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Traditional hepatoprotective herbal medicine of Koch tribe in the South-West Garo hills district, Meghalaya

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Field survey made in 24 villages of the South-West Garo Hills district, Meghalaya, inhabited mainly by the Koch community helped to gather ethnobotanical information concerning 25 medicinal plant species belonging to 24 Angiospermic and 1 Pteridophytic genus under 22 different families that are used as traditional hepatoprotective herbal medicine. Among the different plant parts prescribed for hepatoprotection, fruits are the most frequently used plant part (25%), followed by leaves (21.42%) and then followed by stems, rhizomes, roots and the whole plant which had equal applications (10.71%). Barks (7.14%) and cloves (3.57%) of the medicinal plants were relatively less frequently prescribed plant part for the purpose of hepatoprotection. Regarding the life form of the reported medicinal plants prescribed by the traditional healers, herbs (11 species) were most frequently used, followed by trees (7 species), climbers (3 species), shrubs (2 species) and epiphytes (2 species). All plant parts tested positive for alkaloids.

Keywords: Hepatoprotective, Herbal, Koch community, South-West Garo Hills, Traditional

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Traditional medicine (TM) is frequently being applied all over the world¹. Traditional medicine is the sum total of the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, whether explicable or not. It is used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness². Traditional systems of medicine (folk medicine) have emerged over the ages all over the world under different cultural conditions with oral and written pharmacopoeias³. Due to limited availability and affordability of pharmaceutical medicines, sizable proportions of world population still depend on traditional way of cure⁴. Indian scenario is even not different².

The north-eastern states of India are home to a large number of ethnic communities. These ethnic groups have their own unique culture, tradition, language as well as belief and since time immemorial they have involved themselves in traditional systems of healing to get rid of common as well as infectious diseases⁵⁻¹⁰.

In the state of Meghalaya, the Koch community has mainly inhabited in the Western and South Western parts of the South-West Garo Hills district. This community has inherently been following age old methods to get rid of various ailments, ranging from common cold to highly infectious diseases. The present investigation was carried out to gather information on medicinal plants available in the area that are being used traditionally as hepatoprotective measure by people belonging to the Koch community.

Methodology

Study Area

The present ethnobotanical study was carried out in the South-West Garo Hills district (Fig. 1) in the state of Meghalaya (Fig. 2) within the coordinates 25° 27' 28" N to 25° 27' 36" N latitude and 89° 55' 07" E to 89° 56' 37" E longitude. The study site is mainly occupied by culturally rich as well as vibrant Koch community. The people of the area have been following indigenous knowledge and beliefs to get rid of their ailments using forest based products that are locally available in the area.

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Fig. 1 — Map of South-West Garo Hills district



Fig. 2 — Map of Meghalaya

Data Collection

Field survey was conducted during the period from 2015 to 2018 in total 24 villages of the district inhabited mainly by Koch community. This study was focused on indigenous medicinal plants that are being used by the traditional healers. Respondents that were interviewed for traditional knowledge were either native by birth or had been living in the region for quite long time. The research team reported first to the village head before the start of data collection. The village head himself or somebody else recommended by the village head led the research team to the respective healers. Snow-ball method of sampling was followed to gather information from the respondents. Both male and female traditional medicine practitioners of any age group were interviewed.

A very simple questionnaire was designed for the respondents (traditional healers) in order to gather information that mainly focused on the local name of medicinal plants, knowledge about past and present use, mode of preparation, plant part used, methods of their formulation and administration, procurement method, place of collection of the medicinal plants and habitats, threats and conservation strategies, season of collection, etc. The data gathered was verified by repeated queries among local herbalists in order to authenticate the information¹¹. Respondents were visited two to three times in order to confirm the

reliability of the ethnobotanical information. Information provided by respondents that lack consistency were rejected and they were not included in the sample.

Medicinal plant samples were collected from the study site. Herbaria were prepared following Jain and Rao¹². Identification of medicinal plants was done with the help of literatures, monographs and herbarium like GUBH, ASSAM, etc.

Biochemical analysis

Plant samples were dried and made into powder in order to perform biochemical analysis. The powder was moistened with distilled water and then mixed with ammonia. Thereafter, ethanol was added to the mixture and nicely shaken. The extract was concentrated and mixed with dilute sulfuric acid (H_2SO_4). The mixture was separated into two layers with a separating funnel. The collected acidic solution was made alkaline by the addition of sodium carbonate (Na_2CO_3). The precipitate was extracted in ethanol. Later, presence of alkaloids in the plant parts was tested by Mayer's reagent, Dragendroff's reagent and Wagner's reagent¹³.

Results and discussion

The present ethnobotanical survey revealed widespread popularity of traditional systems of medicine (folk medicine) among people of Koch community of South-West Garo Hills district of Meghalaya. The present ethnobotanical information gathered from the study site of South-West Garo Hills district of Meghalaya is the first of its kind practiced by the traditional healers. All the recorded plant species are locally available in the forests of South-West Garo Hills district and several species are commonly cultivated in the household yards. These plants have entered into their traditional systems of medicine. The study provides ethnobotanical information about 25 medicinal plant species belonging to 24 Angiospermic and 1 Pteridophytic genus under 22 different families that are in use for hepatoprotection. All the plants/ plant parts tested positive for the presence of alkaloids. Information about ethnomedicinal uses, local name of the plants, plant parts used, formulation and preparation of recipes, dose regimen, duration and mode of administration and presence of alkaloids are shown in Table 1.

Plant parts used and mode of preparation

The traditional healers prescribe different plant parts for the preparation of medicine (Fig. 3).

Table 1 — List of plants showing scientific name and family, vernacular name, plant parts used, mode of administration and test for alkaloids (+ve means presence of alkaloids).

Sl.no	Scientific name & family	Vernacular name	Plant parts used	Mode of administration	Test for alkaloids
1	<i>Achyranthes aspera</i> L. (Amaranthaceae)	Kachipha pan	Stem	Stem is cut into 24 equal pieces of about 1 cm each and a garland is made with white thread and tied to the neck on Saturdays or Tuesdays.	+ve
2	<i>Allium sativum</i> L. (Amaryllidaceae)	Rosun	Clove	4-5 cloves are crushed and mixed with ½ cup of hot water and taken orally for three weeks.	+ve
3	<i>Alstonia scholaris</i> (L) R. Br. (Apocynaceae)	Satiyal pan	Bark	½ tea spoon bark juice is taken for 1 week twice daily. The patient is advised not to have sweet and sour things during treatment period.	+ve
4	<i>Amaranthus spinosus</i> L. (Amaranthaceae)	Kotakhuriya pan	Roots	Plant parts are crushed together and an extract is prepared. It is taken twice daily for three weeks.	+ve
	<i>Asparagus officinalis</i> L. (Asparagaceae)	Sotmul	Roots		
	<i>Bryophyllum pinnatum</i> (Lam) Oken. (Crassulaceae)	Khodaimosto	Leaves		
	<i>Cheilocostus speciosus</i> (J.Koenig) C.D.Specht. (Costaceae)	Kewa pan	Rhizome		
	<i>Cynodon dactylon</i> (L.) Pers. (Poaceae)	Dubla talay	Whole plant		
5	<i>Andrographis paniculata</i> (Burm.f) Ness. (Acanthaceae)	Haa neem	Leaves and roots	Leaves and roots are crushed together and a paste is prepared. Small balls are made out of it and dried. Three balls are taken twice daily until cure.	+ve
6	<i>Ananas comosus</i> (L.) Merr. (Bromeliaceae)	Anaros	Tender leaves	All these plant parts are crushed together with palm candy and the juice is filtered and taken orally until cure.	+ve
	<i>Cheilocostus speciosus</i> (J.Koenig) C.D.Specht. (Costaceae)	Kewa pan	Rhizome		
	<i>Drynaria quercifolia</i> (L.) J.Sm. (Polypodiaceae)	Gorpanka	Rhizome		
7	<i>Azadirachta indica</i> A. Juss. (Meliaceae)	Neem teeta	Leaves	25-30 drops of the juice is mixed with a spoon of honey and is taken in empty stomach in early morning for three weeks..	+ve
8	<i>Averrhoa carambola</i> L. (Oxalidaceae)	Kamrenga	Fruit	Fruit is crushed and the juice is taken orally until cure.	+ve
9	<i>Basella alba</i> L. (Basellaceae)	Ganjek	Whole plant	Whole plant is crushed along with one crab and used to prepare curry and taken with rice for 15 days.	+ve
10	<i>Boerhavia diffusa</i> L. (Nyctaginaceae)	Aruwa pan	Leaves	Leaves are fried with ghee and taken with rice for three weeks.	+ve
11	<i>Carica papaya</i> L. (Caricaceae)	Modhu thai	Fruit	Raw fruit is boiled and taken regularly for a week.	+ve

(Contd.)

Table 1 — List of plants showing scientific name and family, vernacular name, plant parts used, mode of administration and test for alkaloids (+ve means presence of alkaloids). (*Contd.*)

Sl.no	Scientific name & family	Vernacular name	Plant parts used	Mode of administration	Test for alkaloids
12	<i>Citrus limon</i> (L.) Burm.f. (Rutaceae)	Kakjik libu	Fruits	Juice of one fruit is mixed with one glass of water and taken orally until cure.	+ve
13	<i>Mangifera indica</i> L. (Anacardiaceae)	Bochot pan	Bark	Freshly dissolved limestone is applied below the knees. The bark is boiled in water, allowed to cool down and later used to wash off the lime applied on the feet.	+ve
14	<i>Momordica charantia</i> L. (Cucurbitaceae)	Gella	Fruit	To about 20 ml of fruit juice is added one cup of water and taken in the morning in empty stomach.	+ve
15	<i>Musa acuminata</i> Colla. (Musaceae)	Aanaji likthai	Raw fruit	Peel of raw banana is soaked overnight and the water is taken daily in empty stomach until cure.	+ve
16	<i>Oxalis corniculata</i> L. (Oxalidaceae)	Ambuluri	Whole plant	Whole plant is cooked with mustard oil and taken with rice.	+ve
17	<i>Phyllanthus emblica</i> L. (Phyllanthaceae)	Paramthai	Fruit	10 ml of fruit juice is mixed with 2-3 spoon of honey and taken orally for three weeks.	+ve
18	<i>Rhynchosytilis retusa</i> (L.) Blume. (Orchidaceae)	Kopoful	Stem	The creeping stem of the plant is pulled in one inhale taking the name of the person and then the stem is cut into odd number of pieces, generally 7 or 9 and a garland is prepared and tied to the neck of the person.	+ve
19	<i>Terminalia chebula</i> Retz. (Combretaceae)	Khochal	Fruit	5 fruits are crushed and mixed with little jaggery and taken orally for one month.	+ve
20	<i>Saccharum officinarum</i> L. (Poaceae)	Koisar	Stem	Stem juice is taken orally thrice daily until cure.	+ve

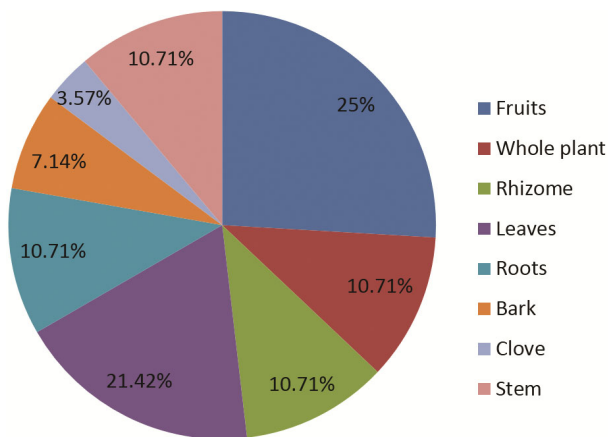


Fig. 3 — Percentage (%) of different plant parts used by traditional healers

Among the different plant parts prescribed for hepatoprotection, fruits are the most frequently used plant part (25%), followed by leaves (21.42%) and then followed by stems, rhizomes, roots and the whole plant which had equal application (10.71%). Barks (7.14%) and cloves (3.57%) of medicinal plants were relatively less frequently prescribed plant part for the purpose of hepatoprotection.

In most cases, single plant is used for medicine preparation. However, certain formulations require usage of multiple plant species together. One formulation had roots and leaves of the same plant, while another formulation is a combination of whole plant, stems, leaves rhizome and roots of five different plant species together. Of the different formulations prescribed by the traditional healers, one

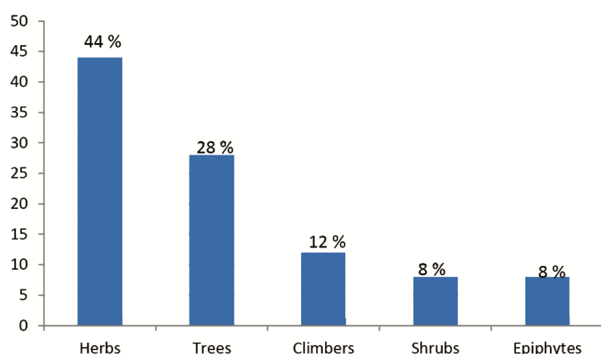


Fig. 4 — Percentage frequency distribution of medicinal plant species according to the life form

is to be freshly prepared. In one formulation, dry form of the medicinal plant is to be used. Whole plant or plant parts used in different formulations are prescribed in the form of paste, extracts, decoction or to be taken after cooking. According to one formulation, the stem of the medicinal plant is externally applied. One medicinal plant, i.e., *Cheilocostus speciosus* is prescribed for two separate formulations in combination with other plant species.

Life form of the medicinal plants

Regarding the life form of the reported medicinal plants prescribed by the traditional healers for hepatoprotection, the present study showed maximum use of herbs (11 species), followed by trees (7 species), climbers (3 species), shrubs (2 species) and epiphytes (2 species) (Fig. 4).

A sizable proportion of human population all over the globe still use some form of traditional herbal medicine¹⁴. Traditional systems of medicine that are based on age old theories and beliefs are getting increasing attention in global health debates. This is due to the fact that these traditional knowledge and ethnobotanical information have formed the basis of many scientific researches in the recent times and have led to detection of novel chemical compounds or new therapeutic agents¹⁵⁻¹⁹. Yet, very little is known about such important ethnobotanical information that are being preserved and passed on over the generations and traditionally practiced by the ethnic communities. Therefore, it is urgently warranted that these traditional ethnobotanical information being embraced by these ethnic communities be properly documented²⁰⁻²¹.

The acceptance of phytotherapy as a natural and safe alternative to synthetic drugs is very high within the general public²². However, these widespread and

culturally rooted traditional systems of medicine may indicate safety, but not efficacy of the treatments. Such traditional systems of medicine being mainly practiced by the ethnic communities are almost completely based on remedies containing active principles at very low and ultra low concentrations and often relying on magical-energetic properties of sun, moon, etc²³. Another discomfort associated with traditionally practiced system is the paucity of precise and complete information about the composition of the herbal medicine. Therefore, such traditional and age old systems require a thorough and systematic investigation for unrevealing the pharmacological qualities that will be totally safe from application point of view. That will only be possible by adoption of improved technologies like pharmacogenomic, metabolomic and microarray methodology which is currently not adequately followed. In other words, herbal-derived remedies cannot simply rely only on the tradition or supposed millenarian beliefs. The acquisition of reliable and accurate data both from health caregiver and patients be coupled with explanatory and pragmatic studies along with related safety issues.

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