rely on non-allopathic treatments for their medicinal needs (Modak *et al.* 2015). Until now, more than 18000 flowering plant species are recorded in India (Singh and Dash 2018, Lakshminarasimhan and Arisdason 2018), out of which around 3000 species are used in different systems of medicine, i.e. 16.33% of the plants are used by the different ethnic communities to treat myriad of illness (Schippmann *et al.* 2002). The ancient Indian text, Charak Samhita and Sushrut Samhita, are the burning examples of the reliance on the herbal remedies for disease curing.

The dominance of these herbal remedies is mostly due to its easy availability, cheap price and almost without any side effects. However, it is worthy to mention here that proper screening of herbal medicine is very important in order to check its toxic potential which may be detrimental to the human health.

Sikkim, the 2nd small state, located in the northern fringe of the country is an abode of unique flora and fauna (Maity 2021). The state is endowed with 4558 species of angiosperms which is nearly 26% of the total floristic diversity of the country (Maity *et al.* 2018, Maity 2021). Sikkim is the treasure of various ethnomedicinal plants and about 500 species are recorded having different medicinal properties (Gurung 2002, Tamsang 2004, Panda and Mishra 2012). Several candidate medicinal plants with high curative potential are already been commercially exploited by the different pharmaceutical companies (Rai and Sharma 1994a,b). In the recent past the uses of many non-conventional medicinal plants growing in this State are reported by several workers (Thapa and Chettri 1993, Maity *et al.* 2003, Maity *et al.* 2004).

The State is colonized by ethnic communities, like

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Fig. 1. A. *Allium wallichii*; B. *Alnus nepalensis*; C. *Bauhinia variegata*; D. *Brassica nigra*; E. *Choerospondias axillaris*; F. *Curcuma caesia*; G. *Diploknema butyracea*; H. *Elatostema obtusum*.

Nepalese, Bhutias, Sherpa, Rai, Limbu, Lepcha, Lachenpa, Lachungpa etc. and among them Lepcha is the original inhabitants of Sikkim (Thakur 1988, Jana and Chauhan 1999, Maity *et al.* 2018). The Lepcha community is primarily restricted to the Upper Dzongu and to protect their socio-religious culture this part of

the State is protected under 3069/O.S dated 24th March 1958, Home Department, Government of Sikkim. They are Mongoloid origin, quite innocent and generally prefer solitude (Thakur 1988, Maity *et al.* 2003). Farming is the major occupation and they commonly cultivate large cardamom, paddy, maize, millet, potato, cabbage, etc.

Fig. 2. A. *Fragaria nubicola*; B. *Hydrocotyle javanica*; C. *Lagenaria siceraria*; D. *Musa balbisiana*; E. *Nasturtium officinale*; F. *Neolamarckia cadamba*; G. *Passiflora edulis*; H. *Rheum nobile*.

Lepcha community holds tremendous ethnic knowledge in the utilization of forest resources. They even survive without modern facilities.

MATERIALS AND METHODS

The study area Dzongu is located at 27°28'–27°38'N and 88°23'–88°38'E and covers an area of about 78 sq. km. The study area falls under the subtropical to the alpine forest covers which is predominantly explored by the

Fig. 3. A. *Rhododendron anthopogon*; B. *Rhododendron grande*; C. *Sicyos edulis*; D. *Taxus wallichiana*; E. *Thysanolaena latifolia*; F. *Viscum album*.

Lepcha community. Extensive field surveys have been conducted in the Dzongu area in the last five years. The traditional ethnomedicinal information had been gathered precisely from different medicine men as well as from the local people of this area. The uses of different plants

or plant parts, their local names and parts used, mode of preparation, dosage etc. were noted carefully. The validation of information in relation to the data quantification and its efficacy in human health care was performed through statistical analyses like Use Value

(UV) (Prance *et al.* 1987, Philips and Gentry 1993a,b) and Fidelity Level (FL) (Friedman *et al.* 1986). Representative specimens had been collected along with its color photographs for better and easy recognition of the species. Herbarium specimens were prepared following standard methodology (Ranjan 2018). All the specimens were deposited at SSFH. Extensive literature surveys were conducted to confirm the new claims. The plant species or taxa as listed, were provided with accepted scientific name, family, local name, parts used, the new use in human health care, UV, FL, preparation of medicine. The accession number of each plant species or taxa of Sikkim State Forest Herbarium (SSFH) were provided as the collected plants were deposited for future reference (Table 1).

Data quantification

Data quantification was performed following Friedman *et al.* (1986) for Fidelity Level (FL) and Philips and Gentry (1993a,b) for Use value (UV) to validate the reliability of ethnomedicinal information.

Fidelity Level (FL):

It were used to identify the species relating to its effectiveness and has been calculated following Friedman *et al.* (1986).

$$\text{Fidelity Level (FL)} = \frac{I_p \times 100}{I_u}$$

Here, I_p means the number of informants suggesting the use of the species and I_u means the total informants.

Use value (UV):

Philips and Gentry (1993a,b) had introduced this method. In this procedure the informants', knowledge of a species was calculated (Philips and Gentry 2013) by the following formula:

$$UV_{is} = \sum U_{is} / n_{is}$$

Where UV_{is} = the use value of the species S mentioned by the informant i; $\sum U_{is}$ = the number of uses of species S mentioned in each event by the informant i; n_{is} = the number of events in which the informant i cited species S.

RESULTS AND DISCUSSION

The Lepcha community of Sikkim is exceptionally rich in indigenous traditional knowledge and efficiently uses forest resources in their daily lives. Under present investigation we recorded 40 medicinal plants with novel

uses which had never been documented earlier. All new medicinal uses along with relevant information are appended in Table 1.

The Lepcha community was living in the difficult areas of Dzongu. In earlier days and even today the community medicates themselves mostly by the plant materials collected directly from forest. Such information on the ethnomedicines of Lepcha community have been compiled in this article and only new claims are considered here. Colour photographs of the collected specimens helped better identification of the plants (Fig. 1,2,3). The age old practice of the community is of great societal value. The validation of the effectiveness and the usefulness of a species have been done through statistical analysis (Friedman *et al.* 1986, Prince *et al.* 1987, Philips and Gentry 1993a,b). Thus, the present information on new claims of medicinal uses of 38 species of seed plants and two species of pteridophytes will open a new arena in the drug discovery. Bioprospection of these species is highly recommended for the sustainable development of the state as well as the country. The information on the use of different non-conventional medicinal plants by the Lepcha community are few (Jana and Chauhan 2000, Maity *et al.* 2003, Tamsang 2004). The rugged terrain and the inaccessible locality often debar its inhabitants to access the modern health care facilities. Their confinement in remote areas has accelerated their reliance on the herbal medicines (Jana and Chauhan 2000). In this present investigation a total of 40 plant species (or taxa), 38 species or taxa of seed plants and two species of pteridophytes, with new medicinal uses are documented from the Lepchas of Dzongu area of Sikkim (Fig.1).

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Table 1. Enumeration of plants with new ethnomedicinal uses by Lepcha community of Dzongu, Sikkim.

Names of plants	Local names	Parts used	Uses	UV/ FL	MP
<i>Allium wallichii</i> Kunth [Alliaceae]; Acc.: SSFH SK002549	Dungdung gay (N), Rumbo (L)	Whole plant	As digestive, in anemia	1.39 /50	Aerial parts boiled in water
<i>Alnus nepalensis</i> D. Don [Betulaceae]; Acc.: SSFH SK002565	Uttis (N), Sungdung kung (L)	Bark	Antioxidant, cancer	1.3/70	Grind 500 gm, boil in 2 litres water, reduce to ¼ volume, 50 ml thrice daily
<i>Bauhinia variegata</i> L. [Fabaceae]; Acc.: SSFH SK002573	Koiralo (N), Aaraykung (L)	Flower	Controlling hypertension	1.46 /80	Boil 500 gm in 2 litres water, reduce to ¼ volume, 50 ml thrice daily
<i>Brassica nigra</i> (L.) W.D.J.Koch [Brassicaceae]; Acc.: SSFH SK002575	Toori (N), Kanba (L)	Whole plant	Weakness, menstrual disorder	1.26 /70	Extract of 500 gm in 2 litres water, reduced to ¼ volume, 100 ml daily
<i>Brassica oleracea</i> var. <i>botrytis</i> L. [Brassicaceae]; Acc.: SSFH SK002576	Busty ko Phul kopi (N)	Flower	Asthma and kidney disorder	1.3/65	Boiled 500 gm in 2 litres water, reduced to ¼ volume, 100 ml thrice daily
<i>Calamus acanthospathus</i> [Arecaceae]; Acc.: SSFH SK002577	Griff. Beth (N), Roo (L)	Young shoot	Hypertension, in cardiac disorder	1.4/65	Boiled two shoots, remove water, make curry, once daily
<i>Castanopsis purpurella</i> (Miq.) N.P.Balakr. [Fagaceae]; Acc.: SSFH SK002554	Jat Kuttus (N), Kushyo Turoi kung (L)	Fruit	In nutrient deficiency	1.3/50	150 gm fruits, once daily
<i>Choerospondias axillaris</i> (Roxb.) B.L.Burtt & A.W.Hill [Anacardiaceae]; Acc.: SSFH SK002613	Lapsi (N), Slutpot (L)	Fruit	In blood dysentery, as appetizer	1.15 /60	100 gm fruits, once or twice daily
<i>Cinnamomum bejolghota</i> (Buch.-Ham.) Sweet [Lauraceae]; Acc.: SSFH SK002545	Sano Sing kawli (N), Sungshoor Kung (L)	Leaf, bark, root	Controlling blood sugar and diarrhea	1.35 /60	Powder 50 gm root and bark, 5 gm per day
<i>Cureuma caesia</i> Roxb. [Zingiberaceae]; Acc.: SSFH SK002583	Kalo Haldi (N), Anokbu manga (L)	Rhizome	Prevent food poisoning and gastric trouble	1.05 /70	Boil 250 gm in 500ml milk, reduce to ½ volume, twice daily
<i>Diplazium maximum</i> (D.Don) C.Chr. [Athyriaceae]; Acc.: SSFH SK002585	Saunay ningro (N), Tungtokbee (L)	Young frond	Controlling cholesterol level	1.05 /55	As curry
<i>Diplazium spectabile</i> (Wall. ex. Mett.) Ching [Athyriaceae]; Acc.: SSFH SK002586	Titay Ningro (N), Akrebu Tungtokbee (L)	Young frond	Maintaining hypertension	1.16 /50	As curry
<i>Diploknema butyracea</i> (Roxb.) H.J. Lam. [Sapotaceae]; Acc.: SSFH SK002589	Chueri (N), Yealkung (L)	Bark	Diabetes, stomach problem, controlling water leach	1.46 /55	Decoction for 24 hours, 280 ml water extract as a single dosage for two days

(Abbreviations: Acc.: Accession number; N: Nepali name, L: Lepcha name; UV: Use Value; FL: Fidelity Level; MP: Medicine Preparation).

Table 1. Enumeration of plants with new ethnomedicinal uses by Lepcha community of Dzongu, Sikkim (Contd.).

Names of plants	Local names	Parts used	Uses	UV/ FL	MP
<i>Elaeocarpus sikkimensis</i> [Elaeocarpaceae]; Mast. Acc.: SSFH SK002590	Bhadrasay (N), Shaykyue kung (L)	Fruit	Blood dysentery	1.6/ 80	Two ripen fruits daily for two days
<i>Elatostema obtusum</i> [Urticaceae]; Wedd. Acc.: SSFH SK002525	Goglayto (N), Khanshalbee (L)	Leaf and stem	Hypertension, diabetes	1.35 /60	As soup
<i>Fragaria nubicola</i> (Lindl. ex Hook.f.) [Rosaceae]; Lacaita Acc.: SSFH SK002591	Bhui Aiselu (N), Zyeuepot (L)	Aerial part/ Fruit	Boosting body energy	1.25 /80	Extract of 500 gm in 2 litres water, reduced to ¼ volume, 100 ml twice daily/ 4 fruits, once daily
<i>Hydrocotyle javanica</i> Thunb. [Apiaceae]; Acc.: SSFH SK002540	Golpatta (N)	Leaf	Cough	1.63 /73	Extract of 500 gm in 2 litres water, reduced to ¼ volume, 100 ml once daily
<i>Lagenaria siceraria</i> (Molina) Standl. [Cucurbitaceae]; Acc.: SSFH SK002595	Lauwka (N)	Fruit	Purifying blood	1.15 /75	Juice of two fruits daily
<i>Litsea citrata</i> Blume [Lauraceae]; Acc.: SSFH SK002597	Siltimbur (N)	Fruit	Anti-infection	1.6/ 80	Grind 10 gm seeds in 1 litres water, reduced to ¼ volume, 10 ml daily
<i>Machilus edulis</i> King ex Hook.f. [Lauraceae]; Acc.: SSFH SK002547	Phomsay (N), Aufompot (L)	Fruit	Controlling blood sugar	1.16 /65	200 gm fruits twice daily
<i>Musa balbisiana</i> Colla [Musaceae]; Acc.: SSFH SK002599 (Fig.2D)	Bankera (N), Punzok kudung (L)	Stem	Throat infection	1.6/ 80	Squeezed in water, thrice daily
<i>Nasturtium officinale</i> W.T.Aiton [Brassicaceae]; Acc.: SSFH SK002600	Simrayo (N), Khaneybee (L)	Leaf and stem	Tuberculosis	1.24 /50	Boil 250 gm in 2 litres water, reduced to ¼ volume, 50 ml once daily
<i>Neolamarckia cadamba</i> (Roxb.) Bosser [Rubiaceae]; Acc.: SSFH SK002546	Kadam (N)	Seed	Food poisoning	1.36 /70	Decoction in water, 150 ml
<i>Neopicrorhiza scrophulariiflora</i> (Pennell) D.Y.Hong [Scrophulariaceae]; Acc.: SSFH SK002607	Kutki (N)	Whole plant	Antidote to poison	1.40 /80	Decoction of 50 gm overnight, 100 ml once daily
<i>Panax bipinnatifidus</i> Seem. var. <i>angustifolius</i> (Burkill) J.Wen [Araliaceae]; Acc.: SSFH SK002603	Ajambhari (N)	Rhizome	Jaundice and liver disorder	1.45 /60	Grind and boiled in 500 ml milk, reduced to ¾ volume, 250 ml once daily
<i>Passiflora edulis</i> [Passifloraceae]; Acc.: SSFH SK002550	Garrendal (N), Ranipot (L)	Leaf and fruit	Boosting immunity, support heart health	1.46 /60	Boil 200 gm in 2 litres water, reduce to 1/2 volume, 100 ml thrice daily

(Abbreviations: Acc.: Accession number; N: Nepali name, L: Lepcha name; UV: Use Value; FL: Fidelity Level; MP: Medicine Preparation).

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Table 1. Enumeration of plants with new ethnomedicinal uses by Lepcha community of Dzongu, Sikkim (Contd.).

Names of plants	Local names	Parts used	Uses	UV/ FL	MP
<i>Phoebe attenuata</i> (Nees) Nees [Lauraceae]; Acc.: SSFH SK002535	Angeri (N), Kuntu (L)	Leaf	Control pest, parasite and plant disease	1.30 /70	500 gm in 2 litres water, reduced to ¼ volume, once daily externally
<i>Piper hamiltonii</i> C. DC. [Piperaceae]; SSFH SK002553	Jungali Paan (N), Teenrek (L)	Leaf	Sore throat, respiratory disorders	1.43 /60	Intake of one or two leaves thrice daily
<i>Rheum nobile</i> Hook. f. & Thomson [Polygonaceae]; Acc.: SSFH SK002608	Paddamchal (N), Sanakundung (L)	Stem, rhizome	Fever, cough, indigestion	1.36 /70	Intake of ½ inches of part twice daily
<i>Rhododendron anthopogon</i> D. Don [Ericaceae]; Acc.: SSFH SK002609	Sunpati (N); Bhalu chalu (L)	Whole plant	Bones	1.63 /80	Intake of 3 to 4 leaves once daily
<i>Rhododendron grande</i> [Ericaceae]; Acc.: SSFH SK002570	Guras (N); Etok-Kung-Reep (L)	Flower	Throat infections, bronchitis, nerve stimulant	1.6/ 80	Traditional liquor preparation
<i>Rubus acuminatus</i> [Rosaceae]; Acc.: SSFH SK002559	Aiselu (N), Kushyem Zyue (Lep)	Fruit, shoot, root	Fever, colic, cough, sore throat	1.36 /70	Extract of 100 gm in 2 litres water, reduced to ¼ volume, 50 ml daily
<i>Sicyos edulis</i> [Cucurbitaceae]; Acc.: SSFH SK002532	Iskus (N), Beepot/kathekpote (L)	Fruit	Cancer, heart problems, immunity boosting	1.60 /80	500 gm boiled to extract juice, 100 ml twice daily
<i>Smilax aspericaulis</i> Wall. ex A. DC. [Smilacaceae]; Acc.: SSFH SK002611	Kukur Dhaney (N), Palamzyue (L)	Young shoot	High pressure, diabetes	1.16 /60	250 gm used as curry once daily
<i>Stephania glandulifera</i> Miers [Menispermaceae]; Acc.: SSFH SK002569	Tamarkay (N)	Young leaf, rhizome	Diabetes, as fodder to animal	0.98 /77	Boil 100 gm to extract juice, 30 ml twice daily
<i>Taxus wallichiana</i> [Taxaceae]; Acc.: SSFH SK002615	Lad Salla (N), Pungshing (L)	Leaf	Dog bites	1.32 /80	100 gm boiled to extract juice, 50 ml twice daily
<i>Thysanolaena latifolia</i> (Roxb. ex Hornem.) Honda [Poaceae]; Acc.: SSFH SK002558	Amliso (N); Pushyur (L)	Root	Mumps, abscesses	1.45 /60	Extract of 10 gm in 150 ml water reduced to ¼ volume, once daily
<i>Tupistra nutans</i> Wall. ex Lindl. [Asparagaceae]; Acc.: SSFH SK002614	Nakima (N), Perfek (L)	Flower	Hypertension	1.43 /44	100 gm boiled to extract juice, 50 ml twice daily
<i>Viscum album</i> L. [Loranthaceae]; Acc.: SSFH SK002618	Harchur (N)	Whole plant	Body ache, fracture, dislocation, gout, gastric problems	1.4/ 80	Grind 25 gm, powder taken twice daily
<i>Zanthoxylum rhetsa</i> (Roxb.) DC. [Rutaceae]; Acc.: SSFH SK002534	Bokay Timbur (N), Yepmu (L)	Fruit	Fever, body pain	1.55 /80	100 gm powder in 2 litres water, reduced to ¼ volume, 20 ml once daily

(Abbreviations: Acc.: Accession number; N: Nepali name, L: Lepcha name; UV: Use Value; FL: Fidelity Level; MP: Medicine Preparation).

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