IJPSR (2022), Volume 13, Issue 11 (Research Article)

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 26 March 2022; received in revised form, 04 May 2022; accepted, 18 June 2022; published 01 November 2022

ETHNOBOTANICAL STUDY OF MEDICINAL PLANTS USED BY THE DIFFERENT TRIBAL COMMUNITIES IN NILAKH- SRIPANI AREA OF DHEMAJI DISTRICT, ASSAM

Pranab Borah and Mousmi Saikia *

Department of Herbal Science & Technology, A. D. P. College, Nagaon - 782002, Assam, India.

Keywords:

Ethnobotanical, Livestock disease, Medicinal plants, Traditional knowledge

Correspondence to Author:
Dr. Mousmi Saikia

Assistant Professor & HOD, Department of Herbal Science & Technology, A. D. P. College, Nagaon - 782002, Assam, India.

E-mail: mousmi3@rediffmail.com

ABSTRACT: Due to plentiful wild plant diversity, poor road conditions to connect modern medical facilities, and age-old folk knowledge on medicinal plants, the tribal communities of Dhemaji District, Assam, India, still practice traditional plant-based therapy in the management of primary healthcare. The present investigation aims to represent the ethnobotanical knowledge of different ethnic community peoples of the Nilakh- Sripani area, a fringe area laying the Assam- Arunachal border. The ethnobotanical field survey (2018- 2020) was carried out based on formal and informal semi-structured questionnaires with village headmen, traditional healers, and well-educated persons from 11 villages belonging to Nilakh and Sripanigaon panchayat. Analysis of the demographic profile of informants, local names of plants, parts used, used in ailments, preparation and route of administration was investigated during the survey. The documented data were also quantitatively analyzed by using standard ethnobotanical parameters like Use Value (UV), Fidelity Level (FL) and Informant Consensus Factor (ICF). A total of 102 plant species belonging to 57 families were recorded. During the time of the study, 33 plant species having new ethnobotanical potential were recorded. Besides the uses of plant species in different human ailment categories, 8 plant species are reported in managing livestock diseases especially in poultries, pigs and cattle, and 2 species used as a bio-pesticide in the study area. The study further should be helpful for the valid discovery of a new active pharmaceutical ingredient (API) or drug formulation from natural origin.

INTRODUCTION: In India, different tribal community people use more than 8000 medicinal plant species and approximately 25,000 folk medicine-based formulations of their traditional healthcare system [1]. The majority tribal community peoples of entire North-East India, *i.e.*, more than 200 tribes of different ethnic groups, are inhabited in the forest ecosystem and have their socio-cultural patterns, tradition, and specific food habits [2].

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.13(11).4586-07

This article can be accessed online on www.ijpsr.com

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.13(11).4586-07

Traditional food items and medicines of plant origin used by the tribes of the north-eastern region are closely connected to virtually all aspects of their socio-cultural, spiritual life, and health care system since ancient times [3]. Documentation of traditional knowledge of indigenous communities plays a significant role in reporting about the utilization of medicinal plants in a particular region.

Firstly, it ensures that indigenous cultural heritage is preserved from being lost for the use of both present and future generations. Moreover, ethnobotanical documentation has become a valuable tool for conducting further bio-active studies on the relevant plant species. Documentation of ethnobotanical study can help to

discover active pharmaceutical ingredients and new efficacious plant remedies [4, 5]. Based on socio-economic status and indigenous plant-based knowledge of the local communities, ethnobotanical research helps investigate and enumerate medicinal plant species' significant roles within the local socio-cultural context [6]. Assam is a multi-ethnic, multi-linguistic and multi-religious community inhabitant state of North-East India. They belong to three main language groups: Indo-Aryan, Austro-Asiatic, and Tibeto- Burman. Among the 35 administrative districts of the state, Dhemaji District is situated in the remote corner of North East India on the north bank of river Brahmaputra. The previous ethnobotanical surveys carried out by the researchers in the district revealed that the community people are widely dependent on the traditional medicinal system for managing primary healthcare. Due to the cultural and community diversity of the district, plant species are used in different diseases and purposes, such as religious practices [7, 8], anti-diabetic potential ethnobotanicals [9], reproductive health [10], anti-malarial treatment, *etc.* [11-15]. Besides medicinal plants in human healthcare, they are also used traditionally for ethnoveterinary purposes [16]. The main objectives of the present investigation were authentication and enumeration of some unexplored potential medicinal plants used and preserved by different tribal community peoples of the Nilakh- Sripani area of Dhemaji district, one of the major tribal community inhabitant districts of Assam.

MATERIALS AND METHODS:

Study Area: Geographically, the Dhemaji district is situated between the 94º12′ 18″ E and 95º41′32″ E longitudes and 27º05′ 27″ N and 27º57′16″ N latitudes of Assam. The district covers an area of 3237 sq. km and is a plain area that lies at an altitude of 104 meters above sea level. The conducted field survey area *i.e.*, Sripani and Nilakh Gaon Panchyat belong to the Sissiborgaon development block, Jonai sub-division under the Dhemaji District **Fig. 1**.

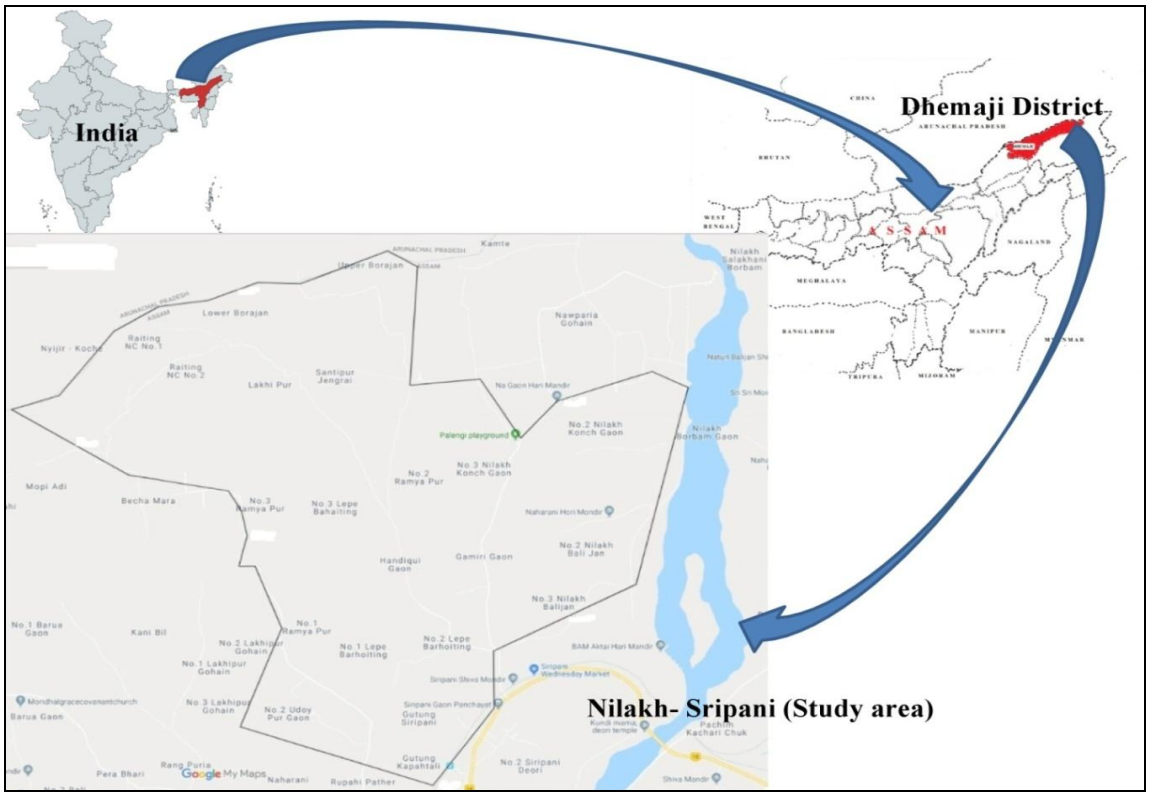

FIG. 1: THE GEOGRAPHICAL LOCATION OF THE STUDY AREA (NILAKH-SRIPANI) (Source: Prepared by PB, Map not to scale).

Dhemaji is the easternmost district of Assam and is constituted bifurcating Lakhimpur district. It is the homeland of many scheduled d tribes namely Mishing, Deori, Sonowal Kacharis, Bodos, Tiwas, Chutias, Ahoms, Koch and others. A total of 11 village inhabitants of different tribal communities,

i.e. Tiwa, Mishing, Deori, Kachari, Ahom, Nepali and Koch under two Gaon panchayat namely Nilakh and Sripani are selected for the study. Most villages of the study area lie near the border region of Arunachal Pradesh which is nearly 20 km distance from Dhemaji town **Fig. 1**. Due to economic backwardness, poor road communication, inadequate modern medical facilities in the study area, traditional knowledge practices are the only option for the treatment of the primary healthcare system. This ethnobotanical knowledge and practices in the study area are still possible due to plentiful wild plant resources in the Assam-Arunachal border region and old age tradition among tribal communities. Most of the folk knowledge practiced by the traditional healer and medicine man is based on oral tradition which is passed through their family background and particular community belief from generation to generation.

FIG. 2: INTERVIEW WITH TRADITIONAL HEALERS: A) A KONCH MEDICINE MAN PRESCRIBING FRESH POLYHERBAL EXTRACT FOR GASTRIC ULCER; B) AUTHOR INTERACTING WITH A DEORI TRADITIONAL HEALER DISCUSSING THE TREATMENT OF DOG BITE; C) A FEMALE PRACTITIONER SPEAKING ABOUT THE MEDICINAL PLANTS USED IN DIFFERENT HEALTH AILMENT; D) AN AHOM TRADITIONAL HEALER TREATING ARTHRITIS USING MATURE LEAVES OF *THELYPTERIS OPULENTA* AND CHANTING MANTRAS

Ethnobotanical Data Collection and Identification: The extensive ethnobotanical fieldwork was carried out over two years (2018-2020). The first phase of data collection contains the demographic profile of informants including ethnic community groups, gender, age groups, informant's types (*i.e.*, old age person, traditional healer, local people, well-educated person) and practice experience on traditional medicine. The second phase of data documentation is comprised of information about the plant name, family, local name, habit, parts used, treatment of diseases using plant species, mode of preparation/ administration of the crude drug for particular ailments and quantitative ethnobotanical indices such as use value (UV), fidelity level (FL) and informant consensus factor (ICF) of particular disease type. During the second phase of data documentation, information about the local name of plants was collected based on the informant's knowledge using semi-structured questionnaires and open-ended interviews. The plant samples/ parts were collected from the study area during the time of the field survey and collected samples were prepared as herbarium specimens followed by standard methods and voucher specimens were submitted to the Department of Herbal Science and Technology, Anandaram Dhekial Phookan College, Nagaon,

Assam for further reference. For validation of the family and scientific name of plant species World Flora online (http://www.worlfloraonline.org), Plants of the World Online (http://www.powo.science.kew.org) and Tropicos (http://www.tropicos.org) were used [17-19].

Quantitative Data Analysis:

Frequency of Citation (FC) and Relative Frequency of Citation (RFC): The Relative Frequency of Citation (RFC) uses for the evaluation of the relative importance and significance of plant species based on the number of informants for each species and the total informants interviewed in study [20-21]. It was calculated by dividing "FC" by the total number of informants in the whole survey (N) as followed by

$$RFC=FC/N$$

Where FC stands for the frequency of citation and expresses the number of informants interviewed for a species that cite its uses. This index varies from 0 (zero), when nobody refers to the plant species as useful, to 1 (one) in the case when there are a maximum number of informants that consider a plant species useful.

Use Value (UV): The use-value is an ethnobotanical index that shows the relative importance of plant species known locally based on the number of recorded uses (Use report) for each species [22]. It was calculated by following the formula

$$UV=U/n$$

Where UV stands for use-value, and "U" is the total number of use citations by all information for a given species, divided by the total number of informants "n".

Fidelity Level (FL): Fidelity level determines the specific uses of each plant species and its preference over other species. It expresses the specificity of disease treated by a reported plant species [23].

$$FL= (Ip/Iu) \times 100$$

Where "Ip" is the number of informants who suggested a given species to treat a specific disease and "Iu" is the total number of informants who mentioned the species for any use.

Informant Consensus Factor (ICF): The informant consensus factor (ICF) expresses informants' consensus about the use of plant species in treating the different types of disease categories [24-25]. The following formula calculates it

$$ICF = Nur – Nt/ Nur - 1$$

Where "Nur" is the number of use reports (number of conditions of a disease category) of a disease category treated by a plant species and "Nt" is the number of plant taxa used for treating that disease category. The maximum ICF value *i.e.*, close to 1 indicates that well-known species are used by a large proportion of local communities due to their authenticity regarding diseases. However, a low ICF index close to 0 specifies that the informants use this species randomly to treat reported diseases.

RESULTS AND DISCUSSION:

Demographic Profile of Informants in the Study Area: A total of 67 informants (*i.e.*, male 44 and female 23) from different ethnic communities were interviewed at their convenience during the study.

Semi-structured questions regarding personal information and information about medicinal plants they used in treating diseases were asked during the time of the study. The information about the demographic profile of the participants, such as ethnic groups they belonged to, gender, age and educational status is shown in **Table 1**.

TABLE 1: CLASSIFICATION OF INFORMANTS ACCORDING TO THEIR DEMOGRAPHIC FEATURES

Variables	Category	No. of Informants	Percentage (%)
Ethnic community groups	Lalung	6	8.96
	Mising	13	19.4
	Deori	17	25.37
	Kasari	4	5.97
	Ahom	19	28.35
	Konch	8	11.94
Gender	Male	44	65.67

	Female	23	34.32
Age groups	30-40	9	13.43
	41-50	16	23.88
	51-60	18	26.87
	61-70	12	17.91
	71-80	7	10.45
	80-90	4	5.97
	90-100	1	1.49
Educational status	No Formal Education	14	20.9
	Primary Level	20	29.85
	High School Level	16	17.91
	Higher Secondary Level	11	23.88
	Graduate Level	06	8.96

Enumeration of Ethnobotanical Data: A total of 102 plant species belonging to 57 families were recorded from the villages of the Nilakh- Sripani area **Table 2**. The families Fabaceae and Rubiaceae had the highest number of species (6) followed by Lamiaceae and Solanaceae (each 5), Apocynaceae, Euphorbiaceae and Malvaceae (each 4), Acanthaceae, Asteraceae and Zingiberaceae (3), Anacardiaceae, Araceae, Compositae, Cucurbitaceae, Lauraceae, Lythraceae, Marantaceae, Poaceae, Rutaceae, Sapotaceae, Urticaceae (each 2) and rest families had one species each. The collected plant species recorded different growth forms such as herbs (38.24%), shrubs (24.5%), trees (20.59%) and climbers (16.67%) **(Fig. 3)**. The medicinal plants were collected mainly from natural vegetation (*i.e.*,. riverbanks, roadside areas and forests) and home gardens **(Fig. 4).** (55.88%) were collected naturally and 45 (44.12%) were collected from the home garden.

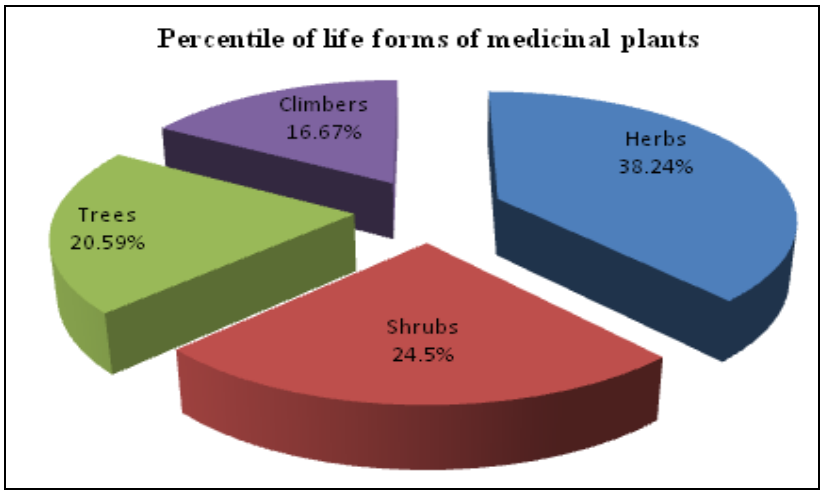

FIG. 3: LIFE FORMS (PLANT HABITS) OF REPORTED MEDICINAL PLANT SPECIES IN THE NILAKH-SRIPANI AREA

Fourteen different plant parts were used to treat diseases in the study. The most cited plant parts used in healthcare treatments are leaves (52 reports) followed by roots (11), fruits (10), rhizomes (9), barks (7), seeds (6), stems, flowers, shoots and aerial parts (5 each), peels (3), mucilage and whole parts (2 each) and latex (1) **(Fig. 5).** According to the informants, different ways to prepare the medicine from the plants were fresh/raw, decoction, infusion, crushing or pounding and direct application administered orally as well as a topical application (*i.e.* poultice/ paste form, eye/ear drop). The plant parts used and the mode of preparation of medicinal plants depend on the ailments. The local peoples of the region also consumed some medicinal plants as leafy vegetables in their food items.

FIG. 4: MEDICINAL PLANTS PARTS COLLECTED FROM THE STUDY AREA. A: YOUNG SHOOTS OF *MAGNOLIA HODGSONII* USED AS A TRADITIONAL LIPSTICK; B: TENDER SHOOTS OF *CALAMUS TENUIS* EATING AS A VEGETABLE; C: RIPEN FRUIT OF *SAPINDUS MUKOROSSI*; D: *CAPSICUM FRUTESCENS* POPULAR SPICY CHILLY; E: RHIZOME OF *MARANTA ARUNDINACEA*; F: SEED POD OF *ENTADA SCANDENS VAR. PURSAETHA*; G: DRY STEM OF *THUNBERGIA GRANDIFLORA*; H: SEEDS AND FRUITS OF *DATUA METEL*; I: SEEDS OF *CAESALPINIA BONDUC*

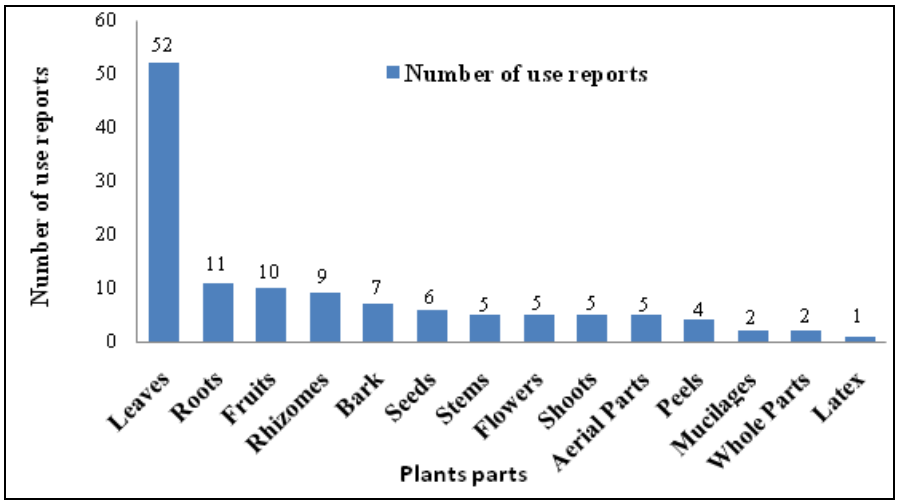

FIG. 5: PERCENTILE DISTRIBUTIONS OF PLANT PARTS USED IN TRADITIONAL MEDICINE

TABLE 2: ENUMERATION OF ETHNOMEDICINAL PLANTS USED BY THE TRIBAL COMMUNITIES IN NILAKH- SRIPANI AREA OF DHEMAJI DISTRICT, ASSAM

S. no.	Scientific name/ Family/Voucher no.	Local name	Life forms	Habitat	Parts used	Uses	Mode of Preparation and route of administration	FC	RFC	UR	UV	FL
1	*Acmella paniculata* (Wall. ex DC.) R.K. Jansen (Asteraceae) /HST-0117	Ass.-Huhoni bon Mis.-Marsang Deo.-Malkathi	Herb	NV	Leaves , Flower	Sore throat	Fresh flower chewed during the tongue infection and sore throat problem. Cooked/boiled leaves also prescribed orally to relieve sore throat.	37	0.55	1	0.03	54.05
2	*Acorus calamus* L. (Acoraceae)/ HST-0001	Ass.- Bos	Herb	HG	Rhizome	Common cold	A piece of rhizome worn as garland.	45	0.67	1	0.02	100
3	*Ageratum conyzoides* (L.) L. (Asteraceae)/ HST-0101	Ass.-Gundhua bon	Herb	NV	Leaves	Cut and wound	Paste or juice applied on the affected area.	55	0.82	1	0.02	100
4	*Alocasia odora* (Roxb. ex Lodd., G. Lodd. & W. Lodd.) Spach (Araceae)/ HST-0111	Ass.- Dohikosu	Herb	HG	Stem	Worm infection*	Stem use as a vegetable.	10	0.15	1	0.1	100
5	*Alstonia scholaris* (L.) R. Br. (Apocynaceae) /HST- 0003	Ass.-Sotiona	Tree	NV	Bark , Latex	Malaria, Pneumonia, Rheumatoid arthritis	Decoction of the bark given orally in Malaria & Pneumonia. Fresh Latex applied topically on the site of Arthritic pain area.	18	0.27	3	0.17	83.33
6	*Amaranthus spinosus* L. (Amaranthaceae) / HST-0086	Ass.-Hatikhutora	Herb	HG	Root	Kidney stone	Fresh root juice eaten in the empty stomach to remove Kidney stone. Leaves use as a vegetable.	12	0.13	1	0.11	75
7	*Ananas comosus* (L.) Merr. (Bromeliaceae)/ HST-0104	Ass.- Anaras	Herb	HG	Leaves	Rabies*	Yong tender leaf mixed with molasses and immediately after Dog bite.	2	0.03	1	0.5	100
8	*Annona reticulata* L. (Annonaceae) /HST-0029	Ass.- Atlas	Tree	HG	Seed	Head lice	Seed powder mixed with coconut oil and the mixer paste is applied as poultice and allowed to remain overnight to kill and remove Hair lice.	12	0.18	1	0.08	100
9	*Averrhoa carambola* L. (Oxalidaceae) /HST-0040	Ass.-Kordoi	Tree	HG	Root	Pyorrhea	Dried root are ground to paste or as toothpowder on bleeding gum.	5	0.07	1	0.2	100
10	*Basella alba* L. (Basellaceae)/HST-0005	Ass.- Puroi	Climber	HG	Leaves	Fire burn	Fresh leaves make a paste form and applied as a poultice.	21	0.31	1	0.05	100
11	*Calamus tenuis* Roxb. (Arecaceae) /HST-0009	Ass.-Jati bet Mis.-Jeing	Climber	NV	Shoot	Malaria*	Cooked tender shoot prescribed orally.	9	0.13	1	0.11	100
12	*Calotropis gigantea* (L.) Dryand. (Apocynaceae) / HST-0064	Ass.- Akon	Shrub	NV	Leaves	Heel pain	Mature leaves to apply to heat to heel for relieve severe pain.	8	0.12	1	0.13	100
13	*Cannabis sativa* L. (Cannabaceae) /HST-0011	Ass.- Bhang	Herb	HG	Leaves , Flower	Dyspepsia, Rabies	Leaves fed to cattle suffering in dyspepsia. 1-2 teaspoonful of raw juice from dried flowers mixed with fresh milk and eaten in empty stomach in Dog bite.	18	0.26	2	0.11	83.33
14	*Capsicum chinense* Jacq. (Solanaceae) /HST-0010	Ass.-Bhutjolokia Deo.-Famsu	Herb	HG	Fruit	Gastric Ulcer, Dyspepsia	Fresh fruit eaten with fermented rice (boiled rice steeped in cold water.	37	0.55	2	0.05	100
15	*Capsicum frutescens* L. (Solanaceae)	Ass.- Kon jolokia	Herb	HG	Fruit	Tonsillitis, Diphtheria	Fresh Ripe fruit prescribed orally in tonsillitis. Fresh Ripe fruit given orally in diphtheria problem in cattle.	16	0.23	2	0.13	56.25
16	*Cascabela thevetia* (L.) Lippold (Apocynaceae)/HST-0013	Ass.-BogaKorobi	Shrub	HG	Root	Snake Bite*	Fresh root bark ground to paste and applied locally in Snake bite.	2	0.02	1	0.5	100
17	*Centella asiatica* (L.) Urb. (Apiaceae) /HST-0028	Ass.- Bormanimuni	Herb	FL	Aerial part	Jaundice	Fresh juice from leaves prescribed orally in jaundice problem.	11	0.16	1	0.09	100
18	*Centipeda minima* (L.) A. Braun & Asch. (Asteraceae)	Ass.- Hachiyoti bon	Herb	NV	Aerial part	Cough, Asthma	DryAerial part mixed with seed powder of P. nigrum and mixer is prescribed in Cough and Asthma.	3	0.01	2	0.67	66.67
19	*Chrysophyllum*	Ass.- Bonpitha	Tree	HG	Seed	Tonsillitis*	2-3 drops of decoction	4	0.06	1	0.25	100

	*roxburghii*G. Don (Sapotaceae)						prepared from of mature seed applied orally in tonsillitis.					
20	*Cinnamomum tamala* (Buch.-Ham.) T. Nees & Eberm. (Lauraceae) /HST-0034	Ass.-Tejpat	Tree	HG	Leaves	`Eczema	Fresh juice of leaves mixed with water is prescribed for washing infected parts.	13	0.19	1	0.08	100
21	*Citrus maxima* (Burm.) Merr. (Rutaceae)/HST-0105	Ass.- RobabTenga Deo.-Sokola	Shrub	HG	Fruit	Worm infection	Fresh juice from mesocarp portion given orally in empty stomach (morning) on round worm infection.	7	0.1	1	0.14	100
22	*Clematis zeylanica* (L.) Poir. (Ranunculaceae) /HST-0049	Ass.-Gopsoroi lota	Climber	NV	Root Leaves	Gastric Ulcer, Cut & Wounds	Decoction or raw juice from roots prescribed orally in gastric ulcer. Leaves are crushed and paste is applied in Cut & wounds.	9	0.13	2	0.22	77.78
23	*Clerodendrum glandulosum* Lindl. (Lamiaceae) /HST-0015	Ass.-Nefafu	Shrub	NV	Leaves	Hypertension	Cooked young tender leaves used as vegetable.	29	0.43	1	0.03	100
24	*Clerodendrum infortunatum* L. (Lamiaceae) /HST-0016	Ass.-Dhopattita	Shrub	NV	Leaves	Malaria, Piles	Leaves powder made into pills. 3-5 pills prescribed orally two times a day. Fresh leaves paste locally applied as a poultice on anus.	8	0.12	2	0.25	62.5
25	*Commelina benghalensis* L. (Commelinaceae) /HST-0017	Ass.- Kona Simalu	Herb	NV	Mucilage	Eye acne	2-3 drops fresh mucilage from stem applied externally once a day.	27	0.4	1	0.04	100
26	*Croton caudatus* Geiseler (Euphorbiaceae) /HST-0018	Ass.-Lota Mahudi	Climber	NV	Leaves	Dyspnea*	A cup of infusion prescribed orally one times a day for 4-5 days continuously.	17	0.25	1	0.06	100
27	*Croton tiglium* L. (Euphorbiaceae)	Ass.- Konibih	Tree	HG	Leaves	Pesticide	Fresh leaves sowing into paddy filed to control pest.	4	0.06	1	0.25	100
28	*Cryptolepis dubia* (Burm.f.) M.R.Almeida (Apocynaceae) /HST-0022	Ass.- Kola anatamul	Climber	NV	Leaves, Stem	Epilepsy* Bone fracture	Fresh leaves juice mixed with wine in 3:1 ratio (60 ml) and prescribed orally in the morning three doses at 3 days interval. Paste prepared from leaves applied as a poultice and tied with stem locally on bone fracture site.	49	0.73	2	0.04	95.92
29	*Curcuma caesia* Roxb. (Zingiberaceae) /HST-0113	Ass.- Kola haldhi Deo.-Aalodu	Herb	NV	Rhizome	Cut & Wound, Rheumatoid arthritis	Paste prepared from fresh rhizomes applied as poultice locally on Cut & Wound and arthritic pain.	52	0.79	2	0.03	76.92
30	*Cucumis sativus* L. (Cucurbitaceae) /HST-0024	Ass.-Tiyoh	Climber	FL	Fruit	Anti-leech	Fresh fruit eaten immediately to repel out leech from the body.	5	0.07	1	0.2	100
31	*Cuscuta reflexa* Roxb. (Convolvulaceae) /HST-0091	Ass.- Akashi lota	Climber	NV	Stem	Poultry disease*	Raw juice mixed with rice and kept for overnight. Then the rice is prescribed orally in the morning in common chick diseases.	19	0.28	1	0.05	100
32	*Cynodonda ctylon* (L.) Pers. (Poaceae) / HST-0039	Ass.-Dubori bon	Herb	NV	Leaves	Leucorrhea	A cup of fresh juice mixed with equal amount of fresh cow milk and adequate amount of sugar and prescribed orally empty stomach in the before 8.00 AM for three days continuously.	6	0.08	1	0.17	100
33	*Datura metel* L. (Solanaceae) /HST-0025	Ass.- Dhatura	Shrub	NV	Leaves, Seed	Rheumatoid arthritis Rabies	2-3 leaves are crushed to make paste and heated over fire, and then the paste is applied as a poultice locally for 2 hours in arthritic pain. Infusion of the seeds of D. metal, leaves of C. sativa and stem of T. grandiflora mixed with fresh cow milk is given orally (two-three teaspoonful) in empty stomach on Dog bite.	9	0.13	2	0.22	55.55

34	*Dendrocnidesinuata* (Blume) (Urticaceae) Chew/HST-0026	Ass.-Borsurat Deo.-Khema	Shrub	NV	Shoot	Eczema*	Young tender leaves eaten as a vegetable.	14	0.21	1	0.07	100
35	Dillenia indica L. (Dilleniaceae) /HST-0061	Ass.- Ou-tenga Mis.-Sompa Deo.-Chopa	Tree	NV	Fruit, Mucilage	Dandruff	Mucilage from fruit of D. indica is prescribed for washing hair to remove dandruff.	57	0.85	1	0.02	100
36	*Drymaria cordata* (L) Willd. ex Schult(Caryophyllaceae)	Ass- Laijabori	Herb	NV	Leaves	Oral thrush*	1-2 drops fresh juice given orally to children in oral thrush problem.	23	0.34	1	0.04	100
37	*Ecliptaprostrata*(L.) L. (Compositae) /HST-0021	Ass.-Kenhraj	Herb	NV	Leaves	Epistaxis* Piles Cut & Wound	2 spoonful of fresh juice immediately given orally in nasal bleeding (Epistaxis). Aerial parts grind make into pills and prescribed orally 4-5 pills twice a day. Paste pre pared from leaves locally applied as a poultice.	24	0.21	3	0.13	75
38	*Eleusine indica* (L.) Gaertn. (Poaceae) /HST-0023	Ass.-Bobosabon	Herb	NV	Root	Headache*	Paste is applied on forehead in Headache.	5	0.07	1	0.2	100
39	*Entada phaseoloides* (L.) Merr. (Fabaceae)	Ass.- Borghila	Climber	NV	Seed	Appendicitis*	One seed embryo mixed with chicken egg and makes an omelet and prescribed orally in appendicitis.	3	0.04	1	0.33	100
40	*Euphorbia antiquorum* L. (Euphorbiaceae)	Ass.- Hiju	Shrub	HG	Leaves	Leucorrhea Whitlow	3 nos. of Slightly smoked leaves mixed with cow milk and prescribed orally in the morning. Fresh leaves are crushed and paste is applied as a poultice and tied locally on nail (infected area).	9	0.13	2	0.22	77.78
41	*Euphorbia hirta*L. (Euphorbiaceae)	Ass.-Gakhirotibon	Herb	NV	Aerial part	Increase breast milk	Fresh aerial part helps to increase milk.	21	0.31	1	0.05	100
42	*Garcinia Morella* (Gaertn.) Desr. (Clusiaceae)/HST-0032	Ass.-Kujithekera Mis.-Tabing-asing	Tree	HG	Fruit	Hypertension, Dysentery	Infusion prepared from 2-3 years old dry stored fruit pulp is given in Hypertension and Dysentery.	28	0.39	2	0.05	85.71
43	*Grewia serrulata* DC. (Malvaceae) /HST-0033	Ass.-Kukurhuta	Shrub	NV	Bark	Leucorrhea*	A cup of fresh juice from the stem bark mixed with equal amount fresh cow milk and adequate amount of sugar candy prescribed orally once a day (morning) in Leucorrhea.	3	0.04	1	0.33	100
44	*Guilandina bonduc* L. (Fabaceae)/HST-0068	Ass.-Letaguti	Climber	HG	Seed, Leaves	Malaria, Pneumonia	Decoction of the leaves or seeds taken orally two times a day.	27	0.4	2	0.07	74
45	*Hellenia speciosa* (J. Koenig) S.R. Dutta (Costaceae)/ HST-0085	Ass.-Jomlakhuti	Herb	HG	Rhizome	Urinary problem	A cup of fresh juice from rhizome is prescribed orally in the morning to clear obstruction.	19	0.28	1	0.05	100
46	*Hibiscus acetosella* Welw. ex Hiern (Malvaceae) /HST-0035	Ass.-RongaTengamora	Shrub	HG	Leaves	Dysentery	Decoction or salad administered orally in blood dysentery.	37	0.55	1	0.03	100
47	*Hibiscus rosa-sinensis* L. (Malvaceae) /HST-0054	Ass.-Joba	Shrub	HG	Leaves Flower	Dandruff Menstrual Disorder	Paste prepared from fresh leaves applied on hair and allowed to remain 1-2 hour and wash hair to remove Dandruff. 5-7 immature flower buds mixed with sugar candy and prescribed orally in irregular menstrual cycle problem.	27	0.4	2	0.07	88.89
48	*Houttuynia cordata* Thunb. (Sauruaceae) /HST-0007	Ass.-Mosondori	Herb	HG	Whole part	Piles	Pills prepared from the plants prescribed orally in piles.	3	0.04	1	0.33	100
49	*Hydrocotyles ibthorpioides*Lam (Araliaceae) /HST-0036	Ass.-Horumanimuni	Herb	FL	Whole part	Diarrhea	Raw juice/salad prepared from plants given orally in Diarrhea and Indigestion.	29	0.43	1	0.03	100
50	*Hygrophila ringens* (L.) R. Br. Ex Spreng (Acanthaceae)	Ass.- Ikhyogandhi	Herb	NV	Leaves	Pneumonia	Leaves mixed with powder of P. nigrum and juice is prescribed in pneumonia.	3	0.04	1	0.33	100
51	*Kalanchoe pinnata* (Lam.) Pers.	Ass.-Duportenga	Herb	HG	Leaves	Kidney stone	Fresh leave juice taken orally in the empty stomach	33	0.49	1	0.03	100

	(Crassulaceae) /HST-0006						(morning).					
52	*Kaempferia angustifolia* Roscoe (Zingiberaceae)	Ass.- Gathiyon	Herb	HG	Leaves Rhizome	Anti-mosquito Asthma	Smoke from dry leaves repels mosquito. Fresh juice prescribed in Asthmatic cough in children.	17	0.25	2	0.12	70.58
53	*Lantana camara* L. (Verbenaceae)	Ass.- Gu Phool	Shrub	NV	Leaves	Mosquito	Smoke from dry leaves repels mosquito.	15	0.22	1	0.06	100
54	*Lasia spinosa* (L.) Thwaites (Araceae) /HST-0037	Ass.-Sengmora	Herb	NV	Leaves Rhizome	Piles Pig diseases*	A piece of rhizome cooked with eel fish and small amount of fruit powder of P. nigrum eaten in Piles. Rhizome ground and mixed with mealand given orally to pigs in common flu.	43	0.67	2	0.05	88.37
55	*Lawsonia inermis* L.(Lythraceae) /HST-0058	Ass.-Jetuka	Shrub	HG	Leaves	Onchomycosis, Menorrhagia	Leaf paste applied as a poultice form externally on infected nail. Raw juice mixed with cow milk and prescribed orally in the early morning.	46	0.69	2	0.04	95.65
56	*Leucas aspera* (Willd.) Link. (Lamiaceae) /HST-0020	Ass.-Durun	Herb	FL	Leaves	Sinusitis Piles, Tonsillitis	One drop fresh juice applied as nasal drops in sinusitis. Leaves eaten as vegetables in piles. 3-4 Fresh leaves mixed with 5 Piper nigrum seeds and prescribed orally in tonsillitis.	24	0.34	3	0.13	58.33
57	*Litseasalic ifolia* (J. Roxb. ex Nees) Hook. f. (Lauraceae)	Ass.-Dighlati	Shrub	NV	Leaves	Anti-mites	Fresh leaves juice sprayed on skin to removal of mites found in cattle's.	39	0.58	1	0.03	100
58	*Magnolia hodgsonii* (Hook. f. & Thomson) H. Keng. (Magnoliaceae) /HST-0129	Ass.- Borhomthuri	Tree	NV	Shoots	Traditional Lipstick, Pyorrhea	Young shoots/leaves are chewed to produce color on lips and to treat pyorrhea.	35	0.52	2	0.06	85.71
59	*Mangifera indica* L. (Anacardiaceae) /HST-0038	Ass.-Aam Mis.-Keidi-asing	Tree	NV	Leaves	Menstrual disorder	Raw juice of leaves taken orally in the early morning to treat menstrual disorder.	3	0.04	1	0.33	100
60	*Marantaarund inacea* L. (Marantaceae) /HST-0042	Ass.-Toraalu	Herb	HG	Rhizome	Worm infection*	Rhizome warmed over fire and eaten in empty stomach on round worm infection.	17	0.25	1	0.09	100
61	*Melastomamala bathricum* L. (Melastomataceae) /HST-0043	Ass.-Futkola	Shrub	NV	Leaves	Piles, Cough, Pneumonia *	Raw or infusion mixed with fruit powder of black pepper is taken orally in piles, cough and pneumonia.	19	0.28	3	0.16	84.71
62	*Melia azedarach* L. (Meliaceae)	Ass.- Ghura neem	Tree	NV	Leaves	Pesticide Anti-mosquito	Leaves juice sprayed in agriculture field to control pest. Smoke from dry leaves repels mosquito.	45	0.82	2	0.04	51.11
63	*Meynala xiflora* Robyns. (Rubiaceae)	Ass.- Kutkura	Shrub	NV	Leaves, Fruit	Dandruff *	Paste prepared from leaves applied on hair for removal of dandruff.	27	0.4	1	0.04	100
64	*Mikania micrantha* Kunth (Compositae) /HST-0044	Ass.-Premlota	Climber	NV	Leaves	Diarrhea	3-4 teaspoonful of raw juice given orally in Diarrhea.	12	0.2	1	0.08	100
65	Mimosa pudicaL. (Fabaceae) /HST-0128	Ass.-Nilaji bon	Herb	NV	Root	Hysteria*	Fresh root juice prescribed orally after dinner to treat hysteria.	5	0.07	1	0.2	100
66	*Mimusopselengi* L. (Sapotaceae) /HST-0046	Ass.-Bokul	Tree	HG	Bark	Dental pain*	Decoction prepared from bark is prescribed for gargling, two times a day for three days in Dental pain.	3	0.04	1	0.33	100
67	*Morinda angustifolia* Roxb. (Rubiaceae) /HST-0047	Ass.-Achu	Tree	NV	Leaves	Epistaxis	3 drops raw juice prepared from leaves prescribed as nasal drops in epistaxis.	4	0.06	1	0.25	100
68	*Moringa oleifera* Lam. (Moringaceae) /HST-0060	Ass.-Chajina	Tree	HG	Bark	Rheumatoid arthritis	Soup prepared from stem bark of M. oeifera and fruit powder of *P. nigrum* with squab meat is prescribed in arthritic pain.	3	0.04	1	0.33	100
69	*Musa balbisiana* Colla (Musaceae)	Ass.- Vimkol	Herb	HG	Peel Leaves	Cut & Wounds, Worm infection	Ash prepared from peel prescribed locally in Cut & Wounds. Warm rice taken on leaves	55	0.82	2	0.04	70.90

							and it helps to kill round worms.					
70	*Mussaenda roxburghii* Hook. f. (Rubiaceae) /HST-0048	Ass.-Hunarupa Deo.-Peseka	Shrub	NV	Leaves	Post natal care	Cooked or boiled leaves prescribed orally to mothers post delivery to stop internal bleeding.	7	0.1	1	0.14	100
71	*Neonauclea purpurea* (Roxb.) Merr. (Rubiaceae)	Ass.- Kodom/Raghu	Tree	NV	Leaves	Winter dysentery in cattle's	Fresh leaves or juice given orally to cattle's in dysentery.	27	0.4	1	0.04	100
72	*Oldenlandia corymbosa* L. (Rubiaceae) /HST-0050	Ass.-Bonjaluk	Herb	FL	Aerial Part	Increase breast milk*	Aerial parts fried with mustard oil and prescribed to increase breast milk for 3 to 7 days.	3	0.04	1	0.33	100
73	*Oroxylum indicum* (L.) Benth. ex Kurz (Bignoniaceae)	Ass.- Bhatghila Mis.- Domiratpong	Tree	NV	Flower, Seed Bark	Worm infection, Otorrhea*, Pneumonia	Flower eaten as vegetables for relive worm infection. Ash prepared from seeds mixed with coconut oil and given as ear drop in otorrhea. Fresh bark juice given orally in pneumonia.	27	0.42	3	0.11	55.55
74	*Phlogacanthus pubinervius T. anderson* (Acanthaceae) /HST-0012	Ass.-RongaBahok	Shrub	HG	Leaves	Fever, Malaria, Pneumonia, Otorrhea*	Decoction of leaves with fruit powder of P. nigrum given orally in fever, malaria and pneumonia. Fresh juice from leaves mixed with coconut oil and 3-4 drops applied as ear drops in otorrhea.	16	0.24	4	0.25	81.25
75	*Phrynium pubinerve* Blume (Marantaceae)	Ass.-Koupat Deo.- Ssahgibi-sah Mis.- Kamreekam	Herb	NV	Leaves	Worm infection*	Rice boiled by wrapping in leaves. The aroma of leaves mixed in rice prescribed 2-3 days which helps repel out round worm.	12	0.18	1	0.08	100
76	*Piper betle* L. (Piperaceae)	Ass.- Pan	Climber	HG	Leaves	Diarrhea	Juice prepared from 3 mature leaves and mixed with garlic prescribed orally in diarrhea problem.	7	0.1	1	0.14	100
77	*Plumbago zeylanica* L. (Plumbaginaceae) /HST-0051	Ass.-Agiachita	Herb	HG	Root	Edema, Liver dysfunction	A piece of root worn around the arm in Edema or root bark is cooked with Channa punctatus fish and juice is orally prescribed in Edema. Root bark crushed and mixed with one 1 chicken egg to make an omelet and prescribed orally once a day for 3 days in liver disorder.	9	0.13	2	0.22	88.89
78	*Pogostemon benghalensis* (Burm. f.) Kuntze (Lamiaceae) /HST-0056	Ass.- Hukloti	Shrub	HG	Leaves	Edema, Hypertension	Leaves twigs used as vegetables once a day for 7-10 days in Edema and hypertension.	21	0.31	2	0.09	76.19
79	*Psidium guajava* L. (Myrtaceae) /HST-0008	Ass.- Madhuri Cach.-Shu-khren Deo.-Moduram	Shrub	HG	Leaves	Diarrhea, Cough	Raw juice prepared from young leaves given orally in Diarrhea, whereas juice mixed with fruit powder of P. nigrum is prescribed in Cough.	46	0.68	2	0.04	54.34
80	*Punica granatum* L. (Lythraceae) /HST-0055	Ass.-Dalim Nep.-Anar	Shrub	HG	Leaves, Peel, Root	Worm infection	Raw Juice prepared from leaves or peel or stem and root bark given orally in empty stomach to repel out pork tapeworm infection.	18	0.27	1	0.06	100
81	*Portulaca grandiflora* Hook (Portulacaceae) /HST-0052	Ass.- MalvugKhutora	Herb	HG	Aerial part	Fire burn Jaundice	Leaves are made into paste and applied as poultice locally in Fire burn. Cooked/boiled aerial parts given orally in jaundice.	29	0.43	2	0.07	68.96
82	*Rhynchostylis retusa* (L.) Blume (Orchidaceae) /HST-0053	Ass.- Kopouful	Herb	NV	Flower	Anti-Lice*	Fresh flower wearing on hair knot of women to remove head lice.	31	0.46	1	0.03	100
83	*Rubus alceifolius* Poir. (Rosaceae) /HST-0057	Ass.-Jetulipoka	Climber	NV	Leaves Bark	Piles , Female puberty disorder*	Fresh leave juice given orally in piles. Decoction of stem bark is prescribed orally in female puberty disorder.	8	0.12	2	0.25	87.5

84	*Sarcochlamys pulcherrima* Gaudich. (Urticaceae) /HST-0070	Ass.-Mesangi Mis.-Ombe Deo.- Mikasi	Shrub	NV	Leaves	Diarrhea, Worm infection	Cooked/boiled leaves eaten as vegetables.	14	0.21	2	0.14	71.42
85	*Sapindus mukorossi* Gaertn. (Sapindaceae)	Ass.- Haitha/Monisal	Tree	HG	Peel	Tonsillitis*	Decoction prepared from fruit peel gargling 5-6 times per day to relive tonsillitis.	10	0.15	1	0.1	100
86	*Scoparia dulcis* L. (Scophulariaceae) /HST-0071	Ass.-Senibon	Herb	NV	Leaves	Diabetes	50-100ml of raw juice prepared from leaves given orally once a day for one week in Diabetes.	20	0.3	1	0.05	100
87	*Senna alata* (L.) Roxb. (Fabaceae) /HST-0059	Ass.-Khorgos	Shrub	NV	Leaves	Ringworm	Leaves are crushed and paste is externally rubbed on ring worm affected area.	48	0.72	1	0.02	100
88	*Sida cordifolia* L. (Malvaceae) /HST-0098	Ass.-Borhunborial	Herb	NV	Root	Fever	A piece of root is worn as a garland on neck in night.	2	0.03	1	0.5	
89	*Smilax ovalifolia* Roxb. Ex. D. Don (Smilacaceae) /HST-0063	Ass.-Tikoniborua	Climber	NV	Shoot	Hair fall	Cooked/boiled young shoots prescribed as vegetables to treat hair fall and repel out tapeworm.	18	0.28	2	0.11	72.22
90	*Solanum anguivi* Lam. (Solanaceae) /HST-0064	Ass.-Titabhekuri Mis.-Sita-bangko	Shrub	NV	Fruit	Asthma	Fruit eaten as vegetables and salads.	25	0.37	1	0.04	100
91	*Solanum americanum* Mill. (Solanaceae)	Ass.- Loskosi	Herb	NV	Root	Rabies	Fresh root juice prescribed orally in dog bite.	7	0.12	1	0.14	100
92	*Solena heterophylla* Lour. (Cucurbitaceae) /HST-0065	Ass.- Belipoka/Ghukus moi	Climber	NV	Rhizome,	Sinusitis*	Fresh raw juice from rhizome locally applied on sinus with the help of cotton bud in nasal cavity in Sinusitis problem.	3	0.1	1	0.33	100
93	*Spondia smombin* L. (Anacardiaceae) /HST-0045	Ass.- Amara	Tree	HG	Fruit	Diarrhea	A little amount of fruit preserved in salt is given orally in Diarrhea.	22	0.33	1	0.05	100
94	*Tamarindus indica* L. (Fabaceae) /HST-0041	Ass.- Teteli	Tree	HG	Fruit	Hypertension	Infusion prepared from ripens fruits prescribed orally in the morning in Hypertension problem.	16	0.24	1	0.06	100
95	*Terminalia arjuna* (Roxb. ex DC.) Wight &Arn. (Combretaceae) /HST-0066	Ass.- Arjun	Tree	HG	Bark	Heart attack	Infusion prepared from stem bark prescribed as tea in the empty stomach (morning) in Heart disease.	24	0.36	1	0.04	100
96	*Thelypterisopulenta* (Kaulf.) Fosb.in Fosb. & Sachet (Thelypteridaceae) /HST-0002	Ass.- Bihlongoni	Herb	NV	Leaves	Rheumatoid arthritis*	Mature leaves and bitten topically on the affected area of patients.	15	0.22	1	0.07	100
97	*Thunbergia grandiflora* Roxb. (Acanthaceae) /HST-0067	Ass.- Kaurithutialota	Climber	NV	Stem	Rabies*	Infusion prepared from stem mixed with fresh cow milk is given orally (2-3 teaspoonful) in empty stomach on Dog bite.	8	0.12	1	0.12	100
98	Uncariarhynchophylla Miq. (Rubiaceae)	Ass.- Borokhi lota	Climber	NV	Rhizome	Bone fracture*	Boiled rhizome topically applied as a poultice.	4	0.06	1	0.25	100
99	*Vachellia farnesiana* (L). Wight & Arn. (Fabaceae)	Ass.-Toruakodom	Shrub	HG	Bark	Menstrual pain*	2 spoonful of infusion prepared from bark given orally in the morning.	4	0.06	1	0.25	100
100	*Vitex negundo* L. (Lamiaceae) /HST-0019	Ass.-Posotiya	Tree	HG	Leaves	Malaria, Psoriosis, Anti-parasite	Decoction of leaves with fruit powder of *P. nigrum* prescribed as a tea for Malarial fever. Fresh juice or decoction prepared from leaves mixed in water and prescribed for bathing in Psoriosis. Leaves kept in poultry nest during the time of incubation period to protect from mites.	52	0.78	3	0.06	61.53
101	*Zingiber montanum* (J. Koenig) A. Dietr. (Zingiberaceae) /HST-0075	Ass.-Borahu	Herb	HG	Rhizome	Paralysis	2 teaspoonful juice prepared from rhizome is given orally in paralysis Oil prepared from rhizome prescribed to massage topically at the site of paralysis.	2	0.03	1	0.5	100
102	*Zanthoxylum nitidum* DC. (Rutaceae) /HST-0073	Ass.-Tejmui	Climber	NV	Stem Leaves, Root	Pyorrhea Pneumonia Piles	Stem is used as a tooth brush in pyorrhea. Decoction of leaves with fruit powder of *P. nigrum*	47	0.7	3	0.06	46.8

						and small amount of salt prescribed orally in Pneumonia. Juice prepared from root bark given orally in Piles.

N.B. – Ass. - Assamese, Deo. - Deori, Mis. - Mishing, Cach. - Cachari, Nep. – Nepali; NV- Natural vegetation, HG- Home garden, *- New ethnobotanical report.

Quantitative Ethnobotanical Data Analysis:

The Relative Frequency of Citation (RFC) and use Value (UV): The RFC and UV indicate the relative importance of medicinal plant species based on the number of informants who reported a species and the number of uses reported for each species respectively. In the present investigation, the RFC ranged from 0.01 to 0.85. The highest RFC value found for *Dillenia indica* L (0.85) while lowest value was found for *Centipeda minima* (L.) A. Braun & Asch (0.01). Besides *Dillenia indica* L on the basis of RFC, the most important plant species in the study area were *Ageratum conyzoides* (L.) L., *Musa balbisiana* Colla., *Melia azedarach* L. (0.82 each), *Curcuma caesia* Roxb (0.79), *Cryptolepisdubia* (Burm.f.) M. R. Almeida (0.73), *Senna alata* (L.) Roxb (0.72) and *Zanthoxylum nitidum* DC(0.7). The reason behind the maximum RFC values of these medicinal plants is that most people use herbal remedies in the study area.

The use-value results of the study area varied from 0.02 to 0.67. The lowest use value found *Senna alata* (L.) (L.) Roxb, *Dillenia indica* L., *Acorus calamus* L. and *Ageratum conyzoides* L. (0.02 each), while the highest value reported for *Centipeda minima* (L.) *A. braun* & Asch (0.67). Other important species having the highest use-value were *Hygrophila ringens* (L.) R. Br. Ex Spreng, *Solena heterophylla* Lour., *Oldenlandia corymbosa* L., *Moringa oleifera* Lam., *Mimus opselengi* L, *Mangifera indica* L, *Houttuynia cordata* Thunb, *Grewia serrulata* DC, and *Entada phaseoloides* (L.) Merr. The use-value significantly indicates the usage tendency of plant species in the study area.

Fidelity Level (FL): In the present study, the plants' fidelity levels (FL) were calculated based on the use reports that had been cited highest informants for use with a given ailment. In the present study, the FL ranged from 46.8 to 100. Out of 102 plant species, 67 plant species were found highest FL (100). The lowest FL was reported for *Zanthoxylum nitidum* DC (46.8). Plant species having highest FL value indicate the good healing potential against a specific disease. So, FL is an important parameter that helps to carry out further study related to clinical practices.

Informant Consensus Factor (ICF): The informant consensus factor indicates the consensus between medicinal plant species and informants regarding the treatment of diseases. In the study, the treatments of the different diseases using medicinal plants were classified into 23 ailment categories **Table 3**. In our present investigation, the IFC value of different ailment categories was found in the range from 0.67 to 1. The highest IFC 1 is found in diabetes, eye disease, nail disease and toxicity complaint category. Neurological seizure and smooth muscle relaxants are the only disease category having the lowest ICF value (0.67). The highest ICFs represent the common occurrence of reported diseases in the study area and particular plant species treated. Otherwise, the main fact for the lowest ICF may be due to the unavailability of information on study participants.

TABLE 3: INFORMANT CONSENSUS FACTOR (ICF) VALUES FOR THE CATEGORIZED AILMENTS MENTIONED BY THE INFORMANTS

Ailment category	Common disease	Number of use reports (N_{ur})	Number of taxa (Nt)	% of plant species	ICF Value
Bone problem	Bone fracture	51	2	1.96	0.98
Cardiovascular diseases	Hypertension, Heart attack	89	5	4.9	0.95
Contagious viral disease	Rabies, Whitlow	31	6	5.88	0.83
Dental problem	Dental pain, Pyorrhea	30	4	3.92	0.89
Dermatological problem	Cut and wound, Burn, Eczema, Ringworm, Lipstick, Psoriasis	261	12	11.76	0.95
Diabetes	Diabetes	20	1	0.98	1

Ear disease	Otorrhea	5	2	1.96	0.75
Eye disease	Eye acne	27	1	0.98	1
Fever and Respiratory disorder	Fever, Malaria, Common cold, Asthma, Cough, Dyspnea, Pneumonia	226	22	21.57	0.90
Gastrointestinal disorder	Dyspepsia, Piles, Gastric ulcer, Oral thrush, Dysentery, Diarrhea, Sore throat, Appendicitis	335	23	22.54	0.93
Gynecological and sexual disorder	Menstrual disorder, Menorrhagia, Postnatal care, Puberty loss, Increase breast milk, Leucorrhea, Hysteria	39	11	10.78	0.73
Hair problem	Dandruff, Hair fall	121	4	3.92	0.97
Inflammation and pain	Rheumatoid arthritis, Headache, Heel pain, Tonsillitis	107	11	10.78	0.9
Liver problem	Jaundice, Liver dysfunction	21	3	2.94	0.9
Nail disease	Onchomyosis,	44	1	0.98	1
Nasal disease	Epistaxis, Sinusitis	24	4	3.92	0.86
Neurological seizure and smooth muscle relaxant	Epilepsy, Paralysis	4	2	1.96	0.67
Parasitic infection	Worm infection, Leech infection, Lice infection	135	11	10.78	0.92
Toxicity complaints	Snake bite	2	1	0.98	1
Urinary disorder	Edema, Kidney, Urine obstrucle	74	5	4.9	0.94
Anti-mosquito	Mosquito repellant	49	3	2.94	0.96
Livestock diseases	Diphtheria, Increase breast milk, Winter dysentery in cattle, Parasitic infection (ectoparasite), Pig disease, Poultry disease	183	7	6.86	0.96
Bio pesticides	Control pest in agriculture	27	2	1.96	0.96

New Ethnobotanical Report Finding: Out of the 102 plant species, 33 plants had new ethnobotanical reports found during the study. Information about the new ethnobotanical importance of the plants was given by the highest number of traditional healers from the Ahom community (16), followed by Deori (7), Mishing (5), Konch (4) and Kachari (1). The plant species *Rubus alceifolius* Poiris reported for the first time in the treatment of two diseases i.e. female puberty loss and piles **(Table 4).**

TABLE 4: NEW ETHNOBOTANICAL REPORT BY THE TRIBAL COMMUNITIES IN NILAKH- SRIPANI AREA OF DHEMAJI DISTRICT, ASSAM

S. no.	Plant species	Disease treated	Reported by community
1	*Vachellia farnesiana* (L). Wight &Arn.	Menstrual pain	Konch
2	*Thelypteris opulenta* (Kaulf.) Fosb.in Fosb. & Sachet	Rheumatoid arthritis	Ahom
3	*Alocasia odora* (Roxb. ex Lodd., G. Lodd. & W. Lodd.) Spach	Worm infection	Mishing
4	*Ananas comosus* (L.) Merr.	Rabies	Konch
5	*Calamus tenuis* Roxb.	Malaria	Deori
6	*Cascabela thevetia* (L.) Lippold	Snake bite	Deori
7	*Chrysophyllum roxburghii* G. Don	Tonsilitis	Deori
8	*Croton caudatus* Geiseler	Dyspnea	Deori
9	*Cryptolepisdubia* (Burm.f.) M.R.Almeida	Epilepsy	Ahom
10	*Cuscuta reflexa* Roxb.	Poultry disease	Kachari
11	*Dendrocnide sinuate* (Blume) Chew	Eczema	Ahom
12	*Drymaria cordata* (L) Willd. ex Schult	Oral thrush	Ahom
13	*Eclipta prostrata* (L.) L	Epistaxis	Ahom
14	*Eleusine indica* (L.) Gaertn	Headache	Deori
15	*Entada phaseoloides* (L.) Merr.	Appendicitis	Ahom
16	*Grewia serrulata* DC.	Leucorrhea	Ahom
17	*Lasia spinosa* (L.) Thwaites	Pig disease	Mishing
18	*Maranta arundinacea* L	Worm infection	Mishing
19	*Melastoma malabathricum* L.	Pneumonia	Deori

20	*Meynalax iflora* Robyns.	Dandruff	Ahom
21	*Mimosa pudica* L.	Hysteria	Ahom
22	*Mimus opselengi* L	Dental pain	Konch
23	*Oldenlandia corymbosa* L.	Increase breast milk	Ahom
24	*Meyna laxiflora* Robyns.	Otorrhea	Ahom
25	*Phlogacanthus pubinervius* T. Anderson	Otorrhea	Ahom
26	*Phrynium pubinerve* Blume	Worm infection	Mishing
27	*Rhynchostylis retusa* (L.) Blume	Anti-lice	Ahom
28	*Rubus alceifolius* Poir	Female puberty loss, Piles	Konch
29	*Sapindusmu korossi* Gaertn.	Tonsilitis	Ahom
30	*Solena heterophylla* Lour	Sinusitis	Ahom
31	*Thunbergia grandiflora* (Roxb. ex Rottl.) Roxb.	Rabies	Deori
32	*Uncariarhyn chophylla* Miq.	Bone fracture	Mishing
33	*Hygrophila ringen s*(L.) R. Br. Ex Spreng	Pneumonia	Ahom

DISCUSSION:

Local Knowledge of Medicinal Plants found in Previous Literature: The plant *Cryptolepis dubia* (Burm.f.) M.R. Almeida is the most widely used plant species recorded in the bone fracture problem in the study area. The plant species also used by different tribal peoples of East Siang district of Arunachal Pradesh [26-27].

In the cardiovascular disease category, the plant species *Clerodendrum glandulosum* Lindl is popularly used to treat hypertension [28]. *Garcinia morella* (Gaertn.) Desr. and *Tamarindus indica* L. both show potential hypotensive activity in rat and human models *(in-vivo*) respectively [29-30]. An experimental study has revealed the bark of *Terminalia arjuna* (Roxb. ex DC.) Wight & Arn. exerting significant inotropic and hypotensive effects increases coronary artery flow and protects myocardium against ischemic damage. It has also been detected to have mild diuretic, antithrombotic, prostaglandin E2 enhancing and hypolipidaemic activity [31, 32].

In the contagious viral disease category, *in vitro* anti-rabies activities of the *Datura metel* L were screened by rapid fluorescent focus inhibition test and molecular method. As the result, *Datura* fruit and seed (Soxhlet and cold) extracts showed 50% inhibition of rabies virus challenge virus standard (RV CVS) at 2.5 mg/ml and 1.25 mg/ml (inhibitory concentration 50% [IC50]), respectively [33]. Traditional healers of the Deori community alone reported 3 plant species out of 5 as anti-rabies potential. Dog bite is one of the most severe infectious diseases in the study area due to ignorance about urgency of dogbite wound management, vaccine administration and misconceptions associated with it. Whitlow is another less known viral infectious disease in the study area. *Euphorbia antiquorum* L is the only plant species used in the treatment of whitlow, which is also reported in the tribal peoples of Thrissur, Kerala [34].

Pyorrhea is a common dental problem recorded in the study area. The peoples of the study area use locally available plant species in the pyorrhea problem. According to the previous ethnobotanical literature, there are three plant species viz., *Averrhoa carmabola* L., *Magnolia hodgsonii* (Hook. f. & Thomson) H. Keng. And *Zanthoxyllum nitidum* DC used in the treatment of pyorrhea by Tai Ahom, Dimasa, Kachari, Bodo and Deori community of state respectively [35-38].

In dermatological problems, there are a total of 12 plant species used in the different skin problems. Five plant species *Ageratum conizoides* L., *Curcuma caesia* Roxb, *Eclipta prostate* L, *Musa balbisiana* Colla and *Clematis zeylanica* (L.) Poir were reported as antiseptic potential commonly used in cuts & wounds [39-45]. *Senna alata* (L.) Roxb. in ringworm infection, *Cinnamomum tamala* (Buch.-Ham.) T. Nees & Eberm. in eczema and *Vitex negundo* L in psoriasis were widely used which is also recorded in our study area [46-47].

Scoparia dulcis L is the only plant species used in diabetes. Recent studies revealed that the extracts of *Scoparia dulcis* L can reduce blood glucose fasting level, increase the plasma insulin level and stimulate insulin secretion [48-49]. In the eye disease category, *Commelina benghalensis* L is used in eye acne treatment. According to a previous report, it is

useful in various eye diseases like night blindness, cataract and acne problems [50].

In fever and respiratory diseases category, malarial fever and pneumonia are one of the most serious diseases in the border region of the study area. Malaria is an endemic and a major public health problem in India's north-eastern region (NER). Assam is highly receptive to malaria transmission and accounts for more than 50% of reported malaria cases in NER. Here malaria transmission is perennial and persistent, with a seasonal peak during April-September corresponding to months of rainfall [51].

The people of the study area use smoke of *Lantana camara* L., *Kaempferia angustifolia* Roscoe and *Melia azedarach L.* to control mosquitoes. Recent experimental studies proved that the essential oil and bioactive compound from the above plant species showed potent larvicidal and mosquito repellant properties [52-54]. A total number of 6 plant species are used in Malaria. Among them, 3 plant species namely, *Alstonia scholaris* (L.) R. Br., *Guilandina bonduc* L., and *Phlogacanthus pubinervius* T. Anderson were used in both malaria and pneumonia [55].

The pharmacological studies by different researchers revealed that *in-vivo* anti-malarial activity of bark of *Alstonia scholaris* (L.) R. Br.N [56], *in-vitro* and anti-plasmodial properties of *Guilandina bonduc* L.[57] and the larvicidal of *Vitex negundo* L. [58]. *Clerodendrum infortunatum* L., traditionally used by *Tani* tribes of Arunachal Pradesh in malaria [59]. In Ayurveda, root decoction of *Sida cordifolia* L used in the intermittent fever [60]. Decoction of rhizome of *Acorus calamus* L is used for the intermittent fever which is also reported by Ahom community peoples of the study area [61]. They treated infants infected by the common cold and asthma with *Solanum anguivi* Lam, *Melastoma malabathricum* L. and *Centipeda minima* L [62-64].

Among the 21 ailment categories, the highest numbers of medicinal plants (23 species) are recorded in gastrointestinal disorders. There is a total of 8 plant species used in the treatment of piles. According to the previous ethnobotanical survey reported that *Clerodendrum infortunatum* L, *Eclipta prostata* L,. *Lasia spinosa* (L.) Thwaites and *Leucas aspera (Willd.) are used different communities* of Kamrup district, Assam for curing piles [65] while two species *Houttuynia cordata* Thunb also found as the remedy of piles in China [66] and *Melastoma malabathricum* L leaves having potential wound healing and anti-hemorrhoids activity [67]. *Hydrocotylesi bthorpioides* L, *Mikania micrantha* Kunth, *Piper bettle* L, *Psidium guajava* L. and *Spondia smombin* L. in diarrhea and *Garcinia morella* (Gaertn.) Desr., in dysentery problems, is traditionally used among the tribes of Assam [68-70].

The Mishing people use the leaves of *Sarcochlamys pulcherrima* Gaudich also called 'Ombe' to prepare an ethnic dish with pork, which is very popular in their society with anti-diarrheal property [7]. Previous reports on plant species i.e. *Capsicum chienense* J acq and *Clematis zeylanica* (L.) Poir in dyspepsia and anti-ulcer potential is similar to our present report [71-73]. *Acmella paniculata* (Wall. ex DC.) R.K. Jansen is widely used as a vegetable to relieve sore throat in the study area [74].

In gynecological and sexual disorders, similar ethnobotanical data were found on *Hibiscus rosa sinensis* L and *Mangifera indica* L. in menstrual cycle disorder, *Lawsonia inermis* L. in menorrhagia, *Mussaenda roxburghii* Hook. f. in postnatal care and *Euphorbia antiquorum* L. and *Cynodonda dactylon L.* in Leucorrhea which are well known in Ayurveda [75-76]. People in the study area also used herbal remedies to the treatment of the dandruff problem. Out of 3 plant species, mucilage of *Dillenia indica* L. is widely used to wash hair in dandruff problem and whereas polyherbal oil prepared with a combination of *Hibiscus rosa-sinensis* L. has shown potent anti-dandruff activity [77-78].

Inflammation and pain, *Alstonia scholaris* (L.) R. Br., *Datura metel* L. and *Moringa oleifera* Lam and *Curcuma caesia* Roxb were used in rheumatoid arthritis. The earlier Ethnobotanical study suggests that these plant species are traditionally used in the treatment of rheumatic pain among different communities [79-80]. The leaves of *Calotropis gigantea* (L.) Dryand and used in heel pain. Local application of *Calotropis gigantea* flowers are

efficacious as well as safe in patients with painful heel syndrome locally applied in heel pain [81].

Tonsilitis is a common inflammatory disease in the study area. There are four plant species reported in tonsillitis. Out of them, two species have been reported earlier i.e. ripe fruit of *Capsicum frutescens* L. and leaves of *Leucas aspera* (Willd.) link used in the treatment of tonsillitis [82-83]. In the liver disease category, *Plumbago zeylanica* L. was used for the treatment of dysfunction in the liver. Root crude powder of *Plumbago zeylanica* L. showed the hepato-protective effect [84-85]. Injaundice, *Centella asiatica* (L.) Urb is a common medicinal plant used by the Mising community in jaundice, which is also used in the indigenous communities of the Sub-Himalayan region of Uttarakhand [86].

Lawsonia innermis L. is a common plant species used traditionally for coloring nails. This plant also helps to prevent onychomycosis. A previous study reported that leaves of *Lawsonia innermis* L. showed potent against Non-dermatophyte molds which are related to onychomycosis [87].

In nasal diseases, raw leave juice of *Morinda angustifolia* Roxbis applied as a nasal drop in epistaxis, which is also reported in a previous ethnobotanical study in Myanmar [88]. Another plant species-*Leucas aspera* (Willd.) Link is used in sinusitis which is well known in the Siddha system of medicine. In the Neurological seizure and muscle relaxant disease category, healers from the Deori community prescribed the rhizome of *Zingiber montanum* (J. Koenig) A. Dietr. in paralysis which has smooth muscle relaxant activity [89].

In the parasitic infection category, 8 plant species out of 11 reported as anthelmintic property. Among them*Citrus maxima* (Burm.) Merr, *Musa balbisiana* Colla, *Oroxylum indicum* (L.) Benth. ex Kurz, *Punica granatum* L. and *Sarcochlamys pulcherrima* Gaudich. have potent anthelmintic property. *Curcumis sativus* L. is the only plant used in the management of leech, which is also used by Karbi tribes of Assam [90-95]. In urinary problems, urinary obstruction is most prevalent, followed by a kidney stone and a few cases are related to edema. In urinary obstruction, juice prepared from the rhizome of *Hellenia speciosa* (J. Koenig) S.R. Dutta is prescribed [96]. For the treatment of kidney stone problems, two plant species *Kalanchoe pinnata* (Lam.) Pers. (leaf extract) and *Amarnthus spinosus* L. (root extract) are used by the tribes, which shows a similar record found in previous studies [97-99]. Another two species *Plumbago zeylanica* L and *Pogostemon benghalensis* (Burm. f.) Kuntze was reported in the treatment of edema [100-101]. Besides the use of plant parts in different ailment categories, the tribes of the study area also used other natural resources. Fresh cow milk is commonly used in two urinary diseases (kidney stone and urinary obstruction), two gynecological disorders (leucorrhea and menorrhagia), one gastrointestinal disease (gastric ulcer) and one formulation prescribed in dog bite. In all polyherbal formulation, raw or fresh juice from respective medicinal plants was mixed with fresh milk and prescribed orally on an empty stomach in the morning. The sugar candy is also used to formulate kidney stones, urinary obstruction and leucorrhea.

As an important ingredient, they also added fish species in the formulations like *Channa punctatus* in edema and *Anguilla bengalensis* in piles. A traditional healer from the Konch community reported that the flesh (squab meat) of *Columbia livia domestica* (pigeon) is an important ingredient used for rheumatoid arthritis formulation. The traditional healers from the Ahom and Konch communities of the study area treat rheumatoid arthritis with the help of mantra therapy in combination with medicinal plants.

The healer takes the mature leaves of *Thelypteris opulenta (Kaulf.)* and hits topically on the affected area of the patient chanting sacred mantras. The healers who treated patients with the help of mantras are referred to as ‘Bej’. They practice these healing powers of Mantra as a successor from their forefather. Plant parts of two species *viz., Acorus calamus* L, and *Sida cordifolia* L. prescribed for wearing as a garland in common cold and fever respectively. One rare plant species was reported as a traditional lipstick plant in the study area. In ancient times, *Magnolia hodgsonii* (Hook. f. & Thomson) H. Keng (‘Borhomthuri’ in Assamese) was widely used as a natural lipstick among Assamese women.

The young shoots of Magnolia when chewed with betelnut or even alone, lips and tongue turn a blackish-red color. It was imagined to be a symbol of love in Assamese culture. The village youths caringly gifted the Borhomthuri to daub at the lips of their beloved and thus expressed their heart's love. The Bihu dancing girl used to daub a layer of Borhomthuri on their lips. But, due to modern civilization and habitat loss, the use of Borhomthuri is almost nil nowadays in the Assamese society.

Medicinal Plants used in the Management of Agriculture and Livestock diseases: All people in the study area organically engaged in paddy cultivation. They practice their indigenous methodologies to control pests and insects without using chemical pesticides. During the study, there are two plant species *viz.*, *Melia azedarach* L. and *Croton tiglium* L. reported as bio-pesticides which were also previously reported [102-103]. Besides using plant parts as a bio-pesticide, fermented cow dung solution and introducing insectivorous birds in paddy fields are also widely used. Livestock farming in the study area includes cattle, pigs, goats and poultry farming. Due to poor veterinary practices poultry farming in the study area is highly affected by the common flu.

The Mising community of the study area is highly engaged in pig farming than other communities. There are 8 plant species viz., *Cannabis sativa* L. in dyspepsia in cattle, *Capsicum frutescens* L. in Diphtheria, *Cuscutareflexa* Roxbin poultry disease, *Euphorbia hirta* L. in increased milk of cattle, *Lasia spinosa* (L.) Thwaites used in common flu of pigs, *Litsea salicifolia* (J. Roxb. ex Nees) Hook. f. in removing of ectoparasites of cattle, *Neonauclea purpurea* (Roxb.) Merr. in winter dysentery of cattle and *Vitex negundo* L. in removing mites of poultries were recorded in the study area. Previous ethnobotanical studies suggest that *Cannabis sativa* L, *Capsicum frutescens* L., *Euphoribiahirta* L., *Litsea salicifolia* (J. Roxb. ex Nees) Hook. f., *Neunauclea purpurea* (Roxb.) Merr., and *Vitex negundo*L were found similar reports [104-111]. *Cuscuta reflexa* Roxbis only and first reported in the study area for treating livestock diseases.

CONCLUSION: The present investigation reveals that the Nilakh- Sripani of the study area has sound knowledge of traditional medicine for different human ailments, livestock and healthcare management. Most of the information is based on oral tradition passing from generation to generation without written literature. Due to the socio-cultural diversity of the tribes, traditionally important plant species were collected and authenticated.

This documentation will help the new generation find the scripted literature on the ethnomedicinal plants and their traditional knowledge that could ignite the conservation strategies of the endangered species. Thus, the present study on the ethnomedicinal plants could be an important source for further phytochemical studies which may lead to the discovery of new active pharmaceutical compounds or drugs from natural resources.

Authors' Contributions: PB conducted the ethnobotanical survey and analyzed the field data under the supervision of MS. Both the authors participated in writing and giving feedback on the manuscript.

ACKNOWLEDGMENT: The authors would like to thank Rajen Borah, Nityanada Deori, Jiba Konwar, Bhuban Chandra Dutta, Koneswar Gogoi, Bhadra Konwar and Sunil Doley for sharing their ethnomedicinal knowledge and bestowing immense help in communicating with the informants of the study area. This research did not receive any specific grant from the public, commercial or not for-profit funding agencies.

CONFLICTS OF INTEREST: The authors declare no conflict of interest.

REFERENCES:

1. Pradeep T: Traditional ethnomedicinal knowledge of Indian tribes. Current Science 2016; 110(4): 486-487.
2. Mao AA, Hynniewta TM and Sanjappa M: Plant wealth of Northeast India with reference to ethnobotany. Indian Journal of Traditional Knowledge 2009; 8(1): 96-103.
3. Singh RK, Sureja AK and Singh D: Indigenous agro-biodiversity conservation in Eastern Himalayan ecosystem of Arunachal Pradesh: Learning from tribal's women wisdom. International workshop on Incentives for support on-farm Conservation, and augmentation of agro-biodiversity through Farmers' Innovations and Community Participation, held at Indian Institute of Management, Ahmadabad and Gujarat 2006; 27-29.
4. Mahwasane ST, Middleton L and Boaduo N: An ethnobotanical survey of indigenous knowledge on medicinal plants used by the traditional healers of the Lwamondoarea, Limpopo province, South Africa. South African Journal of Botany 2013; 88: 69–75.

5. Rahmatullah M, Azam MNK, Rahman MM, Seraj S, Mahal MJ, Mou SM and Chowdhury MH: A survey of medicinal plants used by Garoandnon-Garo traditional medicinal practitioners in two villages of Tangail district, Bangladesh. American-Eurasian Journal of Sustainable Agriculture 2011; 5: 350–357.
6. Sargin SA and Büyükcengiz M: Plants used in Ethnomedicinal practices in Gulnar district of Mersin, Turkey. Journal of Herbal Medicine 2019; 15: 1002-24.
7. Sharma UK and Pegu S: Ethnobotany of religious and supernatural beliefs of the Mising tribes of Assam with special reference to the 'DoburUie'. Journal of Ethnobiology and Ethnomedicine 2011; 7(1): 1-13.
8. Pangging G, Sharma CL and Sharma M: Ethnobotanical study on plants used in magico- religious practices of deori tribe in Assam, India. Plant Archives 2019; 19(1): 387-399.
9. Tarak D, Namsa ND, Tangjang S, Arya SC, Rajbonshi B, Samal PK and Mandal M: An inventory of the ethnobotanicals used as anti-diabetic by a rural community of Dhemaji district of Assam, Northeast India. Journal of Ethnopharmacology 2011; 138(2): 345-50.
10. Lagachu J and Kalita JC: A study on Ethnomedicinal uses of plants in Dhemaji district of Assam with special reference to reproductive health. International Research Journal of Pharmacy 2013; 4(3): 261-263.
11. Wangpan T, Chetry LB, Tsering J, Taka T and Tangjang S: Anti-Malarial Plants of Jonai, India: an Ethnobotanical Approach. Notulae Scientia Biologicae 2016; 8: 27-32.
12. Gogoi M, Barooah MS and Dutta M: Use of medicinal plants in traditional health care practices by tribes of Dhemaji district, Assam, India. International Journal of Herbal Medicine 2019; 7(5): 01-06.
13. Pegu R, Tamuli AK and Teron R: Diversity of medicinal plants in Poba Reserved Forest, Dhemaji district, Assam, India. Pleione 2014; 8(2): 462 - 474.
14. Ayam VS, Doley P and Singh CB: Ethnomedicinal plants used by the Mising tribe of Dhemaji District of Assam, India. International Research Journal of Biological Sciences 2017; 6(8): 37-43.
15. Sharma UK and Hazarika D: Study of Ethno-Medicinal plants used by the Mishing People of Dhemaji District of Assam, India. J of Natural & Ayurvedic Medicine 2018; 2
16. Sharma UK and Sapcota D: Studies on some ethnoveterinary practices in Dhemaji district of Assam. Journal of Natural Medicine 2003; 3(1): 73-77.
17. WFO (2020): World Flora Online - An online flora of all known plants, available at http://www.worldflroaonline.org/ Retrieved 20 June 2020.
18. POWO (2020): "Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. Available at; http://www.plantsoftheworldonline.org/Retrieved 15 July 2020.
19. Tropicos (2020): An online botanical database containing taxonomic information on plants. Maintained by Missouri Botanical Garden, Available at; http://www.tropicos.org.
20. Vitalini S, Iriti M, Puricelli C, Ciuchi D, Segale A and Fico G: Traditional knowledge on medicinal and food plants used in Val San Giacomo (Sondrio, Italy)—an alpine ethnobotanical study. Journal of Ethnopharmacology 2013; 145: 517–529.
21. Yaseen G, Ahmad M, Sultana S, Alharrasi AS, Hussain J and Zafar M: Ethnobotany of medicinal plants in the Thar Desert (Sindh) of Pakistan. Journal of Ethnopharmacology 2015; 163, 43–59.
22. Tardío J and Pardo-de-Santayana M: Cultural importance indices: a comparative analysis based on the useful wild plants of Southern Cantabria (Northern Spain). Economic Botany 2008; 62(1): 24–39.
23. Khan MPZ, Ahmed M, Zafar M, Sultana S, Ali MI, Sun H: Ethnomedicinal uses of edible wild fruits (EWFs) in swat valley, Northern Pakistan. Journal of Ethnopharmacology 2015; 173: 191-203.
24. Polat R, Cakilcioglu U and Satil F: Traditional uses of medicinal plants in Solhan (Bingöl-Turkey). Journal of Ethnopharmacology 2013; 148 (3): 951–963.
25. Trotter RT and Logan MH: Informant consensus: a new approach for identifying potentially effective medicinal plants. Plants in Indigenous Medicine and Diet 1986; 91-112.
26. Tayung K and Saikia N: Cryptolepisbuchanani- A less-known medicinal plant used in bone fracture. Indian Journal of Traditional Knowledge 2003; 2(4): 371-374.
27. Dutta T: Traditional bone setting practice of Rabha people of Assam. Asian J Pharm Clin Res 2019; 12(1): 81-83.
28. Panmei R, Gajurel PR and Singh B: Ethnobotany of medicinal plants used by the Zeliangrong ethnic group of Manipur, northeast India. Journal of ethnopharmacology 2019; 235:164-182.
29. Schobert R and Biersack B: Chemical and Biological Aspects of Garcinol and Isogarcinol: Recent Developments. Chemistry and Biodiversity 2019; 16(9): e1900366.
30. Ebifa-Othieno E, Kabasa JD, Nyeko P, Nakimbugwe D and Mugisha A: Nutritional potential of tamarind (*Tamarindus indica* L.) from semi-arid and subhumid zones of Uganda. Journal of Food Measurement and Characterization 2020; 14(2): 1125-1134.
31. Dwivedi S, Chopra D and Bhandari B: Role of Terminalia arjuna Wight and Arn. in the treatment of chronic coronary artery disease from pharmacovigilance point of view. Ayu 2019; 40(2), 104.
32. ThakurS, Kaurav H and Chaudhary G: Terminalia arjuna: A Potential Ayurvedic Cardio Tonic. International Journal for Research in Applied Sciences and Biotechnology 2021; 8(2): 227-236.
33. Roy S, Mukherjee S, Pawar S and Chowdhary A: Evaluation of *In-vitro* Anti-viral Activity of Datura metel Linn. Against Rabies Virus. Pharmacognosy Research 2018; 10(1): 109–112.
34. Sudhadevi PK: Ethnobotany of medicinal plants used by tribes of kerala, Ph.D Thesis (Kerala Agricultural University, Vallanikkra, Thrissur, Kerala, India) 1992.
35. Borgohain P, Saikia LR and Mahanta J: Herbal medicine as an alternative for the treatment of onychomycosis. International Journal of Botany Studies 2022; 7(2): 29-34.
36. Nath SC: Plant folk-medicines & medicinal plants of North-East India. CSIR-North East Institute of Science & Technology, Jorhat. 2011.
37. Hazarika P, Hazarika P and Dutta D: Traditional knowledge for using plant resources as tooth brushing stick (datun) by the indigenous communities of Assam, India. International J of Herbal Med 2018; 6(6): 22-34.
38. Bhuyan B and Baishya K: Ethno-medicinal value of various plants used in the preparation of traditional rice beer by different tribes of Assam, India. Drug Invention Today 2013; 5:335-341.
39. Baidya S, Thakur B and Devi A: Ethnomedicinal plants of the sacred groves and their uses by Karbi tribe in KarbiAnglong district of Assam, Northeast India.Indian Journal of Traditional Knowledge 2020; 19 (2): 277-287.
40. Tamrakar V and Arora C: Curcuma caesia: Present status and future prospect as herbal drug. Progressive Agriculture 2019; 19(2): 258-261.

41. Hua OH, Tran QTT, Trinh DTT, Nguyen VD, Duong DPN and Nguyen TT: A Review of Traditional Uses, Phytochemistry and Pharmacological Properties of Some Vietnamese Wound-Healing Medicinal Plants. Natural Product Communications 2022; 17(4): 1934578X221088379.
42. Kalita H, Hazarika A, Kandimalla R, Kalita S and Devi R: Developments of banana (*Musa balbisiana*) pseudo stem fiber as a surgical bio-tool to avert postoperative wound infections. Royal Society of Chemistry Advances 2018; 8(64): 36791-36801.
43. Ashoka SM, Sridevi G and Shastry S: Evaluation of wound healing activity of Naraveliazeylanicaleaves. International Journal of Chemical Sciences 2009; 7(3): 1857-1866.
44. Pooranachithra M, Bhaskar JP, Murali D, Das SS, JebaMercy G, Krishnan V and Balamurugan K: Unravelling the wound healing ability and mode of action of pyridine carboxamide oxime using Caenorhabditis elegans as potential prescreen wound model. Life sciences 2019; 235: 116859.
45. Aksoy H, Şekerler T and Mert NM: *In-silico* investigation of wound healing potential of some compounds in tubers of Asphodelus species with GSK3-β protein. J Res Pharm 2021; 25(5): 747-754.
46. Legaspi CLB and Maramba-Lazarte CC: The Phytochemical Content and the *In-vitro* Antifungal Properties of *Senna alata* (Linn.) Roxb.: A Review. Acta Medica Philippina 2020; 54(1): 86-93.
47. Arshad W, Khan HMS, Akhtar N and Nawaz M: Assessment of changes in biophysical parameters by dermocosmeticemulgel loaded with *Cinnamomum tamala* extract: A split-faced and placebo-controlled study. Journal of Cosmetic Dermatology 2020; 19(7): 1667-1675.
48. Murugan G, Rajkumar DS, Kaliyaperumal M, Ramdoss R, Natarajan S and Padmanaban R: Elucidating the inhibitory mechanism of yeast α-glucosidase by phytocompounds from Scoparia dulcis through *in-vitro* and *in-silico* approach. Journal of Biomolecular Structure and Dynamics 2022; 1-13.
49. Jiang Z, Sung J, Wang X, Zhang Y, Wang Y, Zhou H and Wen L: A review on the phytochemistry and pharmacology of the herb *Scoparia dulcis* L. for the potential treatment of metabolic syndrome. RSC Advances 2021; 11(50): 31235-31259.
50. Ghosh P, Duta A, Biswas M, Biswas S, Hazra L, Nag SK, Sil S and Chatterjee S: Phytomorphological, chemical and pharmacological discussions about *Commelina benghalensis* Linn. (Commelinaceae): A review. Pharma Innovation 2019; 8(6): 12-18.
51. Handique BK, Khan SA, Dutta P, Nath MJ, Qadir A and PLN Raju: Spatial correlations of malaria incidence hotspots with Environmental factors in Assam, North East India; ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume III-8, 2016 XXIII ISPRS Congress, 12–19 July 2016, Prague, Czech Republic.
52. Sharma M, Alexander A, Saraf S, Saraf S, Vishwakarma UK and Nakhate KT: Mosquito repellent and larvicidal perspectives of weeds Lantana camara L. and *Ocimumg ratissimum* L. found in central India. Biocatalysis and Agricultural Biotechnology 2021; 34: 102040.
53. Panyakaew J, Sookkhee S, Rotarayanont S, Kittiwachana S, Wangkarn S and Mungkornasawakul P: Chemical variation and potential of Kaempferia oils as larvicide against *Aedes aegypti*. Journal of Essential Oil Bearing Plants 2017; 20(4): 1044-56.
54. Naimi I, Zefzoufi M, Bouamama H andM'hamed TB: Chemical composition and repellent effects of powders and essential oils of *Artemisia absinthium*, Melia azedarach, Trigonella foenum-graecum, and Peganum harmala on *Tribolium castaneum* (Herbst)(Coleoptera: Tenebrionidae). Industrial Crops and Products 2022; 182: 114817.
55. Lahange SM, Porte SM and Bhangare AN: Traditional medicine used for malaria in India. International Journal of Medical and Health Research 2016; 2(1): 39-46.
56. Pandey K, Shevkar C, Bairwa K and Kate AS: Pharmaceutical perspective on bioactives from Alstoniascholaris: ethnomedicinal knowledge, phytochemistry, clinical status, patent space, and future directions. Phytochemistry Reviews 2020; 19(1): 191-233.
57. Nondo RS, Erasto P, Moshi MJ, Zacharia A, Masimba PJ and Kidukuli AW: *In-vivo* anti-malarial activity of extracts of Tanzanian medicinal plants used for the treatment of malaria. Journal of Advance Pharmaceutical Technology and Research 2016; 7(2): 59–63.
58. Kumar SV, Kumar RA, Mani P, Bastin TMMJ and Ravikumar G: Mosquito Larvicidal, Oviposition deterrent and repellent properties of Vitex negundo L extracts against Aedes aegypti, Anopheles stephensi and Culex quinquefasciatus. Journal of Pharmaceutical Research 2011; 4(7): 2060-2063.
59. Kohli YP: Ethnomedicines in the service of tani tribes, In: Mibang T, Chaudhuri SK, editors. Ethnomedicines of the tribes of Arunachal Pradesh. Itanagar: Himalayan publishers 2013; 13–7.
60. Singh DK, Singh PK, Pandey RK and Agnihotri RK: Ethno botanical approaches, pharmacological and phytochemical benefits of genus Sida used in traditional medicines. Journal of Medical Pharmaceutical and Allied Sciences 2021; 10 (4): 3304-3309.
61. Dobriyal RM, Singh GS, Rao KS and Saxena KG: Medicinal plant resources in Chhakinal watershed in the Northwestern Himalaya. Journal of Herbs Spices and Medicinal Plants 1997; 5: 15–27.
62. Savithramma N, Sulochana C and Rao KN: Ethnobotanical survey of plants used to treat asthma in Andhra Pradesh, India. Journal of Ethnopharmacology 2007; 113(1): 54–61.
63. Anshari M, Martiana T, Putra ST and Dyson L: Ethnomedicine of Dayak Paramasan Ethnic in the Meratus Mountains (part-1): The Medicinal Plants for Diarrhea and Respiratory Disorder. Journal of Applied Environmental and Biological Sciences 2015; 5(5): 139-147.
64. Tan J, Qiao Z, Meng M, Zhang F, Kwan HY, Zhong K, Yang C, Wang Y, Zhang M, Liu Z and Su T: Centipeda minima: An update on its phytochemistry, pharmacology and safety. Journal of Ethnopharmacology 2022; 115027.
65. Das N: Traditional Medicinal Practices by tribal People for the Treatment of Piles. International Journal of Ayuvedic and Herbal Medicine 2017; 7(4): 2851-2855.
66. Lu HM, Liang YZ, Yi LZ and Wu XJ: Anti-inflammatory effect of Houttuynia cordata injection. Journal of Ethnopharmacology 2006; 104:245–9.
67. Maigoda TC: The effectiveness of guava (*Psidium guajava*) and senduduk leaves (*Melastoma malabathricum* L.) Extract gel towards the inflammation markers and collagens on induced male rats (spraguedawley) with diabetes. Malaysian Applied Biology 2022; 51(1): 157-162.
68. Bora D, Mehmud S, Das KK and Medhi H: Report on medicinal plant practices for dysentery, diarrhea, and cholera in different parts of Assam, India. Journal of Medicinal Plants 2016; 4(6): 208-212.

69. Swargiary A, Roy MK and Verma AK: *In-vitro* study of the antioxidant, antiproliferative, and anthelmintic properties of some medicinal plants of Kokrajhar district, India. Journal of Parasitic Diseases 2021; 45(4): 1123-1134.
70. Manek MS: Uji Aktivitas Antidiare Ekstrak Etanol DaunSirih (Piper betle L.) Pada Tikus Putih Jantan Galur Wistar Yang Diinduksi Oleum Ricini. CHMK Pharmaceutical Scientific Journal 2020; 3(2): 147-151.
71. Rudrapal M and Sarwa KK: Capsicum: Chemistry and Medicinal Properties of Indigenous Indian Varieties. In Capsicum. Intech Open 2020; 92241
72. Gogoi M, SM DB and Dutta M: Use of medicinal plants in traditional health care practices by tribes of Dhemaji district, Assam, India. International Journal of Herbal Medicine 2019; 7(5): 01-06.
73. Bhattacharyya R, Medhi KK, Borthakur SK and Borkataki S: An ethnobotanical study of medicinal plants used against jaundice by tea tribes of Morigaon District, Assam (India). Journal of Natural Remedies 2020; 20(1): 16-28.
74. Rani AS, Sana H, Sulakshana G, Puri ES and Keerti M: Spilanthesacmella-an important medicinal plant. Int J Minor Fruits, Med Aromat Plants 2019; 5: 15-26.
75. Balamurugan S, Vijaykumar S, Prabhu S and Yabesh MJE: Traditional plants used for the treatment of gynaecological disorders in *Vedaranyam taluk*, South India- an Ethnomedicinal Survey. Journal of Traditional and Complementary Medicine 2018; 8: 308-323.
76. Krupa J, Sureshkumar J, Silambarasan R, Priyadarshini K and Ayyanar M: Integration of traditional herbal medicines among the indigenous communities in Thiruvarur District of Tamil Nadu, India. Journal of Ayurveda and Integrative Medicine 2019; 10(1): 32-37.
77. Saikia A, Ryakala V, Sharma P, Goswami P and Bora U: Ethnobotany of medicinal plants used by Assamese people for various skin ailments and cosmetics. Journal of Ethnopharmacology 2006; 106(2): 149-157.
78. Hati D, Bhatnagar SP and Sethi KK: Development and evaluation of polyherbal antidandruff hair oil. Pharmacognosy Journal 2010; 2(10): 328-334
79. Choudhury M, Kumar V, Malhotra H and Singh S: Medicinal plants with potential antiarthritic activity. Journal of Intercultural Ethnopharmacology 2015; 4(2): 147-179.
80. Singh H, Gopal K and Baske PK: Plants used in in the treatment of joint diseases (rheumatism, arthritis, gout and lumbago) in Mayurbhanj district of Odisha, India. Report and Opinion 2010; 2: 22-26.
81. Aung T and Phyo TT: Indigenous knowledge of traditional medicine and local development in Myanmar: the case of Calotropis gigantea R. Br. In ayeyarwady region. On socio-economic and environmental issues in development 2018; 328-334.
82. Muthuswamy R and Nison M: Review on Capsicum frutescens, A Tribal herbal food used as medicine. Research Journal of Pharmacognosy and Phytochemistry 2021; 13(4): 191-194.
83. Mollik M, Hossan M, Paul A, Taufiq-Ur-Rahman M, Jahan R and Rahmatullah M: A Comparative Analysis of Medicinal Plants Used by Folk Medicinal Healers in Three Districts of Bangladesh and Inquiry as to Mode of Selection of Medicinal Plants. Ethnobotany Research and Application 2010; 8: 195-218.
84. Tayubi IA, Desai A, Madar IH and Hussain AS: Hepatoprotective activity of *Plumbago zeylanica* Linn against carbon tetrachloride induced hepatotoxicity in rats. International Journal of Innovation Science 2018; 5(2): 094-098.
85. Akhilraj AR, Bhat S, Priyalatha B and Vimala KS: Comparative hepatoprotective activity of detoxified roots of *Plumbago zeylanica* L. and Plumbago rosea L. in Wistar rats. Journal of Ayurveda and Integrative Medicine 2021; 12(3): 452-457.
86. Sharma J, Gairola S, Gaur RD and Painuli RM: The treatment of jaundice with medicinal plants in indigenous communities of the Sub-Himalayan region of Uttarakhand, India. Journal of Ethnopharmacology2012; 143(1): 262–291.
87. Borgohain P, Barua P, Das D, Mahanta J, Saikia B, Dutta P and Saikia LR: Antifungal Activity of Selected Medicinal Plants Used by Indigenous People of Assam in India to Treat Onychomycosis. Journal of Herbs, Spices & Medicinal Plants 2022; 28(2): 160-178.
88. DeFilipps RA and Krupnick GA: The medicinal plants of Myanmar. Phyto Keys 2018; 102: 1–341.
89. Pirompanich P, Ayudhya TDN, Koontongkaew S and Poachanukoon O: A Phase I Study of Oral Phlai (*Zingiber cassumunar* Roxb.) Capsule in Healthy Adult Volunteers. Science & Technology Asia 2022; 136-142.
90. Sawant TP and Panhekar D: A brief review on recent advances of *Citrus maxima* (chakota). International Journal of Recent Scientific Research 2017; 8(8): 19400-19416.
91. Sarma A, Das M and Dutta T: Traditional alkaline food additives 'Kola-khar'extracted from banana rhizome with reference to Musa balbisiana from Assam the state of India. International Journal of Bio-Pharma Research 2020; 9(6): 2671-2677.
92. Devanathan K: *Oroxylum indicum* (L.) Kurz Bignoniaceae. In Ethnobotany of the Mountain Regions of Southeast Asia (pp. 1-15). Cham: Springer International Publishing 2020.
93. Ahmed AH, Ejo M, Feyera T, Regassa D, Mummed B and Huluka SA: *In-vitro* anthelmintic activity of crude extracts of *Artemisia herba-alba* and *Punica granatum* against Haemonchus contortus. Journal of Parasitology Research 2020, 1-7.
94. Swargiary A, Daimari M and Roy MK: Survey and documentation of anthelmintic plants used in traditional medicine system of tribal communities of Udalguri district of Assam, India. J Appl Pharm Sci 2019; 10(1): 46-54.
95. Ingtipi W, Teronpi N and Teron R: Ethnomedicinal Knowledge for Management of Leeches in Assam. Defence Life Science Journal 2016; 1(1): 102-106.
96. Hadi HA and Hasan RH: Effect of plant extracts of *Salvia officinalis* L. and *Costus speciosus* L. in growth of some bacteria species isolated from urinary tract infections in Samarra city. Tikrit Journal of Pure Science 2020; 25(1): 47-51.
97. Pandhare RB, Shende RR, Avhad MS, Deshmukh VK, Mohite PB, Sangameswaran B and Daude RB: Anti-urolithiatic activity of Bryophyllumpinnatum Lam. hydroalcoholic extract in sodium oxalate-induced urolithiasis in rats. Journal of Traditional and Complementary Medicine 2021; 11(6): 545-551.
98. Dighade R, Ingole R, Ingle P, Gade A, Hajare S & Ingawale M: Nephroprotective effect of *Bryophyllum pinnatum*-mediated silver nanoparticles in ethylene glycol-induced urolithiasis in rat. IET nanobiotechnology 2021; 15(3): 266-276.
99. Sundaram SS, Suresh K and Sundaram SP: Traditional knowledge of medicinal plants used to treat kidney related diseases in selected areas of Madurai district, Tamil Nadu,

India. Journal of Medicinal Plants Studies 2019; 7(4): 250-253.
100. Kumar G and Gani B: Ethnomedical and Pharmacological Potentials of Plumbago zeylanica L-A Review. American J of Phytome and Clinical Therapeutics 2013; 1: 313-337.
101. Aryal S, Adhikari B, Panthi K, Aryal P, Mallik SK, Bhusal RP, Salehi B, Setzer WN, Sharifi-Rad J and Koirala N: Antipyretic, Antinociceptive, and Anti-Inflammatory Activities from Pogostemonbenghalensis Leaf Extract in Experimental Wister Rats. Medicines. 2019; 6: 96.
102. Gopi R, Avasthe RK, Kalita H, Kapoor C, Yadav A, Babu S and Das SK: Traditional pest and disease management practices in Sikkim Himalayan region. International Journal of Bio-resource and Stress Management 2016; 7(3): 471-476.
103. Ponce de Leon EL: Botanical pesticides for rice blackbug (*Scotinophara coarctata*) control. In2. National Review and Planning Workshop on Botanical Pesticides, Los Banos, Laguna (Philippines) 1990.
104. Abbasi AM, Khan SM, Ahmad M, Khan MA, Quave CL and Pieroni A: Botanical ethnoveterinary therapies in three districts of the Lesser Himalayas of Pakistan. Journal of Ethnobiology and Ethnomedicine 2013; 9(1): 1-21.
105. Kumar BK, Munshi AD, Joshi S and Kaur C: Note on evaluation of chilli (*Capsicum annuum* L.) genotypes for biochemical constituents. Capsicum and Eggplant Newsletter 2003; 22: 41-42.
106. Buno K, André K, Flora K, Jules D and Augustin A: Galactagogue Effect of *Euphorbia hirta* (Euphorbiaceae) Aqueous Leaf Extract on Milk Production in Female Wistar Rats. Journal of Biosciences and Medicines 2019; 7(9): 51-65.
107. Noosidum A, Prabaripai A, Chareonviriyaphap T and Chandrapatya A: Excito-repellency properties of essential oils from *Melaleuca leucadendron* L., *Litsea cubeba* (Lour.) Persoon and *Litseasa licifolia* (Nees) on *Aedes aegypti* (L.) mosquitoes. Journal of Vector Ecology 2008; 33(2): 305-313.
108. Kaura T, Mewara A, Zaman K, Sharma A, Agrawal SK, Thakur V and Sehgal R: Utilizing larvicidal and pupicidal efficacy of Eucalyptus and Neem oil against Aedes mosquito: An approach for mosquito control. Tropical parasitology 2019; 9(1): 12.
109. Nazeer AA, Rajan HV, Vijaykumar SD and Saravanan M: Evaluation of larvicidal and repellent activity of nanocrystal emulsion synthesized from F. glomerata and neem oil against mosquitoes. Journal of Cluster Science 2019; 30(6): 1649-1661.
110. Quattrocchi U: CRC world dictionary of medicinal and poisonous plants: common names, scientific names, eponyms, synonyms, and etymology. CRC press; First Edition 2012.
111. Ahuja S, Ahuja S and Ahuja U: Nirgundi (Vitex negundo) – Nature's Gift to Mankind. Asian Agri-History 2015; 19(1): 5-32.

How to cite this article:
Borah P and Saikia M: Ethnobotanical study of medicinal plants used by the different tribal communities in Nilakh- Sripani area of Dhemaji district, Assam. Int J Pharm Sci & Res 2022; 13(11): 4586-07. doi: 10.13040/IJPSR.0975-8232.13(11).4586-07.